



ECONOMIC PLANNING UNIT
DEPARTMENT OF THE PREMIER OF SARAWAK

WISMA BAPA MALAYSIA
PETRA JAYA,
93502 KUCHING,
SARAWAK.

FINAL REPORT

SRI AMAN MASTER PLAN

2020 - 2030

SRI AMAN DETAILED PROJECTS

C

Prepared by:

**UNIMAS
HOLDINGS**

Level 6, UNIMAS City Campus,
Lot 77, Section 22, KTLD
Jalan Tun Ahmad Zaidi Adruce
93150 Kuching, Sarawak, Malaysia

Tel: +60 82 22 2000
Fax: +60 82 22 2107
Email: helpdesk@unimasholdings.com

Collaborating
Partner:

DAYA RANCANG

Lot 8157, 3rd Floor
Jalan Simpang Tiga
93300 Kuching, Sarawak,
Malaysia

Tel: +60 82 254461
Fax: +60 82 246462
Email: drancang@yahoo.com

**FROST
&
SULLIVAN**

Suite C-11-02, Block C
Plaza Mont' Kiara
2 Jalan Kiara, Mont' Kiara
50480 Kuala Lumpur, Malaysia

Tel: +603.6204.5800
Fax: +603.6201.7402
Email: myfrost@frost.com

SRI AMAN MASTER PLAN

2020 - 2030 DETAILED
PROJECTS

Prepared for:



ECONOMIC PLANNING UNIT
DEPARTMENT OF THE PREMIER OF SARAWAK

Prepared by:



Collaborating
partners:

DR DAYA RANCANG



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Economic Planning Unit Sarawak
Level 6 & 7, Wisma Bapa Malaysia
Petra Jaya
93502 Kuching, Sarawak
Malaysia

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We would like to extend a special thanks to the YAB Premier of Sarawak for his time and guidance, and to the following esteemed members for their invaluable insights and direction:

STEERING COMMITTEE

- State Secretary of Sarawak as Chairperson
- State Attorney-General's (SAG);
- State Financial Secretary's Office (SFS);
- Deputy State Secretary (Economic Planning & Development);
- Permanent Secretary, Ministry of Modernisation of Agriculture and Regional Development
- Permanent Secretary, Ministry of Natural Resource and Urban Development
- Permanent Secretary, Ministry of Education, Innovation and Talent Development Sarawak
- Permanent Secretary, Ministry of Public Health, Housing and Local Government Sarawak
- Permanent Secretary, Ministry of Youth, Sports and Entrepreneur Development Sarawak
- Permanent Secretary, Ministry of Infrastructure and Port Development Sarawak
- Permanent Secretary, Ministry of Utilities and Telecommunication Sarawak
- Permanent Secretary, Ministry of Welfare, Community Wellbeing, Women, Family and Childhood Development
- Permanent Secretary, Ministry of Tourism, Creative Industry and Performing Arts Sarawak
- Permanent Secretary, Ministry of International Trade, Industry and Investment Sarawak
- Permanent Secretary, Ministry of Transport Sarawak
- Sri Aman Resident;
- Other relevant Agencies to be invited based on needs.
- Economic Planning Unit as the Secretariat.

TECHNICAL COMMITTEE

- Economic Planning Unit Director as Chairperson
- State Financial Secretary of Sarawak
- Permanent Secretary, Ministry of Modernisation of Agriculture and Regional Development
- Permanent Secretary, Ministry of Natural Resource and Urban Development
- Permanent Secretary, Ministry of Public Health, Housing and Local Government Sarawak
- Permanent Secretary, Ministry of Infrastructure and Port Development Sarawak
- Permanent Secretary, Ministry of Utilities and Telecommunication Sarawak
- Permanent Secretary, Ministry of Tourism, Arts and Culture
- Permanent Secretary, Ministry of International Trade, Industry and Investment Sarawak
- Permanent Secretary, Ministry of Transport Sarawak
- Sri Aman Resident
- Director, Public Works Department
- Director, Department of Land and Survey
- Director, Department of Agriculture
- Director, Forest Department
- Director, Department of Irrigation and Drainage
- Director, Department of Sewerage Services
- Director, Rural Water Supply Department
- Controller, Natural Resources and Environmental Board (NREB)
- Controller, Sarawak Rivers Board
- Secretary, Lubok Antu District Council
- Secretary, Sri Aman District Council
- General Manager, Sarawak Land Consolidation and Rehabilitation Authority (SALCRA)
- General Manager, Land Custody and Rehabilitation Authority (LCDA)
- Chief Executive Officer, Housing Development Corporation (HDC)
- General Manager, Sarawak Tourism Board (STB)
- General Manager, Sarawak Multimedia Authority (SMA)

- Chief Executive Officer, Sarawak Biodiversity Centre (SBC)
- Chief Executive Officer, Sarawak Energy Berhad (SEB)
- Economic Planning Unit as the Secretariat.

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FOCUS GROUP DISCUSSION

- Centre of Technical Excellence (CENTEX)
- I-Cats University College
- Sarawak Department of Labour
- Sarawak Museum Department
- Sarawak Craft Council
- IADA Batang Lupar
- Sarawak Disaster Management Committee
- Fire and Rescue Department Sarawak
- Sarawak RELA Office
- Sarawak Malaysian Civil Defence Force
- Sarawak Contingent Police Headquarters
- Giatmara
- Institut Latihan Perindustrian (ILP) Miri
- Institut Kemahiran Belia Negara Miri
- Sarawak Education Department
- Department of Marine Fisheries (Biosecurity Section)
- Inland Fisheries Branch, Department of Agriculture
- Batang Ai Ecofish Sdn. Bhd.
- Supreme Cold Storage Sdn. Bhd.
- Persatuan Nelayan Kawasan Sebuyau
- Persatuan Nelayan Kawasan Layar Rimbas / Pusak
- Jabatan Perikanan Laut Daerah Sebuyau
- Ibu Pejabat Jabatan Perikanan Laut
- Sarawak Digital Economy Corporation (SDEC)
- SACOFA Sdn. Bhd.

STUDY TEAM

This study team consists of 3 consulting companies led by UNIMAS Holding Sdn. Bhd. The team members include:

UNIMAS Holdings Sdn Bhd

- Datu Dr Hatta Solhi (Advisor)
- Prof. Datuk Dr Mohamad Kadim Suaidi (Advisor)
- Prof. Dato Dr Morshidi Sirat
- Prof. Dr Shahren Ahmad Zaidi Aduce
- Prof. Dr Puah Chin Hong
- Prof. Dr Liew Khim Sen
- Prof. Dr Tarmiji Masron
- Assoc. Prof Dr Abang Ekhsan bin Abang Othman
- Assoc. Prof Dr M. Affendy Arip
- Assoc. Prof Dr Kartinah Ayupp
- Assoc. Prof Dr Lee Nung Kion
- Dr Regina Garai Abdullah
- Dr Lam Chee Keung
- Harem Peri
- Bong Sze Ya (Secretariat)
- Mohd Hazman Othman (Secretariat)
- Nor Amaleena Mazlan (Research Officer)
- Khairul Afiq Othman (Research Officer)
- Noor Zaiem Fadli Mosa (Research Officer)
- Kuek Tai Hock (Research Officer)
- Muhammad Azri Abdul Aziz (Research Officer)
- Thien Fung Thai (Research Officer)
- Azizul Ahmad (Research Officer (GIS))
- Racquel Rowland (Research Officer)

Daya Rancang

- Khathijah Md Jaafar
- Michael Bain
- Dato Abd Kadir Hadi
- Dato Kamal Arifin
- Dr Md Nasrudin Md Salleh
- Wayne Tarman
- Ir. Abg Marani Abg Busut
- Vincent Ting
- Nordin Abdullah
- Gopinath Nagaraj
- Dr Marek Kozlowski
- Goh Bok Yen
- Kevin Mohan Ratnasingan
- Meor Shairilnizam (Asst. Planner)
- Syed Alif (Research Officer)

Frost & Sullivan

- Barry Lim
- Chia Yi Han
- Fathemah Dehdar
- Shivaji Das

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PART 1 INTRODUCTION

The Sri Aman Master Plan Study 2020-2030 (SAMP) was commissioned to guide the development planning of the Sri Aman Division. To this end, the SAMP was expected to make recommendations on strategic direction and determine focus areas to accelerate in order to achieve sustainable and balanced spatial and socio-economic development for the Sri Aman Division within ten years.

Volume C provides a detailed list of projects proposed for the Sri Aman Division. It explains project details such as the purpose of each and every project proposed, such as budgets, implementation schedules, business models, key agencies, and other essential details. More importantly, how these projects will impact their respective sector in the Sri Aman Division will be assessed and presented. Additionally, it will also help to inform how the various projects will need to be implemented.



Source: UNIMAS Holdings, Daya Rancang and Frost & Sullivan

SECTION 1.1 STUDY APPROACH: SURVEYS AND OTHER BASELINE DATA

Based on the expected output of the SAMP study, baseline data and findings gathered from field research and surveys were analysed to benchmark and develop key performance indicators (KPI). Right from the outset, it was necessary to define the economic drivers that will most likely help direct Sri Aman's economic, social, and environmental development and formulate strategies to accelerate human capital development and productivity in the region. Thus, it is critical to consider the strategic positioning required to formulate economic and spatial development plans that adhere to the time frame. Additionally, there must also be financial and feasibility studies for each project and programme to be implemented.

SECTION 1.2 DEVELOPMENT FRAMEWORK

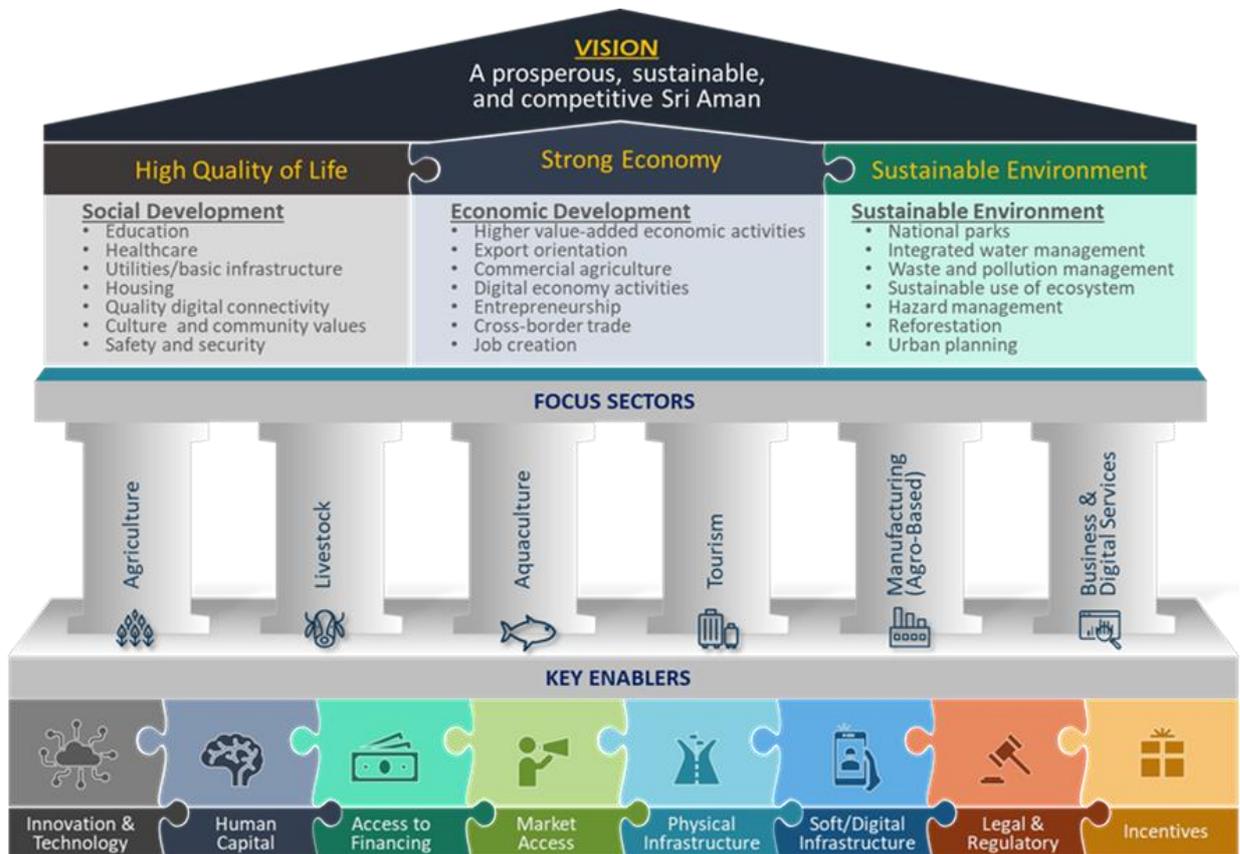
1.2.1 A Prosperous, Sustainable, and Competitive Sri Aman

The development framework of the SAMP study was designed for a systematic inter-sectoral analysis, which has enabled the setting of strategic direction and establishment of focus areas for the SAMP.

The exercise began with an overall vision: "A prosperous, sustainable, and competitive Sri Aman". Moving on from this vision, three development goals were established, focusing on the economy, quality of life and the environment. The continued development of a strong economy and the assurance of the population's well-being will need to acknowledge environmentally sensitive areas. Development in such areas could negate expected improvement in the socio-economic condition and the quality of life of the people.

1.2.2 Key enablers

Key enablers which needed to be enhanced and, in some cases, needed to be introduced were identified in order to move forward strategic initiatives based on economic, social, sustainable and environmental factors. All the above have implications for six economic sectors in the Sri Aman Division, with agriculture, aquaculture, and tourism as the sectors that need to be reinvigorated in particular. The potential of manufacturing, business and digital services were assessed to inject new additional economic development impetus in the division.



Source: UNIMAS Holdings, Daya Rancang and Frost & Sullivan

This development framework considered the fact that development plans for Sri Aman must proceed while acknowledging the current and emerging challenges over the immediate, medium- and long-term. Development outlook and policy shifts and thrusts at both the national and state levels were translated into possible strategic policy directions with strategic focus areas at the Sri Aman Division level.

Overall, the objective was to find a method to best achieve as many of the intended outcomes with the resources available while considering current and future development proposals of various ministries and state agencies, particularly the newly established Sri Aman Development Agency (SADA). Admittedly, these would necessitate the adoption and implementation of new business models/canvas.

SECTION 1.3 STRUCTURE OF THE REPORT: VOLUME A · B · C

The SAMP Study report is comprised of three volumes: Volume A - Background and Analysis, Volume B - Sri Aman Development Plan, and Volume C – Sri Aman Detailed Projects. The Executive Summary section provides an overview, highlighting important findings and recommendations from these three volumes primarily to address the expected output of this SAMP Study as indicated earlier. The following table indicates the connection between the expected output of the SAMP Study and the relevant volumes of the Final Report.

Expected Output of the SAMP Study	Relevant Volumes of the Final Report
(i) Overview of Baseline Data	Volume A
(ii) Strategic positioning and Socio-Economic Development Plan	Volume B
(iii) Strategies for human capital development	Volume B
(iv) A GIS-based concept plan to articulate the development of transportation and logistics system, infrastructure and utilities, land use zoning as well as conceptual master plans for towns and important settlements	Volume B Appendix (Maps)
(v) Maps showing the general land use, land titles and but not land ownership	Volume B Appendix (Maps)
(vi) Implementation plan of programmes and projects according to time frame	Volume B
(vii) Pre-feasibility studies and commercial viability of proposed projects and its sub-components for the purpose of funding by private sectors	Volume C
(viii) Sri Aman Detailed Projects	Volume C

Additionally, each volume of the Sri Aman Master Plan Study is not independent of each other and will require a reading of volumes A, B and C in their entirety to have a proper understanding of this report.

1.3.1 Introduction for Volume A

Volume A covers the ‘Background and Analysis’ of the report. This study has considered the various development plans in the region and used data collected from several agencies, including critical input from SADA. The baseline data is essential as it provides a comprehensive background and description of the past and current division of the Sri Aman Division and provides a clear understanding of Sri Aman within a regional context. The information also helps ease understanding the circumstances surrounding the various sectors and industries within and around Sri Aman. It also provides an understanding of the socio-economic trends affecting the region. These inputs facilitate the formulation of strategies for the development of the Masterplan.

1.3.2 Introduction for Volume B

Volume B provides an in-depth analysis and description of the “Sri Aman Development Plan.” It focuses on defining the various frameworks to be implemented throughout the development of this Masterplan from its conceptual inception to the eventual implementation of the projects to fulfil the goals set for the Sri Aman Division. It highlights different aspects of the developmental plan, including the economic framework, sustainable development framework, prioritizes key projects, financial analysis, and economic assessment. This volume guides how various strategies and frameworks conceptualised for this master plan help reinvigorate the Sri Aman Division and transform the living standard of people while ensuring sustainability.

1.3.3 Introduction for Volume C

Volume C provides a detailed list of projects proposed for the Sri Aman division. This volume of the Masterplan explains in greater detail the purpose of every project proposed and how they will impact their respective sector in the Sri Aman Division. It will also help inform how the various projects will need to be implemented within each sector and how they are prioritised within the Sri Aman Masterplan.

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PART 2 KEY PROJECTS

SECTION 2.1 AGRICULTURE

2.1.1 Batang Lupar Integrated Agriculture Development Area (IADA)

Action/ Project No: AG 1: Batang Lupar Integrated Agriculture Development Area (IADA)

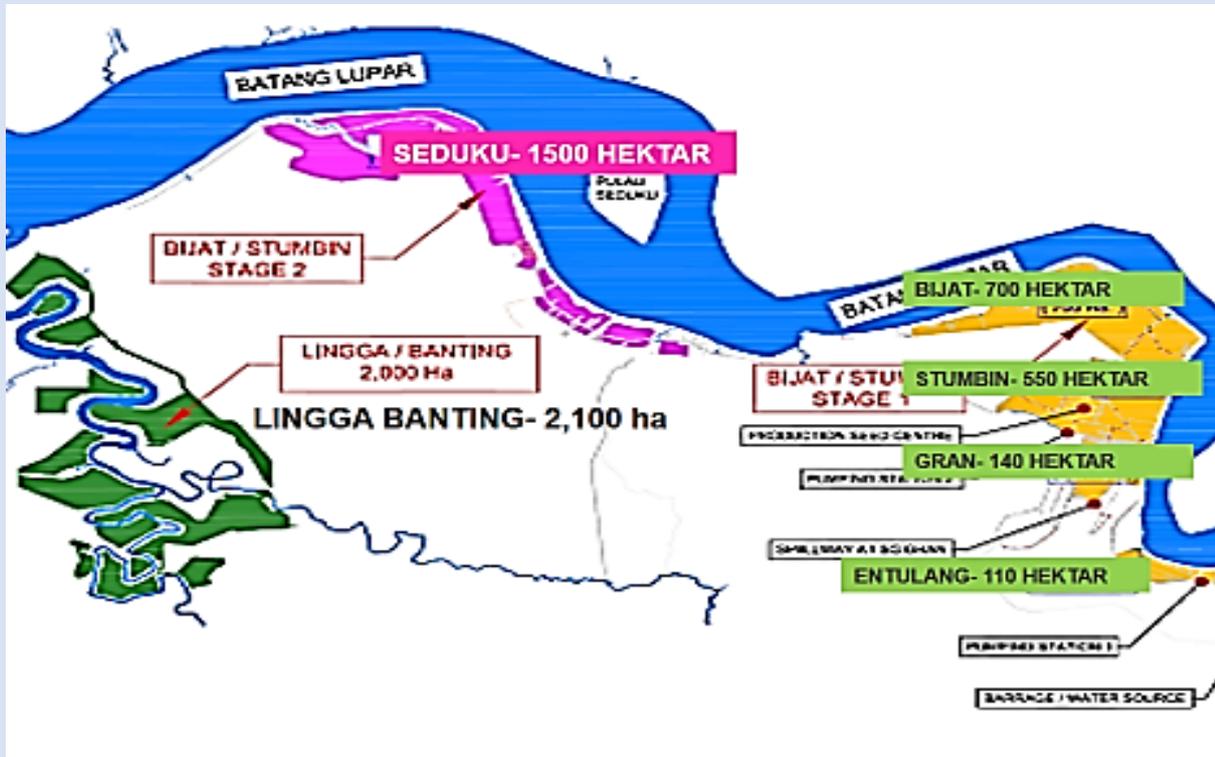
Project Description:

- The Batang Lupar project is committed under the Ministry of Agriculture Malaysia to develop Paddy.
- The project areas are located in narrow strips along the Batang Lupar River and the Batang Lingga River, covering 5,100 ha. The areas included six irrigation schemes.

	Irrigation Schemes	Area (ha)
1	Lingga-Banting	2,100
2	Seduku	1,500
3	Bijat	700
4	Stumbin	550
5	Gran	140
6	Entulang	110
	Total	5,100

Action/ Project No: AG 1: Batang Lupar Integrated Agriculture Development Area (IADA)

Batang Lupar Granary Paddy under IADA Batang Lupar



Source: IADA Batang Lupar

Paddy seed production programme by DOA in Batang Lupar



Action/ Project No: AG 1: Batang Lupar Integrated Agriculture Development Area (IADA)

Symbol	Series	Family (Group)	Main Characteristic	Terrain	Capability (Limitations)	Area (Ha. +/-)
And1	Anderson 1	ANDERSON (Organic Soils)	150-200cm organic (peat) layer	Level coastal lowlands or interior valleys	Class 05 (water-table, fertility, inundation)	1189.6
And1	Anderson 2		200-250cm organic (peat) layer			2233.4
And3	Anderson 3		>250cm organic (peat) layer			34.7
Bjt	Bijat	BIJAT (Gleysols)	Clayey; alluvial; non-sulphidic; white to grey	Flat to undulating floodplains or valleys	Class 3 (wetness, inundation)	2950.5
Lng	Lingga	SERIN (Oxisols)	Clayey; microgranite; palid; hue 10YR	Moderately steep to steep mountains	Class 3 to 5 (slope, erosion hazard)	25.8
Mkh	Mukah	MUKAH (Organic Soils)	50-150cm organic layer non-sulphidic fine loam to clay	Level coastal lowlands or interior valleys	Class 04 (water-table, fertility)	751
Nyl	Nyalau	NYALAU (Red-Yellow Podzolic)	Coarse loamy; residual; non-calcareous	Moderately steep to steep hills	Class 2 to 5 (fertility, slope, erosion hazard)	320.3

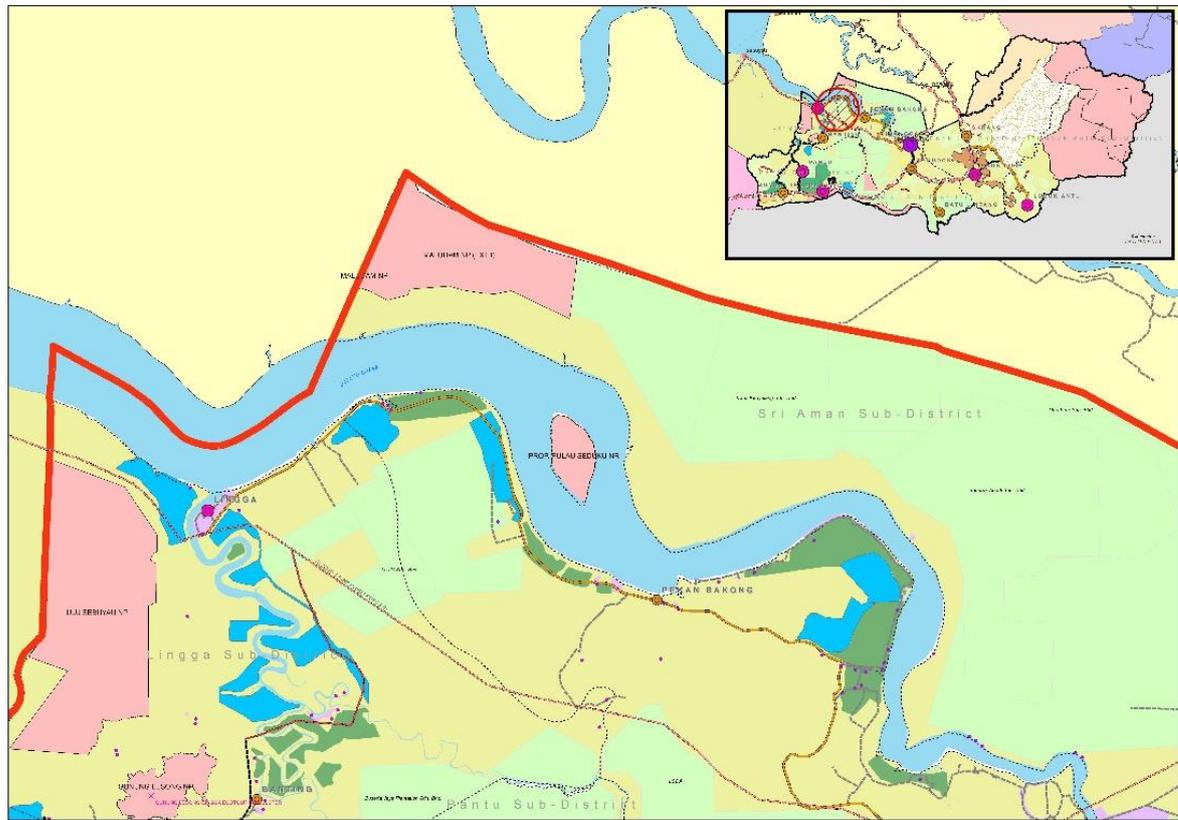
Source: (Soil Management Division, DOA Sarawak, Sept 2020)

Proposed Reformulation of Project

- Based on the soil types and soil suitability classification, the project will involve scaling up and strengthening farming productivity in the Batang Lupar area. The project has three components:
 - i) Improvement of irrigation and drainage in IADA Batang Lupar. The total area for ten years is 5,100 ha.
 - ii) Establishment of paddy mini-estates through consolidation of farms in 2,000 ha of suitable paddy areas, particularly in the Bijat-Stumbin and partly in the Seduku and Lingga areas
 - iii) Cultivation of pineapple in the peat areas totalling 3,100 ha.
- Undertake detailed soil survey of the project area by DOA to determine suitable soils for paddy and pineapple
- Improvement of the irrigation intensity programme to 30 meters/ha will be implemented in phases over ten years in the paddy areas, starting 2021 to 2030.
- Establishment of mini-estate paddy with the following objectives:
 - Adoption of new technologies such as smart farming, the use of certified paddy seeds and good farming practices to increase average yields to 5 tons/ ha.
 - Adoption of good farming practices to increase average yields to 5 tons/ ha.
 - Turning paddy farming into a commercial industry that can increase the farming family’s annual income to at least RM24,000 by 2030.
 - Improvement of farm management efficiency so that it will be a sustainable industry.
- The paddy mini-estates will be managed by BERNAS, the private sector and Area Farmers’ Association (PPK) and will involve consolidating paddy land belonging to farmers. This will allow the existing paddy farmers to exit from paddy farming, and move to more lucrative crops such as pineapple and sweet corn, especially in the peat areas as shown in the soil map above.
- Further enhanced the certified paddy seed scheme
- Cultivation of MD2 pineapple on group farming or cooperative basis

Action/ Project No: AG 1: Batang Lupar Integrated Agriculture Development Area (IADA)

Project Site:		Paddy	2,000 ha
		Pineapple	3,100 ha



Source: UNIMAS Holdings

Project Rational:	<ul style="list-style-type: none"> ● In line with government policy to Increase food security and food production in Sarawak ● As an exit plan for paddy farmers in Batang Lupar to venture into high value and more profitable pineapple cultivation ● In line with the policy of modernisation of agriculture using smart farming technology ● Increase export of high-value agricultural products such as pineapple. ● Reduce the deficit in food trade in Sarawak. ● To transform existing small-scale rice farming into a commercial enterprise
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Increase the self-sufficiency level (SSL) in rice production. ● Increase area of food production under food basket programme. ● Improved irrigation and drainage facilities ● Better use of farm mechanisation and smart farming technology ● Increased farmers income to more than RM2,000/month from the project
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Development of irrigation infrastructure to 30 meters/ha ● Planted physical area of 2,000 ha of paddy and planted area of 4,000 ha/yr. (through double cropping) ● Production of 20,000 metric tonnes of paddy/yr. or 12,600 metric tonnes of rice/yr. ● Planted pineapple area of 3,100 ha and production of 75,000 metric tonnes of pineapple/yr.
Estimated Budget:	<p>Total Budget RM337 million</p> <ul style="list-style-type: none"> ● Irrigation and drainage infrastructure ● Farm roads ● Seed production programme ● One-off subsidy for pineapple cultivation

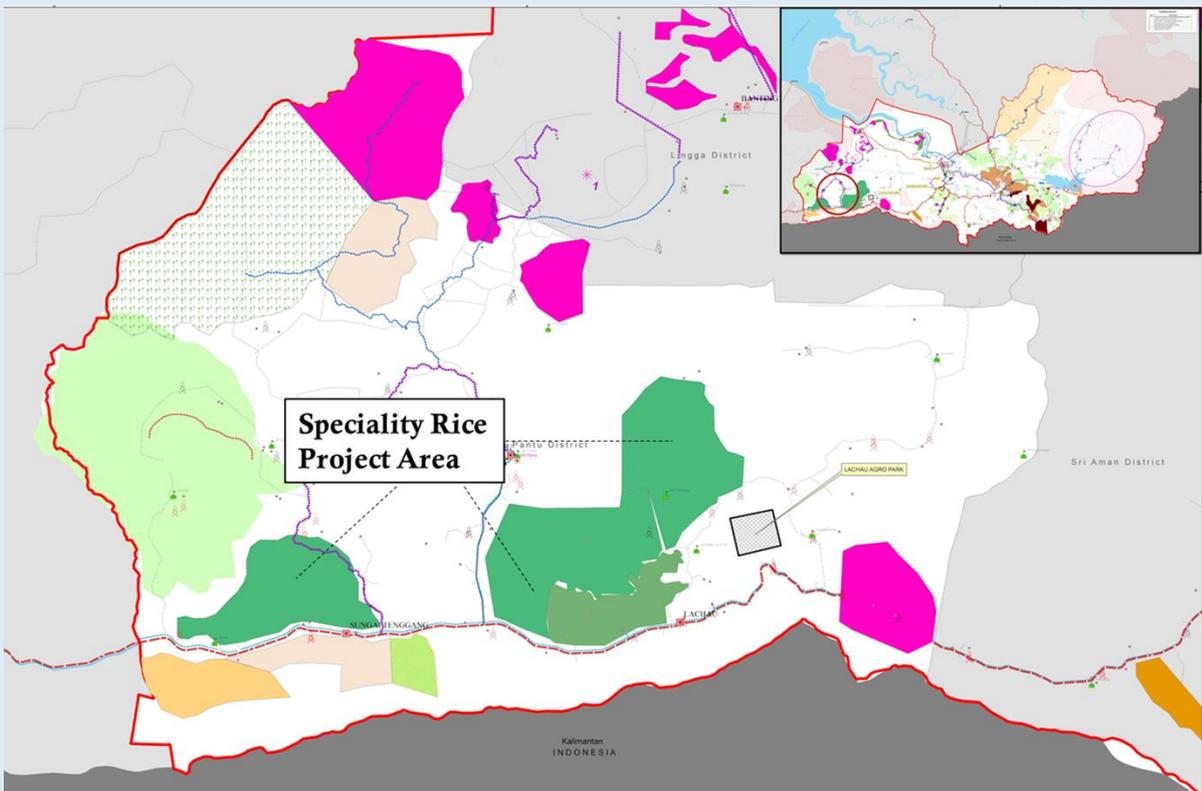
Action/ Project No:		AG 1: Batang Lupar Integrated Agriculture Development Area (IADA)																							
	<ul style="list-style-type: none"> Maintenance of infrastructure 																								
Activities/ Components:	<ul style="list-style-type: none"> Design and development of infrastructure i.e., irrigation channels, farm roads, collection centres etc. Planting of paddy Paddy certified seed production scheme Planting of pineapple 																								
Investors:	Federal Ministry of Agriculture and Food Industry (MAFI)																								
Business Model:	<p>The project is based on the central management model.</p> <ul style="list-style-type: none"> Systematic and efficient establishment of 2,000-hectare paddy estate and 3,100 ha smallholder pineapple plantation. Since much of the agricultural lands are NCR land, a hybrid of the centralized model (Anchor Company Outgrower Model) and the Cooperative model is recommended <p style="text-align: center;">The Centralized Model (Ancho Company- Out Growers Farming Model)</p> <p>Notes:</p> <ol style="list-style-type: none"> Consolidation of land to be managed by SPV on profit sharing basis; Participants receives dividends from profit of operation. They can also opt to work in the estate. 																								
Project Time Frame:		<table border="1"> <thead> <tr> <th></th> <th>Phase 1 2021-2023</th> <th>Phase 2 2024-2026</th> <th>Phase 3 2027-2030</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>1.Improvement of Irrigation & Drainage</td> <td>1,500 ha (Bijat, Stumbin, Gran and Entulang)</td> <td>2,100 ha (Lingga-Banting)</td> <td>1,500 ha (Seduku)</td> <td>5,100 ha</td> </tr> <tr> <td>2.Paddy Cultivation (Physical area)</td> <td>2,000 ha</td> <td>500 ha</td> <td>500 ha</td> <td>2,000 ha</td> </tr> <tr> <td>3.Pineapple Cultivation</td> <td>500 ha</td> <td>1,500 ha</td> <td>1,100 ha</td> <td>3,100 ha</td> </tr> </tbody> </table>					Phase 1 2021-2023	Phase 2 2024-2026	Phase 3 2027-2030	Total	1.Improvement of Irrigation & Drainage	1,500 ha (Bijat, Stumbin, Gran and Entulang)	2,100 ha (Lingga-Banting)	1,500 ha (Seduku)	5,100 ha	2.Paddy Cultivation (Physical area)	2,000 ha	500 ha	500 ha	2,000 ha	3.Pineapple Cultivation	500 ha	1,500 ha	1,100 ha	3,100 ha
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2.Paddy Cultivation (Physical area)	2,000 ha	500 ha	500 ha	2,000 ha																					
3.Pineapple Cultivation	500 ha	1,500 ha	1,100 ha	3,100 ha																					
Key Success Factors:	<ul style="list-style-type: none"> Availability of flat gley soils land for paddy production Survey and issuance of title for NCR land Improved irrigation infrastructure for paddy Sufficient irrigation water for the off-season paddy 																								

Action/ Project No:	AG 1: Batang Lupar Integrated Agriculture Development Area (IADA)
	<ul style="list-style-type: none"> ● Improved control drainage for pineapple ● Improved supply of certified paddy seeds ● Economies of scale in paddy management (estate management)
Possible Barriers & Threats	<ul style="list-style-type: none"> ● Farmers are reluctant to participate in mini-estate schemes ● A possible shortage of irrigation water for rice cultivation ● Shortage of farm mechanisation facilities ● Lack of internet infra for smart farming ● Encumbrances to land consolidation and estatization due to the NCR status of the paddy areas ● The difficulty of mechanisation due to scattered land parcels and organic soils

2.1.2 Pantu Specialty Rice Project

<p>Action/ Project No:</p>	<p>AG 2: Pantu Specialty Rice Project</p>	
<p>Project Description:</p>	<ul style="list-style-type: none"> • To compensate for the reduced paddy areas in Batang Lupar, it is being proposed that the rice project should be expanded to the Pantu District, where about 6,000 ha of land is found to be suitable for wet paddy cultivation. With suitable small-scale irrigation development, these areas could be suitable for double cropping of paddy. • The project will be dedicated to the production of speciality red rice for processing and export with companies such as Nestle as Anchor Company under the Contract Farming Scheme. Other high value local varieties such as Bubok and Mamut will also be promoted. • Apart from being resistant to the common disease in paddy cultivation, Mardi Warna 98 has a shorter maturity period of 103 days, suitable for two-cycle cultivation per year. Mardi Warna 98 can also be used to produce downstream products such as flour, biscuits, cakes, and baby food, not only for the local market but also for premium products to be exported abroad <p>The Mardi Warna 98 variety can yield around 4.5 to 6.7 tonnes per hectare</p>	

<p>Project Site:</p>	<p>The Project will be in the area between Pantu and Lachau, covering 6,000 ha</p>
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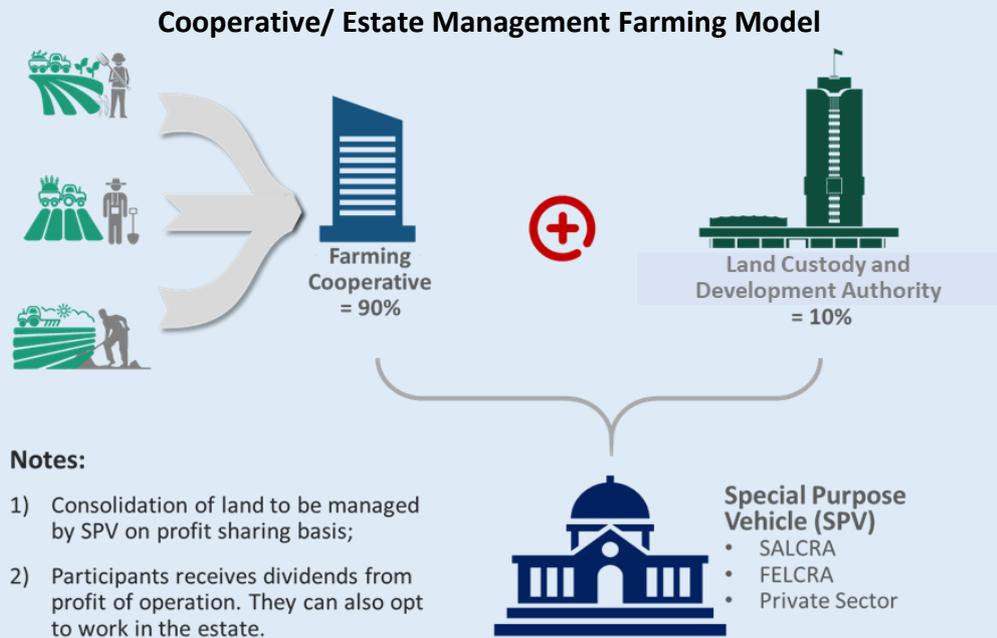
Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

<p>Link Projects:</p>	<p>CPPC Lachau</p>
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Action/ Project No:		AG 2: Pantu Specialty Rice Project																							
Project Rationale:	<ul style="list-style-type: none"> At present, Nestlé Malaysia, manufacturer of infant cereal, the key ingredient of which is red rice, has partnered with Malaysian Agricultural Research and Development Institute (MARDI), the Agricultural Research Centre (ARC) Sarawak and the Sarawak Department of Agriculture in this contract farming scheme to buy red rice. In line with government policy of Increase food security and food production in Sarawak In line with the policy of modernisation of agriculture using smart farming technology Increase export of high-value agricultural products Reduce the deficit in food trade in Sarawak Sarawak traditional rice can be developed into speciality rice or 'niche product' comparable to Jasmine or Basmati rice New income opportunities for farmers in the local community leading to poverty alleviation 																								
Impacts/ Outcomes:	<ul style="list-style-type: none"> Increase the self-sufficiency level (SSL) in rice by 20% Increase area of food production under food basket programme Improved irrigation and drainage facilities Better use of farm mechanisation and smart farming techniques 																								
Outputs of Project & KPIs:	<ul style="list-style-type: none"> Development of 6,000 hectares of paddy estate in Pantu Increase paddy yield to 5 mt/ha Production of 60,000 metric tonnes of paddy in 2030 Production of 39,000 metric tonnes of speciality rice in 2030 Adoption of full mechanisation in all paddy farms Develop D&I and field infrastructure for 6,000 ha of paddy farms by the year 2030 																								
Estimated Budget:	<table border="1"> <thead> <tr> <th></th> <th>Phase 1 2021-2023</th> <th>Phase 2 2024-2026</th> <th>Phase 3 2027-2030</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Improvement of Irrigation & Drainage</td> <td>2,000 ha</td> <td>2,000 ha</td> <td>2,000 ha</td> <td>6,000 ha</td> </tr> <tr> <td>Estimated CAPEX (RM million)</td> <td>60</td> <td>60</td> <td>60</td> <td>180</td> </tr> <tr> <td>Employment Generation</td> <td>200</td> <td>200</td> <td>200</td> <td>600</td> </tr> </tbody> </table>						Phase 1 2021-2023	Phase 2 2024-2026	Phase 3 2027-2030	Total	Improvement of Irrigation & Drainage	2,000 ha	2,000 ha	2,000 ha	6,000 ha	Estimated CAPEX (RM million)	60	60	60	180	Employment Generation	200	200	200	600
	Phase 1 2021-2023	Phase 2 2024-2026	Phase 3 2027-2030	Total																					
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Estimated CAPEX (RM million)	60	60	60	180																					
Employment Generation	200	200	200	600																					
Activities/ Components:	<ul style="list-style-type: none"> Development of irrigation and drainage infrastructure by DID Land levelling Implementation of certified paddy seed programme Planting of speciality rice paddy Processing of paddy using dedicated mills 																								
Investors:	<ul style="list-style-type: none"> Total funding from public funding is estimated at RM 180 million, i.e. at RM30,000/ha <ul style="list-style-type: none"> Major Irrigation infrastructure Major Drainage and farm roads Certified Paddy seed scheme The project is proposed to be developed as a granary project under MAFI 																								
Business Model:	<ul style="list-style-type: none"> Since much of the agricultural lands are NCR land, the Cooperative concept of Native Customary Rights (NCR) land development involves the participation of LCDA (Land Custody and Development Authority (LCDA) or PELITA, will be implemented In the Cooperative farming model, farmers pool their resources in certain areas of activity e.g farming. Cooperative is a member-owned, member-controlled business that distributes benefits on the basis of use 																								

Action/ Project No: AG 2: Pantu Specialty Rice Project

- Under this model, farmers will form cooperatives and the day-to-day management of the agriculture project will be performed by either entrepreneurs or the private sector through profit sharing mechanisms. The cooperative will have marketing contract agreement to market the produce



Project Time Frame:

	Phase 1 2021-2023	Phase 2 2024-2026	Phase 3 2027-2030	Total
Improvement of Irrigation & Drainage	2,000 ha	2,000 ha	2,000 ha	6,000ha



<p>Phase 1</p> <ul style="list-style-type: none"> • Perimeter survey • Prepare design and physical plan of paddy area • Design & tender document • Selection of anchor companies • Selection of participants • Planning of seed farm 	<p>Phase 2</p> <ul style="list-style-type: none"> • Construction of Irrigation and Drainage infrastructure in phases • Cultivation of special paddy • Construction of milling facilities at the CPPC • Milling of rice 	<p>Phase 3</p> <ul style="list-style-type: none"> • Completing necessary eco-system to sustain paddy project in the long run
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Key Success Factors:

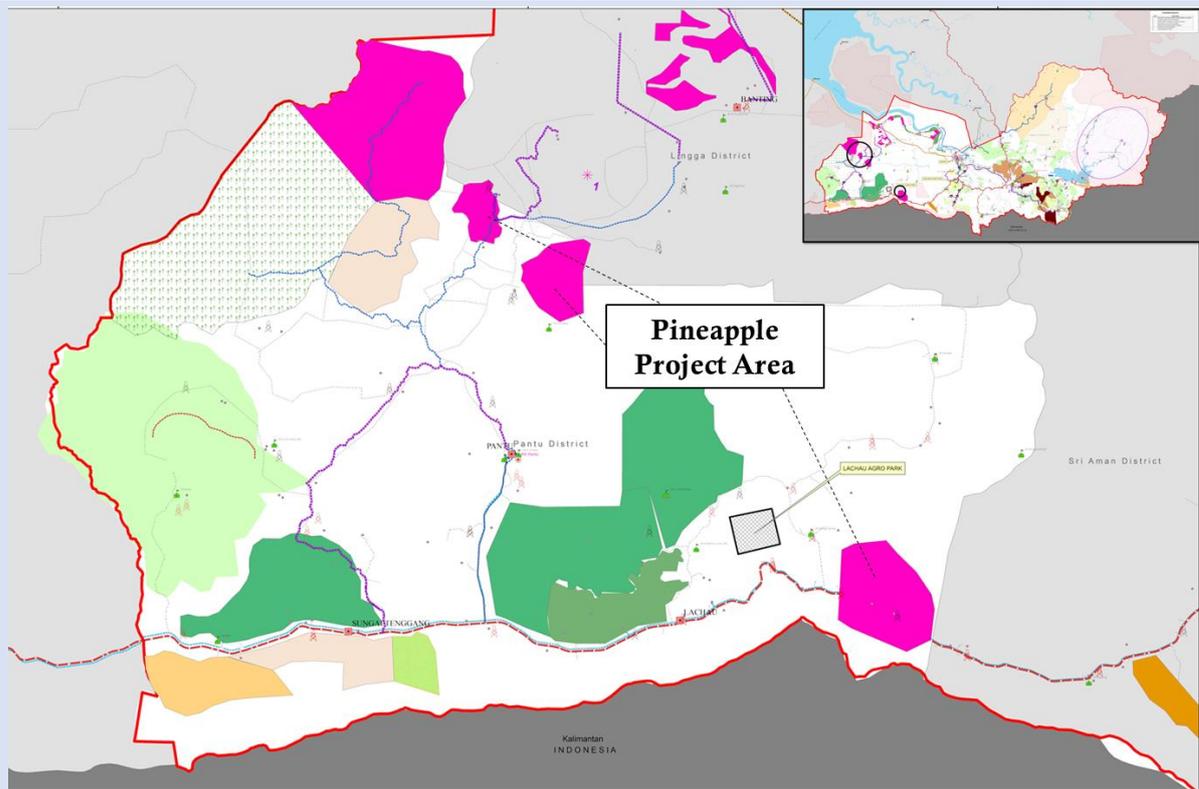
- Availability of flat gley soils land for paddy production
- Improved irrigation infrastructure @ 30 m/ha irrigation intensity
- Improved certified paddy seeds
- Economies of scale
- Estate management

Action/ Project No:		AG 2: Pantu Specialty Rice Project	
Possible Barriers & Threats	<ul style="list-style-type: none"> ● Farm size uneconomic, much too small to ensure income above the poverty line ● Farmers are reluctant to participate in mini-estate schemes ● A possible shortage of irrigation water for rice cultivation especially during the off-season ● Shortage of farm mechanisation facilities due to simultaneous planting of paddy ● Lack of internet infrastructure for smart farming 		
Roles & Responsibilities:	Agencies		Role & Responsibilities
	SADA	<ul style="list-style-type: none"> ● Conduct feasibility studies for the proposed project ● Overall monitoring of project ● Assist in land issues ● Provided funds for physical infrastructure 	
	DOA	<ul style="list-style-type: none"> ● Detailed soil survey to determine soil suitability for paddy ● Planning, design, and approval of plans for development ● Development of irrigation infrastructure ● Implementation of project ● Advisory services and Certification program ● Certified Paddy seed production programme 	
	DID	<ul style="list-style-type: none"> ● Design and construction of irrigation and drainage infrastructure 	
	Farmers Cooperative	<ul style="list-style-type: none"> ● Establishment of mini-estate paddy ● Milling of paddy at CPPC 	
	MARDI	R &D on new technologies in smart farming	
	Nestle	Contract farming with Co-op	

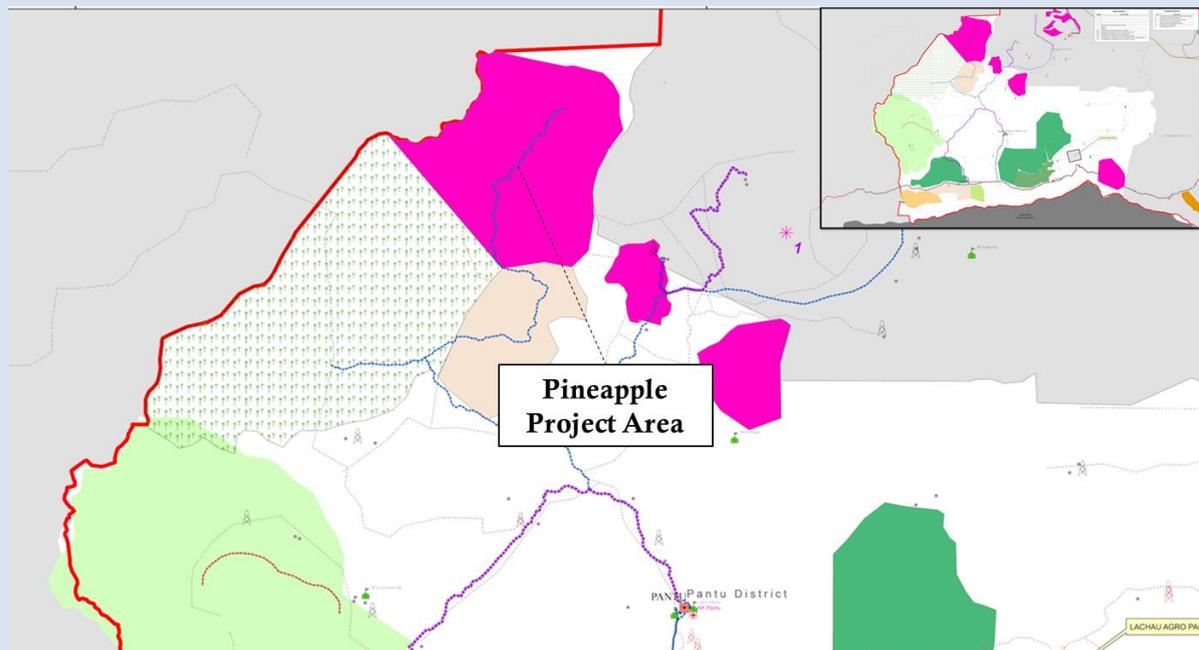
2.1.3 Pineapple Project

<p>Action/ Project No:</p>	<p>AG 3: Pineapple Project</p>
<p>Project Description:</p>	<p>The project involves the development of 5,000 hectares of pineapple in Pantu.</p> <p>The plantation is an initiative to promote the production of MD2 pineapple for the international market. It uses high technology and large-scale commercial farming good opportunities for local farmer-entrepreneurs and the local community to increase their income through contract farming arrangements with an anchor company.</p> <p>Other varieties can also be planted for the local market e.g., N36, Morris and Josephine</p> <p>The project will involve the establishment of a seed garden to produce certified MD2 planting material by the Anchor Company.</p> <p>The project is a fully integrated pineapple value chain involving nurseries, plantations and a Collection, Processing and Packaging Centre (CPPC).</p> <p>The project will be provided with physical infrastructure consisting of farm roads, access roads, drainage system, administrative centre, collection and processing centre, quarters and stores, and the required utilities such as electricity and water.</p> <p>The project will be implemented using the cooperative contract farming business model with the private sector as Anchor Company.</p> <p>The project will be located in the Pantu District, consisting of Red Yellow Podzolic soils. The target established for the Sri Aman Division is 5,000 ha in areas with a slope of less than 12 degrees. To allow for economies of scale, the project will be implemented in a particular zone, i.e., the Lachau Zone and Sebuyau zone.</p>
<p>Cultivation of MD2 Pineapple for the Export Market</p> <div style="display: flex; justify-content: space-around;">   </div>	
<p>Project Site:</p>	<p>Land Size: 5,000 ha</p> <p>Suitable lands are found along both sides of the Pan-Borneo Highway near Kg Gua Dalam, Lachau (1,436 ha). More suitable lands (about 1,000 ha) may be found to the north of Pantu.</p>

Action/ Project No: AG 3: Pineapple Project



New Pineapple Area in Sebuyau, Pantu District



Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

Link Projects:	CPPC Lachau
Project Rational:	<ul style="list-style-type: none"> MD2 has been identified as a key crop under the Food Basket Programme in Sarawak MD2 was developed to fulfil export market demand for fresh pineapples with exceptional sweetness and uniformity, consistency in size and ripeness, and longer shelf life Huge export market especially to China, Japan and S Korea. China has signed an agreement with Malaysia to import MD2 pineapples up to 100 containers per month, but we have not met their demand. Japan and South Korea would also start importing

Action/ Project No: AG 3: Pineapple Project	
	<p>MD2 from Malaysia this year with two containers monthly, with each container storing up to 12,000 cartons. (A 100 (40ft) container/ month is equivalent to 3,300 tonnes or 82.5 hectares/month or 990 hectares/yr.)</p> <ul style="list-style-type: none"> • The global demand for fresh pineapples will grow by 5% because of the increase in population and consumption (MPIB) • MD2 was chosen instead of local pineapple varieties as it could withstand long journeys, making the fruit an ideal choice for export • Sarawak recorded the largest pineapple plantation areas after Johor with 1,805ha currently • Being a 14-month crop, it can generate a fast income stream • The project is also aimed at benefiting the local community by generating employment and creating business opportunities as cooperative contract out-growers
Impacts/ Outcomes:	<ul style="list-style-type: none"> • Increase area of food production under food basket programme • Improved irrigation and drainage facilities • Better use of farm mechanisation and smart farming techniques • Increased farmers income
Outputs of Project & KPIs:	<ul style="list-style-type: none"> • Net Profit/ha/yr.: RM35,000 • Production of pineapple: 56,000 tonnes/yr • Export value of RM420 million/yr • Jobs Created: 3,000
Project Relevance and Alignment:	<ul style="list-style-type: none"> • In line with government policy of Increase food security and food production in Sarawak • In line with the policy of modernisation of agriculture using smart farming technology • Increase export of high-value agricultural products • Reduce the deficit in food trade in Sarawak
Estimated Budget:	RM50 million
Activities/ Components:	<p>The development of the pineapple plantations will involve several activities, including:</p> <ul style="list-style-type: none"> • <u>Land Survey</u> The actual boundary for the development of pineapple needs to be surveyed • <u>Development of Basic External Infrastructure</u> The basic infrastructure requirements include access roads and drainage system • <u>Nursery Establishment</u> MD2 has been planted via suckers which have been imported from the Philippines. Some growers have also imported fruits (with crown) from the Philippines (through Singapore) and used the crowns for quartering purposes to obtain planting materials. There have been attempts to produce MD2 planting materials through tissue culture. However, there have been reports on the somatic variations (mutation) which occur with tissue cultured plants. Variations can go as high as 20%. These variations cause off-types fruits that can affect the quality of the product as many such growers prefer to use planting materials from quartering or suckers from the mother plant • <u>Site Preparation</u> includes land survey, clearing existing vegetation, establishing roads and field drainage system, and drip irrigation system • <u>Field Establishment</u> The recommended planting distance for pineapple varieties in Malaysia is between 35,000 to 42,000 plants per hectare. Adequate fertiliser needs to apply to ensure a good yield • <u>Flowering</u> To ensure even flowering and fruiting special flower induction hormone are used • <u>Harvesting</u> Harvesting can be fully mechanised. However, it can result in harvesting losses of up to 20%. As such semi-mechanized harvesting is preferred • <u>On-Farm Packaging</u>

Action/ Project No: AG 3: Pineapple Project

Pineapple harvested will be collected in a number of on-farm collections centres. The pineapples will then be transported to the CPPC located in Lachau where the fruits are sorted, graded, washed, cleaned, dried (or treated), packed in corrugated cardboard boxes and GAP certified before transported in suitable vehicles

Planting Materials

In Malaysia, MD2 has been planted via suckers which have been imported from the Philippines. Some growers have also imported fruits (with crown) from the Philippines (through Singapore) and used the crowns for quartering purposes to obtain planting materials.

There have been attempts to produce MD2 planting materials through tissue culture. However, there have been reports on the somatic variations (mutation) which occur with tissue cultured plants. Variations can go as high as 20 %. However, the % of variation depends very much on the concentrations of hormones used during the tissue culture and the generation cycle. Therefore, DOA recommends a lower concentration of hormone used during tissue culture. High variations can cause off-types fruits that can affect the quality of the product as many such growers prefer to use planting materials from quartering or suckers from the mother plant.

The recommended planting distance for pineapple varieties in Malaysia is between 35,000 to 42,000 plants per hectare. However, planting densities can also be increased up to 63,700 plants per hectare in a double row system.

Investors: Total funding from public funding is estimated at RM50 million.

- Major Irrigation infrastructure
- Major Drainage and farm roads

Business Model:

- The project will involve the establishment of Taman Kekal Pengeluaran Makanan (TKPM)
- The project will be implemented following the Cooperative/ Estate Management Farming Model

The diagram illustrates the business model structure. On the left, three icons representing farming activities (planting, tilling, and harvesting) are grouped by a large arrow pointing to a 'Farming Cooperative = 90%' icon. To the right of the cooperative is a red circle with a white plus sign, followed by a 'Land Custody and Development Authority = 10%' icon. A bracket underneath these two elements points to a 'Special Purpose Vehicle (SPV)' icon, which is a blue building with a dome. Below the SPV icon, a list of entities is provided: SALCRA, FELCRA, and Private Sector.

Notes:

- 1) Consolidation of land to be managed by SPV on profit sharing basis;
- 2) Participants receives dividends from profit of operation. They can also opt to work in the estate.

- Business needs to be organised following the supply chain concept to ensure product quality and commercial sustainability.
- Anchor company to ensure the structural integrity of the value chain.

Project Time Frame:	Location	Budget Estimate	Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Total 2030
		Pantu	RM 50 mil	500ha	2,000ha	3,000ha

Action/ Project No: AG 3: Pineapple Project						
2021	2022	2023	2024	2025	2026	2027-2030
Short Term		Mid Term			Long Term	
Phase 1 <ul style="list-style-type: none"> Perimeter survey Prepare design and physical plan of pineapple area Design & tender document Construction of drainage & irrigation system Phase 1 Selection of anchor companies Selection of participants Planning of planting materials Cultivation of 500 ha of pineapple 		Phase 2 <ul style="list-style-type: none"> Construction drainage and irrigation infrastructure Phase 2 Cultivation of pineapple 			Phase 3 <ul style="list-style-type: none"> Construction of drainage & irrigation system infrastructure Phase 3 Cultivation of pineapple 	
Key Success Factors:	<ul style="list-style-type: none"> Improved irrigation and drainage infrastructure Improved planting material (MD2) Economies of scale Estate management 					
Possible Barriers & Threats	<ul style="list-style-type: none"> Shortage of farm mechanisation facilities Lack of internet infra for smart farming 					
Roles & Responsibilities:	Description	Name	Role & Responsibilities			
	Main Agencies	SADA	<ul style="list-style-type: none"> Conduct feasibility studies on project Planning, design, and approval of plans for development Provided funds for physical infrastructure consisting of farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water supply. Monitoring and evaluation of a project 			
		PELITA	<ul style="list-style-type: none"> Implementation of mini-estate schemes Identify anchor company Implementation of group farming schemes 			
	Other Agencies	DID	Improvement of drainage and irrigation			
		DOA	<ul style="list-style-type: none"> Group farming projects Certification under MyGAP Extension services Multiplication of MD2 pineapple planting materials 			
Private Sector	<ul style="list-style-type: none"> Top Fruits Del Monte Dole Fruit and Vegetable Malaysia Sdn. Bhd. Top Fruits (Sarawak) Sdn. Bhd. 		<ul style="list-style-type: none"> Invest in a pineapple plantation Act as Anchor Company Construct and manage the CPPC Marketing 			
Summary:	Pineapple					
	Planting density/ ha					40,000 plants
	Maturity					15 months
	Yield/ha/year					35 tons
	Price/kg					RM2.00
	Farm Size/Household					1 ha

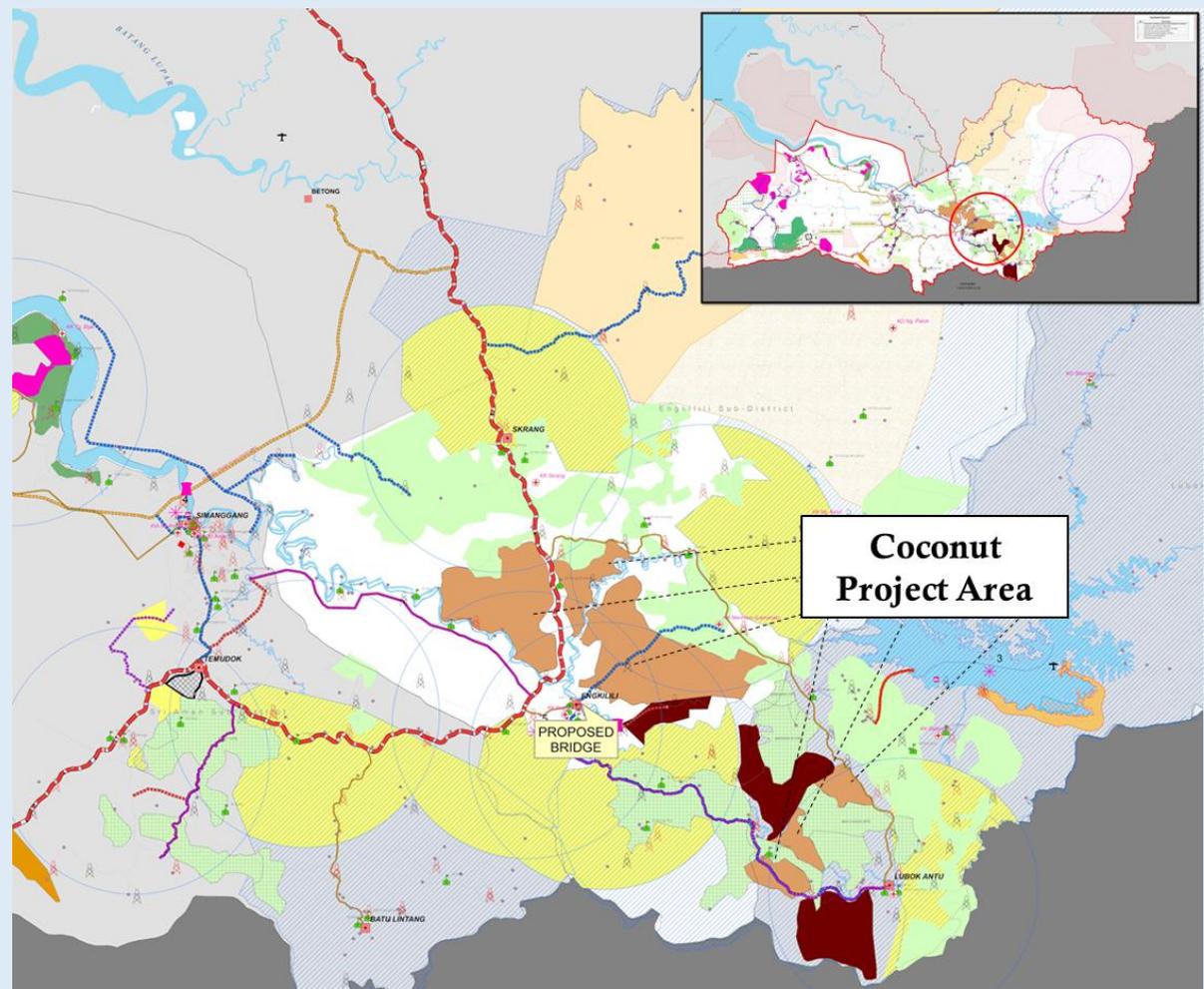
Action/ AG 3: Pineapple Project
Project No:

Business Model	Ladang Rakyat concept under PELITA
Total Area (Hectares)	5,000
The volume of Production/yr.	140,000 metric tonnes
Value of Production/yr.	RM 280 million
Net Profit/ Ha/yr.:	RM 35,000
Jobs created	3,000

2.1.4 Coconut Project

Action/ Project No:	AG 4: Coconut Project																			
Project Description:	<ul style="list-style-type: none"> • The project will involve about 10,000 hectares of coconut cultivation in Engkilili and Temudok. • The project will also involve the establishment of MATAG seed garden. • The coconut plantation will be developed with DOA as the lead agency. DOA will develop the necessary infrastructure required for coconut cultivation. • About 3,300 farmers will be involved as shareholders. • The planting programme @ RM10,000/ha aims to cultivate coconut with hybrid varieties such as MATAG, Pandan that can yield about 22,000 nuts per hectare per year. • Where necessary, the development areas would be improved using drains, bunds, and water-control structures. A system of roads would be constructed in tandem with the development of the drainage/canal system to enable efficiency in field operations. • The marketing of coconuts and intercrops will be organised through anchor companies or farmers’ cooperative. 																			
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 15%;">Agencies</th> <th style="width: 15%;">Location</th> <th style="width: 10%;">Budget</th> <th style="width: 10%;">Short Term 2021 – 2022</th> <th style="width: 10%;">Mid Term 2023 – 2025</th> <th style="width: 10%;">Long Term 2026 – 2030</th> <th style="width: 10%;">Total 2030</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">MANRED PELITA DOA DID</td> <td style="text-align: left;">Simanggang- Engkilili Valley</td> <td style="text-align: left;">RM 100 mil</td> <td>1,000ha</td> <td>4,000ha</td> <td>5,000ha</td> <td>10,000ha</td> </tr> </tbody> </table>						Agencies	Location	Budget	Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Total 2030	MANRED PELITA DOA DID	Simanggang- Engkilili Valley	RM 100 mil	1,000ha	4,000ha	5,000ha	10,000ha
Agencies	Location	Budget	Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Total 2030														
MANRED PELITA DOA DID	Simanggang- Engkilili Valley	RM 100 mil	1,000ha	4,000ha	5,000ha	10,000ha														
	<p>Planting of High Yielding Hybrid Coconut Hybrid Variety for High Income</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Coconut Farm on Raised Bunds at Ratchaburi Province, Thailand</p> </div> <div style="text-align: center;">  <p>High Value Virgin Coconut Oil</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>																			
Project Site:	The project will cover an area of 10,000 ha, located between Engkilili and Lubok Antu.																			

Action/ Project No: AG 4: Coconut Project



Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

<p>Link Projects:</p>	<ul style="list-style-type: none"> ● CPPC Temudok ● Temudok Industrial Park
<p>Project Rational:</p>	<ul style="list-style-type: none"> ● The National Agriculture Policy has encouraged the maintenance of the coconut crop in traditional areas to fulfil the domestic demand and the demand for processed products for export. ● The country imports about 120 million coconuts mainly from Indonesia to meet domestic needs, estimated to exceed 650 million coconuts a year. ● Domestic demand is expected to increase to up to 1 billion coconuts by 2020. ● Soils in the identified areas are generally suitable for coconut with an improvement on drainage. ● Increasing farmers' income through coconut cultivation and intercropping ● Developing the industry value chain. These include coconut milk, desiccated coconut, coconut water, virgin coconut oil, activated carbon, cocopeat. ● The project will also provide start-ups and SMEs the opportunity to commercialise downstream in the coconut industry.
<p>Impacts/ Outcomes:</p>	<ul style="list-style-type: none"> ● Increased production of coconuts: 200 million nuts/yr. in 2035 ● Value of production of coconut at farm gate of RM300 million in 2035 ● Jobs Created: 1,200 by 2030 ● Revitalised the coconut industry along the value chain. ● Increased farmers Net Income/month/household: RM5,000 (from 3.0 ha)

Action/ Project No: AG 4: Coconut Project	
	<ul style="list-style-type: none"> ● Catalyst in creating the value chain of the coconut industry as well as in the development of related supporting industries
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Planted area of 10,000 ha of coconut in 2030 ● Planting of intercroops such as banana ● Improved drainage infrastructure for 10,000 Ha ● Development of 1,000 km of farm roads ● Creation of 1,200 employment opportunities ● Better use of farm mechanisation and smart farming techniques
Estimated Budget:	RM100 million
Activities/ Components:	<p>Major Activities:</p> <ul style="list-style-type: none"> i) Land clearing and Development of basic infrastructure (farm roads, drainage system, bunds) ii) Sourcing of high yielding planting materials iii) Establishment of 100 Ha seed garden iv) Establishment of coconut holdings; planting with new hybrid varieties such as Matag, MAWA and Pandan v) Rationalising resource use by crop integration vi) Establishment of a Collection, Processing and Packaging Centre (CPPC) in Temudok vii) Downstream activities of coconut will be undertaken at the Temudok Industrial Park. viii) Strengthening institutional support, and
Investors:	<p>Total public funding is estimated at RM 100 million over ten years.</p> <ul style="list-style-type: none"> ● Major Drainage and farm roads ● Raise bunds ● Farm Collection Centre ● Planting materials
Business Model:	<ul style="list-style-type: none"> ● The project will be based on the Nucleus Estate Land Consolidation Model involving Native Customary Rights (NCR) land. The development involves the participation of LCDA (Land Custody and Development Authority (LCDA), i.e., PELITA. Under this concept, local shareholders/ farmers hold 90 per cent of the equity while LCDA holds 10 per cent equity. LCDA will then appoint land development agencies such as FELCRA and/or SALCRA or private sector (as Anchor Company) to manage the project base on profit sharing or management service chargers. ● The Anchor Company) will also do the processing and marketing of the coconuts. <div style="text-align: center; margin-top: 20px;"> <pre> graph TD subgraph UPSTREAM PELITA[PELITA] ANCHOR[ANCHOR COMPANY Nucleus Plantation Operated by Anchor Company] ICL[INTERCROPS & LIVESTOCK] ENABLERS[Enablers: • R&D • High yield varieties • Mechanization to reduce manpower • Trained human resources • Market research] PELITA --> ANCHOR ENABLERS --> ICL end subgraph PROCESSING FC[FARMERS COOPERATIVE] CPPC[CPPC Processing of Coconut by ANCHOR COMPANY] ANCHOR --> FC ANCHOR --> CPPC end FC --> M[Temudok Industrial Park Distribution & Marketing] CPPC --> M </pre> </div>

Action/ Project No:		AG 4: Coconut Project																									
Key Success Factors:	<ul style="list-style-type: none"> ● Improved drainage infrastructure ● Improved hybrid seeds ● Economies of scale ● Estate management 																										
Project Time Frame:	<table border="1"> <thead> <tr> <th>2021</th> <th>2022</th> <th>2023</th> <th>2024</th> <th>2025</th> <th>2026</th> <th>2027-2030</th> </tr> </thead> <tbody> <tr> <td colspan="2">Short Term</td> <td colspan="3">Mid Term</td> <td colspan="2">Long Term</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Phase 1</th> <th>Phase 2</th> <th>Phase 3</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Perimeter survey • Prepare design and physical plan of coconut area • Construction of drainage system Phase 1 • Selection of anchor companies • Selection of participants • Planning of planting materials • Cultivation of 1,000 ha of coconut & intercropping </td> <td> <ul style="list-style-type: none"> • Construction drainage infrastructure Phase 2 • Cultivation of 4,000 ha coconut & intercropping </td> <td> <ul style="list-style-type: none"> • Construction of drainage system infrastructure Phase 3 • Cultivation of 5,000 ha coconut & intercropping </td> </tr> </tbody> </table>							2021	2022	2023	2024	2025	2026	2027-2030	Short Term		Mid Term			Long Term		Phase 1	Phase 2	Phase 3	<ul style="list-style-type: none"> • Perimeter survey • Prepare design and physical plan of coconut area • Construction of drainage system Phase 1 • Selection of anchor companies • Selection of participants • Planning of planting materials • Cultivation of 1,000 ha of coconut & intercropping 	<ul style="list-style-type: none"> • Construction drainage infrastructure Phase 2 • Cultivation of 4,000 ha coconut & intercropping 	<ul style="list-style-type: none"> • Construction of drainage system infrastructure Phase 3 • Cultivation of 5,000 ha coconut & intercropping
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Possible Barriers & Threats	<ul style="list-style-type: none"> ● Difficulty in getting the hybrid seedlings. ● Flash Flooding 																										
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Action/ AG 4: Coconut Project
Project No:

<i>Summary:</i>	Coconut	
	Area (ha)	10,000 ha
Planting density/ Ha (Palms/ha)	120	
Maturity Period (years)	4	
Yield/ha/year (nuts)	22,000	
Price/nut	RM1.50/nut	
No. of the household involved	3,300	
Farm Size/Household	3.00 ha	
Business Model	Ladang Rakyat concept under PELITA	
The volume of Production/yr.	200 million nuts	
Value of Production /yr.	RM330 million	
Gross Income/yr./3.0 Ha	RM99,000	
Costs of Production/3.0 Ha	RM30,000	
Net Income/yr./household	RM69,000	
Net Income/month/household	RM5,750	

2.1.5 Durian Project

Action/ Project No: AG 5: Durian Project

**Project
Description:**

- The project will be focused on Skrang Valley and Pantu, covering an area of 3,000 Ha and involving 1,500 households.
- Each household to be allocated 2 hectares for (90-100 durian trees). They can adopt the mixed cultivation concept involving three types of durian clones on the 60:20:20 ratio, namely 60% Musang King and 20% each from the other varieties (e.g., D24, IOI or XO).
- Mixed cultivation technique was important to ensure a smooth pollination process and achieve a better yield, fruit set and longer fruiting season.
- Agriculture Department will organise training courses on durian management for farmers at the Temudok, Agriculture Station.
- The development of durian will involve the participation of smallholders as out-growers and anchor company for processing at the CPPC Temudok.

A model of a Commercial Durian Plantation with Drip Irrigation Facilities



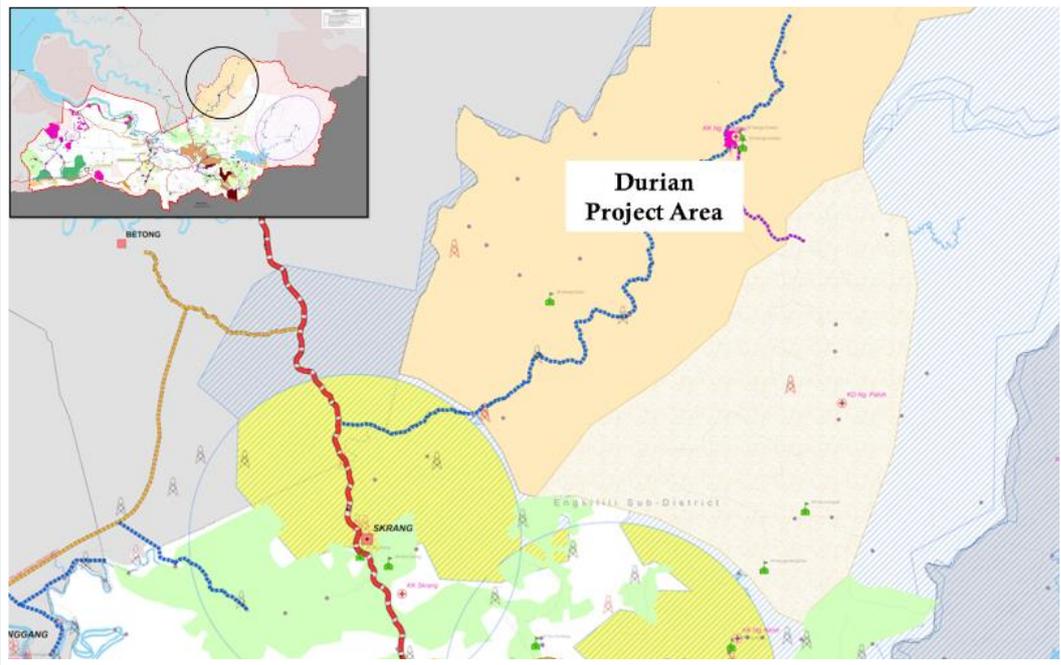
Musang King: The Most Sought After Clone for the Chinese Market



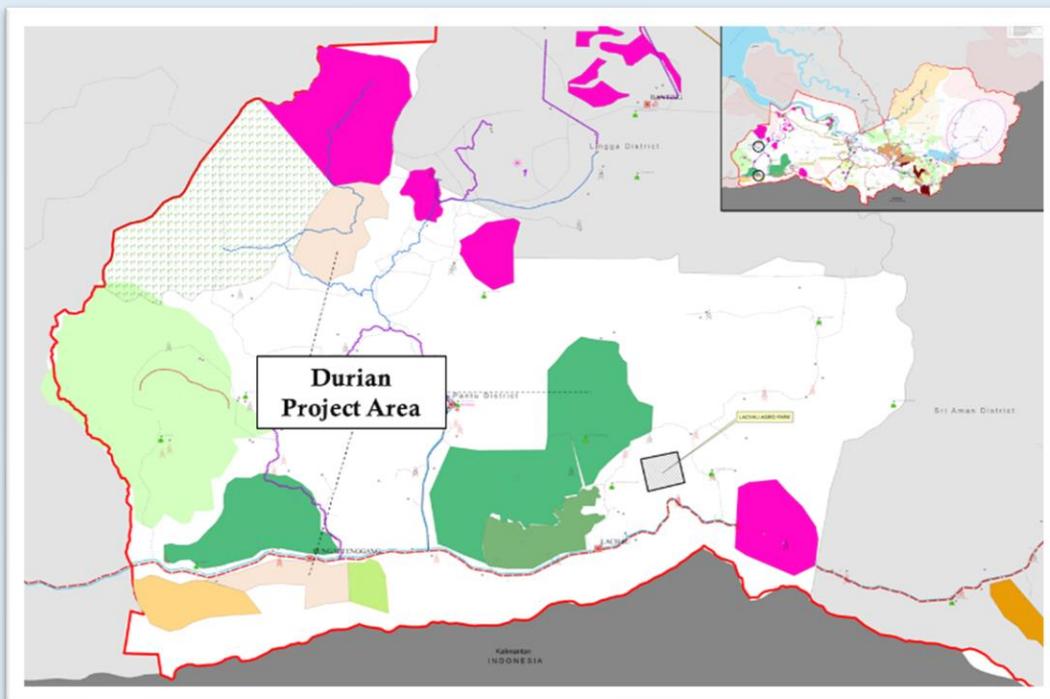
Action/ Project No: AG 5: Durian Project

Project Site: The project will cover an area of 3,000 ha, located in the Skrang Valley and Pantu

Skrang Valley



Pantu



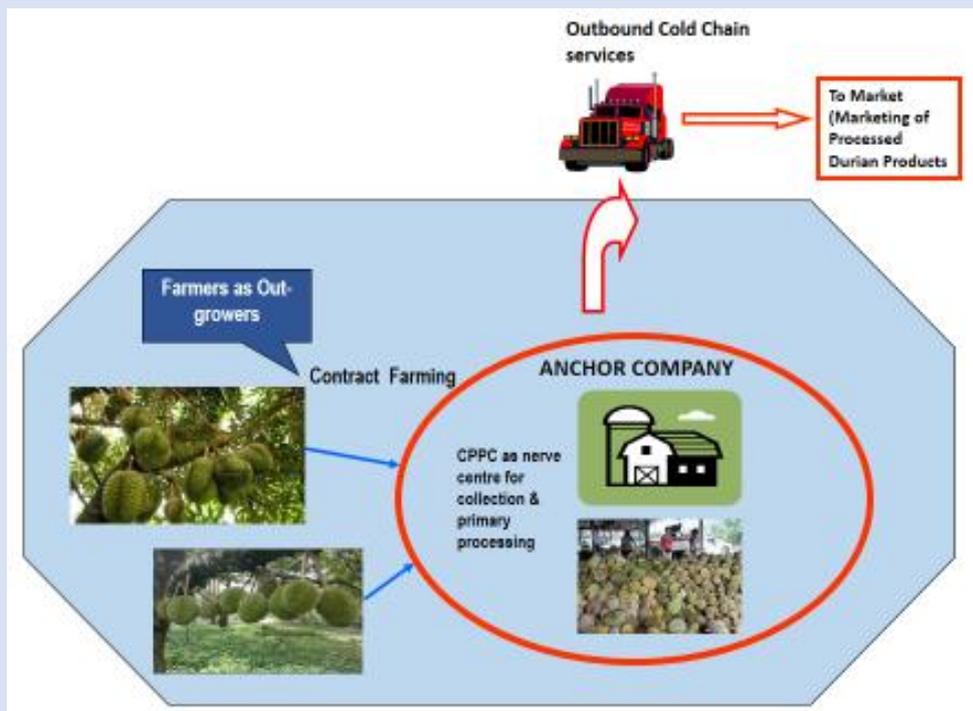
Source: Daya Rancang

Note: Base map source from UNIMAS Holdings

Link Projects:	<ul style="list-style-type: none"> ● CPPC Temudok
Project Rational:	<ul style="list-style-type: none"> ● There is potential to increase the area under durian in Sarawak to cater to China’s export market. The suitable varieties are D24 and D197 (Musang King).

Action/ Project No: AG 5: Durian Project	
	<ul style="list-style-type: none"> ● China represents a unique market opportunity; The current market situation in China is truly remarkable as consumers are fascinated with Musang King and yet unfazed by record-high prices. Rapidly rising consumption in China has led to prices skyrocketing up to 120 USD per kg and has even resulted in Musang King Durian tours in Malaysia, catered directly to consumers in China. ● At present, Sarawak largely exports durian paste with China being a notable market for the product. Durian businessmen should be more innovative and develop more downstream products such as durian powder, durian mooncake, durian ice-cream and durian coffee as the move could help boost the local tourism. ● Increasing farmers' income through durian cultivation and intercropping ● Develop the industry along the value chain
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Increase area of food production under food basket programme ● To increase farmers' income ● Increased supply of quality durians for the fresh and downstream industries
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Net Income/month/household: RM6,972 ● Increased production of durian: 30,000 metric tonnes/yr. ● Jobs Created: 1,500 ● Create further employment and tap on the higher value-added/ income opportunities in the durian industry
Project Relevance and Alignment:	<ul style="list-style-type: none"> ● In line with government policy of Increase food security and food production in Sarawak. ● In line with the policy of modernisation of agriculture using smart farming technology ● Increase export of high-value agricultural products ● Reduce the deficit in food trade in Sarawak
Estimated Budget:	RM30 million
Activities/ Components:	<ul style="list-style-type: none"> ● Land clearing ● Construction of drains and bunds ● Supply of planting material ● Planting of durians and intercrops ● Maintenance ● Collection, processing and packaging of durians at the CPPC in Temudok
Investors:	<p>Total public funding is estimated at RM30 million over ten years.</p> <ul style="list-style-type: none"> ● Irrigation and farm roads ● Farm Collection Centre ● Planting materials
Business Model:	The project will be developed based on the Centralised Farming Model. The Anchor Company will source durian fruits from contract growers. The anchor company will also operate the Collection, Processing and Packaging Centre (CPPC) and marketing the fruits and products.

Action/ Project No: AG 5: Durian Project



Project Time Frame:	Location	Budget Estimate	Short Term 2021 – 222	Mid Term 2023 – 2025	Long Term 2026 – 2030	Total 2030
		<ul style="list-style-type: none"> ● Skrang Valley ● Lachau / Pantu 	RM30 mil	500ha	1,000ha	1,500ha

- Key Success Factors:**
- Improved drainage infrastructure
 - Improved hybrid seeds
 - Economies of scale
 - Estate management

- Possible Barriers & Threats**
- Difficulty in getting the bud grafted plants.
 - Long gestation period of 5 years
 - Pests and diseases

Roles & Responsibilities:	Description	Name	Role & Responsibilities
	Main Agencies	MANRED DOA	<ul style="list-style-type: none"> - Implementation of group farming schemes - Provision of planting materials - Extension services
	Other Agencies	DID	Improvement of drainage and farm roads
	Private Sector	Anchor Company	Processing and marketing

- Role of SADA**
- Planning, design, and approval of plans for development
 - Provide funds for physical infrastructure consisting of buildings, collection centres, farm roads, access roads, drip irrigation system (ponds and main lines), and the required utilities such as electricity and Internet
 - Monitoring and evaluation of the project

Summary:	Durian	
	Area (ha)	3,000 ha
	Planting density (trees/ Ha)	90-100
	Economic Life (years)	25

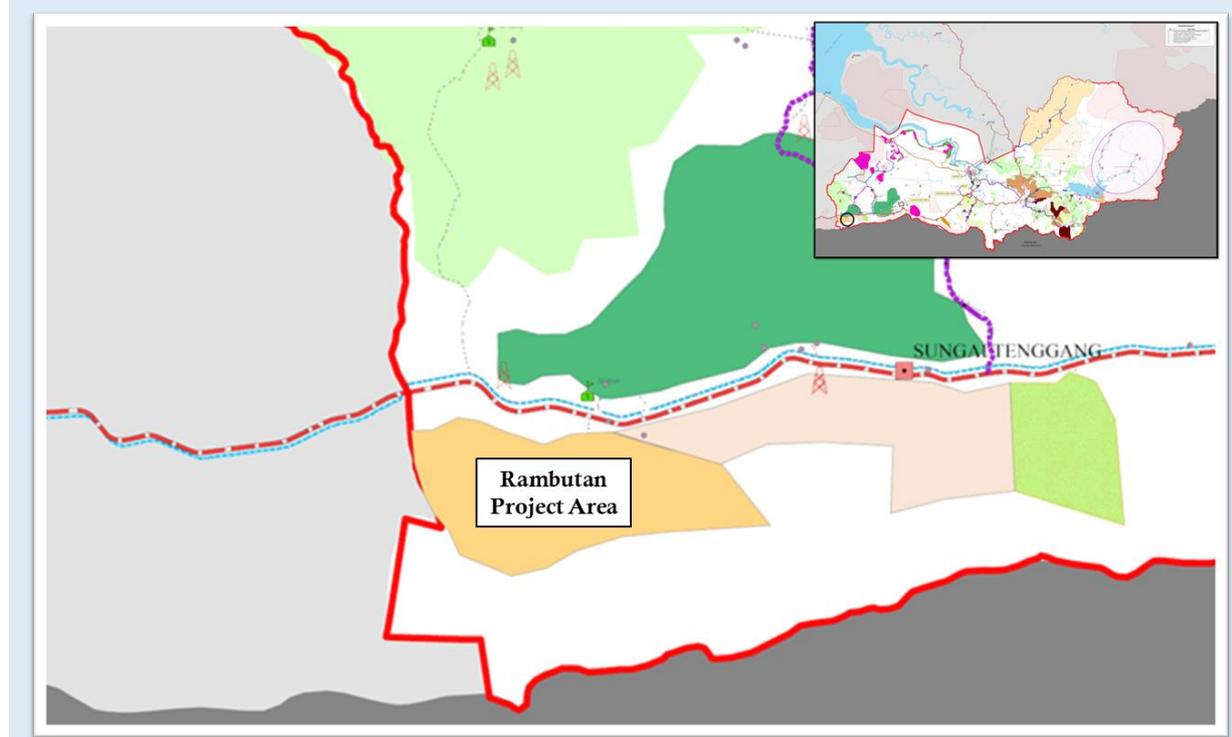
**Action/
Project No:** AG 5: Durian Project

Maturity Period (years)	5-6
Yield/ha/year	10 tons
Price/kg	RM7.00
Farm Size/Household	2 ha
Jobs created	1,500
Business Model	Individual management and anchor company
Value of Production/yr.	RM210 million
Net Farm Income/ yr. / HH	RM83,664
Net farm Income/household/month	RM6,972

2.1.6 Rambutan Project

<p>Action/ Project No:</p>	<p>AG 6: Rambutan Project</p>
<p>Project Description:</p>	<ul style="list-style-type: none"> • The project will be focused on the Lachau area covering 500 ha and involving 250 households. • The project will involve the cultivation of rambutan (Anak Sekolah Variety R191). The local farmers will implement the project under the group farming / cooperative concept. • Rambutan is suitable to be planted in the NCR area on well-drained soils. Rambutan has long been grown by the local people on a small scale in Sri Aman. • Each household to be allocated 2 ha of farm area. Rambutan will be planted around the villages, especially on hill soils on slopes of less than 10°. • DOA will organise training courses on rambutan management for farmers. The development of rambutan will involve the participation of smallholders as out-growers and anchor company. The anchor company will operate the Collection, Processing and Packaging Centre (CPPC) in Lachau and marketing the fruits. • The target for 2030 is the cultivation of 500 ha. <p style="text-align: center;">Planting of Anak Sekolah Rambutan Variety in Pantu</p> 

<p>Project Site:</p>	<p>The project will cover an area of 500 ha, located in Pantu</p>
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Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

<p>Link Projects:</p>	<ul style="list-style-type: none"> • CPPC Lachau
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Action/ Project No: AG 6: Rambutan Project	
Project Rationale:	<ul style="list-style-type: none"> ● In line with government policy of Increase food security and food production in Sarawak ● Anak Sekolah rambutan is one of the 14 signature products identified by FAMA to be marketed on a larger scale ● Due to soil and agro climate, the Lachau region, Sri Aman, produces the best rambutan in size, texture, and taste – this variety can easily penetrate the international market ● Big demand for rambutan both in the local market and international markets such as China, Middle East, and the EU
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Increase area of food production under food basket programme ● To increase farmers' income ● Increased supply of quality rambutan for the fresh and downstream industries
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Planted area of 500 hectares by 2030 ● Development of major irrigation and drainage scheme for 500 ha (water harvesting ponds and irrigation main lines) ● Participation of 250 farmers
Estimated Budget:	-
Activities/ Components:	<ul style="list-style-type: none"> ● Land clearing ● Construction of ponds and irrigation system drains and farm roads. ● Supply of planting material ● Planting of rambutan ● Maintenance ● Collection, processing and packaging of rambutan at the CPPC in Lachau
Investors:	<p>Total public funding is estimated at RM 4 million over ten years.</p> <ul style="list-style-type: none"> ● Irrigation (Ponds and Drip irrigation system) ● Drainage and farm roads ● One-off Input Subsidy to farmers (Land clearing, planting materials and fertilisers)
Business Model:	<p>The development of rambutan will involve the Centralised Farming Model ie the participation of smallholders as out-growers and FAMA/ anchor company. The anchor company will have contract farming arrangement with farmers and operate the Collection, Processing and Packaging Centre (CPPC) in Lachau and marketing of Rambutan to both local, P. Malaysia and export market.</p> <pre> graph TD A[RAMBUTAN PRODUCTION 500 ha] --> B[UPSTREAM] A --> C[MIDSTREAM] B --> D[Contract Farming Agreement] D --> E[Out-Growers] F[DOA: Planting Material Provider] --> E G[R&D and Extension Activity DOA] --> E E --> H[CPPC Lachau Anchor Company/FAMA] H --> I[Local and Export Market] </pre>

Action/ Project No:		AG 6: Rambutan Project																		
Project Time Frame:	Location	Short Term 2021 – 222	Mid Term 2023 – 2025	Long Term 2026 – 2030	Total 2030															
	Pantu	100ha	200ha	200ha	500ha															
	2021	2022	2023	2024	2025	2026	2027-2030													
	Short Term		Mid Term			Long Term														
	Phase 1	Phase 2	Phase 3																	
	<ul style="list-style-type: none"> Perimeter survey Prepare design and physical plan of Rambutan area Construction of irrigation & drainage system Phase 1 Selection of anchor companies Selection of participants Planning of planting materials Cultivation of 100 ha Construction of CPPC by Anchor Company 	<ul style="list-style-type: none"> Construction of irrigation & drainage infrastructure Phase 2 Cultivation of 200 ha 	<ul style="list-style-type: none"> Construction of irrigation & drainage infrastructure Phase 3 Expansion of cultivation areas (200 ha) 																	
Key Success Factors:	<ul style="list-style-type: none"> Improved drainage infrastructure Improved bud grafted planting material. Economies of scale and good agriculture practice (GAP) Group farming arrangement within the village Contract farming with Anchor Company 																			
Possible Barriers & Threats	<ul style="list-style-type: none"> Difficulty in getting bud grafted plants. Long gestation period of 4 years Pests and diseases Seasonal fruiting and excess of fruits during the season 																			
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Description</th> <th>Name</th> <th>Role & Responsibilities</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Main Agencies</td> <td>SADA</td> <td> <ul style="list-style-type: none"> Planning, design, and approval of plans for development Provide funds for physical infrastructure such as buildings, collection centres, farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water One-off subsidy to farmers Monitoring and evaluation of a project </td> </tr> <tr> <td>MANRED DOA</td> <td> <ul style="list-style-type: none"> Implementation of group farming schemes Provision of planting materials Extension services </td> </tr> <tr> <td>Other Agencies</td> <td>DID</td> <td>Improvement of irrigation, drainage, and farm roads</td> </tr> <tr> <td>Private Sector</td> <td>Local farmers Organization/ Anchor Company</td> <td>Processing and marketing</td> </tr> </tbody> </table>						Description	Name	Role & Responsibilities	Main Agencies	SADA	<ul style="list-style-type: none"> Planning, design, and approval of plans for development Provide funds for physical infrastructure such as buildings, collection centres, farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water One-off subsidy to farmers Monitoring and evaluation of a project 	MANRED DOA	<ul style="list-style-type: none"> Implementation of group farming schemes Provision of planting materials Extension services 	Other Agencies	DID	Improvement of irrigation, drainage, and farm roads	Private Sector	Local farmers Organization/ Anchor Company	Processing and marketing
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	MANRED DOA	<ul style="list-style-type: none"> Implementation of group farming schemes Provision of planting materials Extension services 																		
Other Agencies	DID	Improvement of irrigation, drainage, and farm roads																		
Private Sector	Local farmers Organization/ Anchor Company	Processing and marketing																		
Summary:	Rambutan																			
Variety	Anak Sekolah (R 191)																			
Area (ha)	500 ha																			

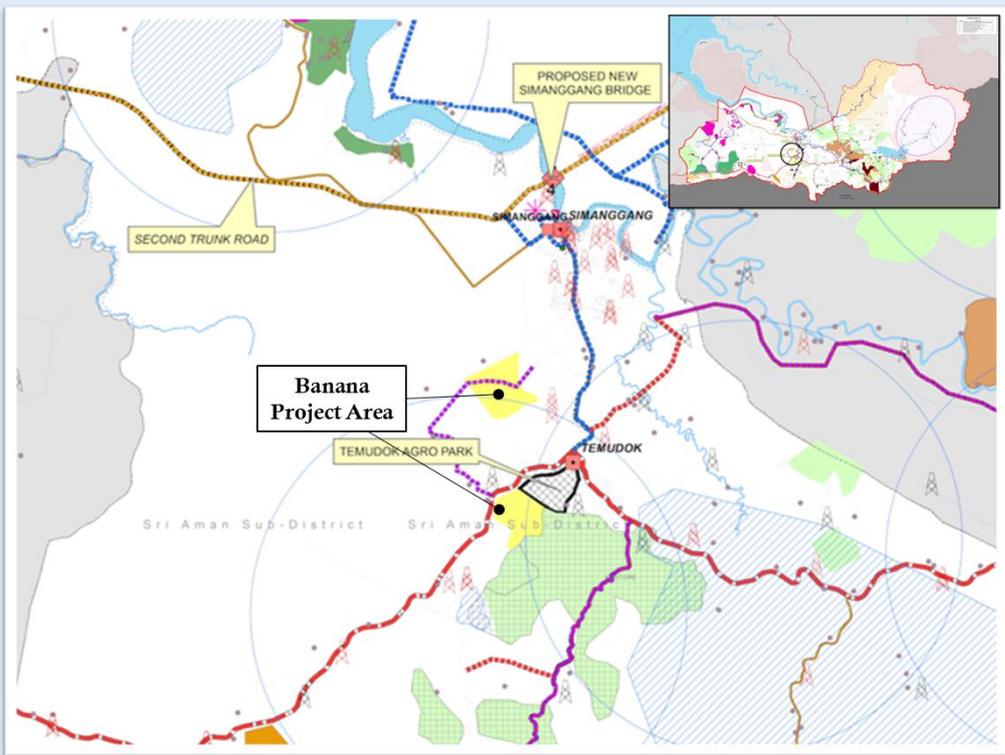
**Action/
Project No:** AG 6: Rambutan Project

Planting density/ ha	123
Economic Life (years)	More than 25
Maturity Period (years)	4
Yield/ha/year	8 MT
Price/kg	RM3.00
Average Total revenue/ha/ yr.	RM24,000
Number of farmers	250
Farm Size/Household	2 Ha
Business Model	Individual management (Outgrower) with Anchor company
Gross farm Income/household/yr.	RM48,000
Gross farm Income/household/month	RM4,000
Net Income/household/month	RM3,000

2.1.7 Banana Agro-based Project

<p>Action/ Project No:</p>	<p>AG 7: Banana Agro-based Project</p>
<p>Project Description:</p>	<ul style="list-style-type: none"> • The Banana Agro-Based project will be divided into two components: upstream and downstream activities. <ul style="list-style-type: none"> – Upstream Activity: bananas cultivation – Downstream Activity to produce banana chips • All the banana produced will be processed into banana chips • The project will involve an area of 500 ha of banana cultivation involving the Nipah/Kapok variety and Sekaki variety • Each farmer to be allocated 2 ha of land for the planting of bananas on a group or cooperative farming basis. • About 250 farmers will be involved in the project • The farmers will sell their bananas to the CPPC for processing into chips (kerepek). The processing will be managed by the Farmers Cooperatives/ women’s group or private sector Anchor Company. • The project will be provided with physical infrastructure consisting of farm roads, irrigation, access roads, drainage system, collection and processing centre, and the required utilities such as electricity and water. <p style="text-align: center;">The Kapok Variety is Suitable for Processing into Banana Chips</p> <div style="display: flex; justify-content: space-around;">   </div>

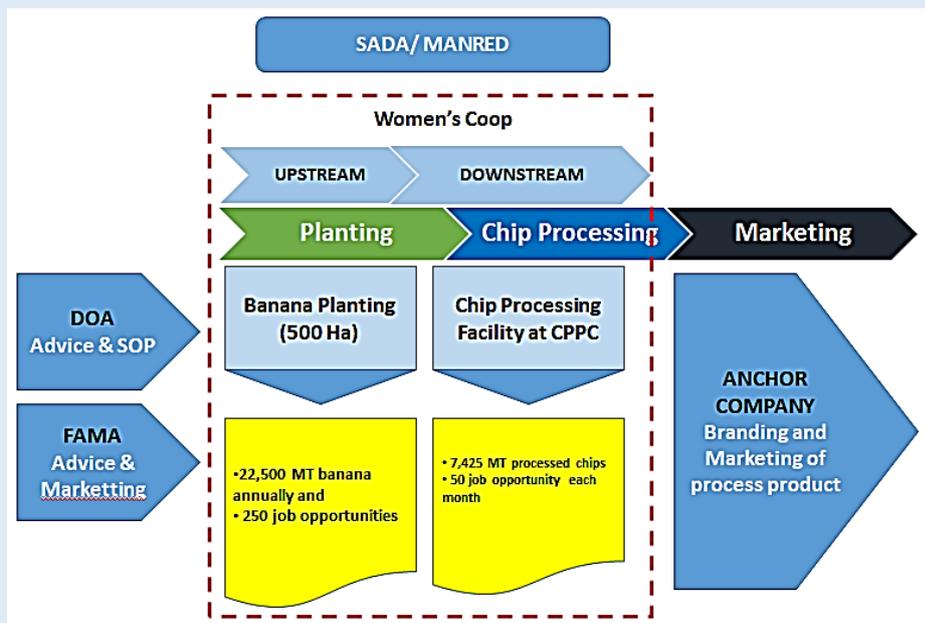
Project Site: Land Size: Temudok 500 ha



Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

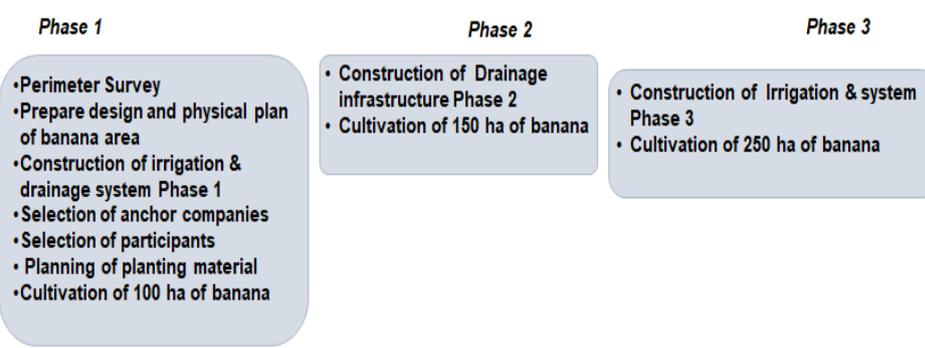
Action/ Project No: AG 7: Banana Agro-based Project	
Link Projects:	<ul style="list-style-type: none"> ● CPPC Temudok
Project Rational:	<ul style="list-style-type: none"> ● In line with government policy of Increase food security and food production in Sarawak ● Big demand for banana chips both in the local market and overseas ● Social Impact – Empowering the Women in the processing of bananas. ● By providing work for the participant wives, it will not only provide employment but increase the household income but also empower the women to be more successful. In turn, this will create a social impact on the whole family, particularly the children. ● In line with the policy of modernisation of agriculture using smart farming technology ● Increase export of high-value agricultural products
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Increase area of food production under food basket programme. ● Improved irrigation and drainage facilities ● Better use of farm mechanisation and smart farming techniques ● Increased farmers' income ● Production value of RM15 million/yr. of fresh banana by 2030 ● Production value of RM24.38 million/yr. of banana chips by 2030 ● Jobs Created: 300
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Planted banana area of 500 ha ● Involvement of 250 out-growers ● Production of fresh banana: 12,500 tonnes/yr. by 2030 ● Production of banana chips: 3,750 tonnes/yr. by 2030 ● Construction of CPPC for processing of banana into banana chips ● Establishment of farmers cooperatives for cultivation and processing of bananas
Estimated Budget:	RM7.5 million
Activities/ Components:	<ul style="list-style-type: none"> ● Identification of areas ● Development of physical infrastructure ● Land clearing and planting of bananas ● Establishment of CPPC ● Processing of banana chips
Investors:	<p>Total funding from public funding is estimated at RM7.5 million.</p> <ul style="list-style-type: none"> ● Irrigation infrastructure ● Drainage and farm roads ● One-off Planting materials ● Farm Collection Centre and processing centre
Business Model:	<p>The project will be developed based on a Cooperative Farming Model, involving farmers, women's groups, contract out growers and anchor companies. The Coop will spearhead the development of the project and source inputs for processing at the CPPC from both its farm and contract growers. The anchor company will assist in the marketing of the chips.</p>

Action/ Project No: AG 7: Banana Agro-based Project



Project Time Frame:

Location	Budget Estimate	Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Total 2030
Temudok	RM7.5 mil	100ha	150ha	250 ha	500ha



Key Success Factors:

- Improved irrigation and drainage infrastructure
 - Improved planting material (Kapok/ Nipah)
 - Good agronomic practices.
- Banana plantations in Malaysia have been severely affected by Fusarium wilt and Moko diseases, and effective management of these two diseases are central to the successful production of banana.
- Efficient supply chain management

Possible Barriers & Threats

- Lack of internet infra for smart farming
- High labour input for wrapping fruits.
- Pest and disease outbreak especially Panama and Moko disease

**Action/
Project No:** AG 7: Banana Agro-based Project

Roles & Responsibilities:	Description	Name	Role & Responsibilities
	Coordinating Agency	SADA	<ul style="list-style-type: none"> • Planning, design and approval of plans for development • Promote potential park operators. • Provide funds for physical infrastructure such as buildings, collection centres, farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water • Monitoring and evaluation of a project
	Main Agencies	<ul style="list-style-type: none"> • MANRED • PELITA/ SALCRA • DOA 	-Implementation of the mini-estate banana project -Implementation of group farming schemes -Certification under MyGAP -Extension services
	Other Agencies	DID	Improvement of drainage and irrigation
	Private Sector	<ul style="list-style-type: none"> • Area farmers Organization/ Farmers Cooperatives • Banana Tree Sdn. Bhd - Exporter of Banana Chips in Malaysia 	- Act as Anchor Company - Manage the CPPC - Marketing of produce

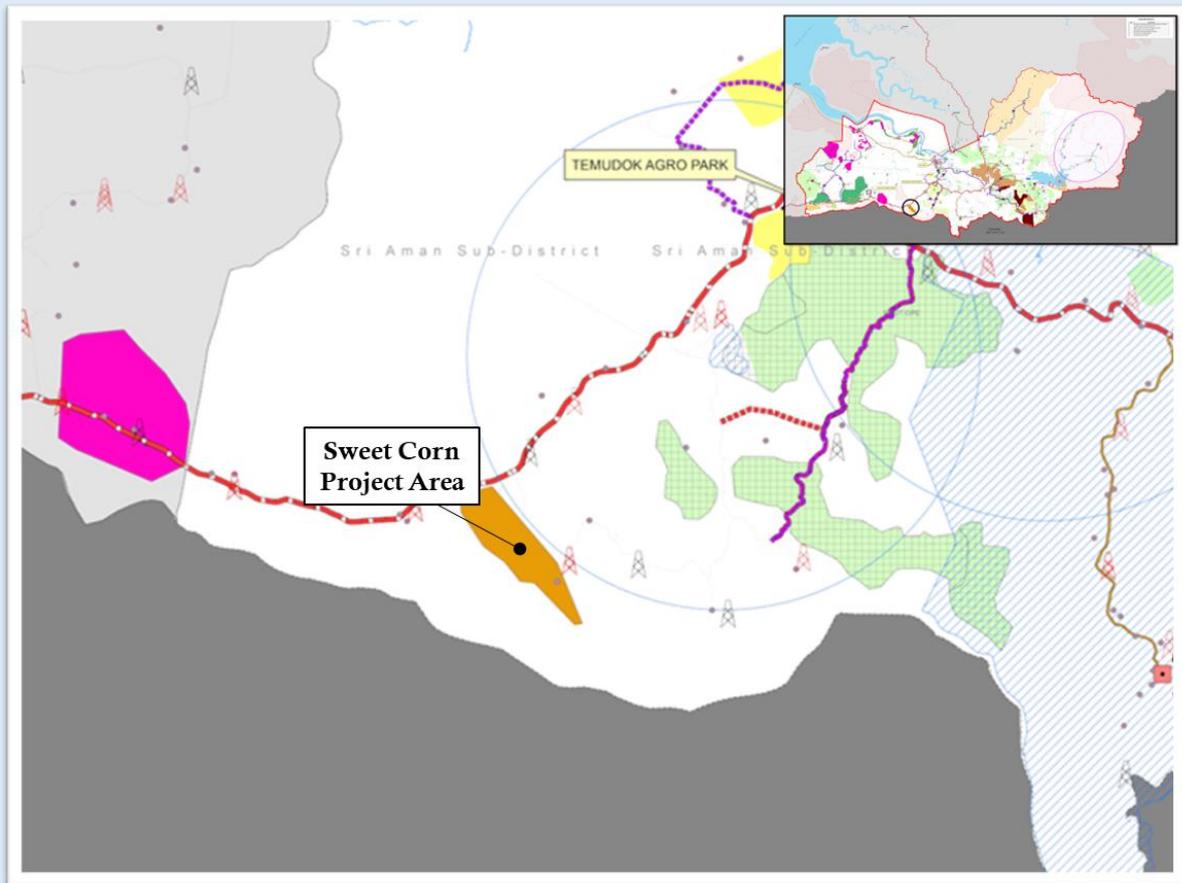
Summary:

Banana	
Plantation	
Planting density/ ha	1,100 plants
Maturity	12 months
Yield/ha/year	20 tonnes
Price/kg	RM 1.50
Farm Size/Household	2 ha
Total Area (Hectares)	500
Number of Household	250
Farm Size/Household	2 ha
Volume of Production/yr	10,000 tonnes (annualized)
Gross Revenue from Production/yr	RM 15million
Costs of Production/yr	RM5.00 million
Net Return/yr	RM10.00 million
Net Return/HH/yr	RM40,000
Net Return/HH/month	RM3,333.00
Chip Processing	
Volume Fresh Banana /yr	10,000 tonnes
Costs of raw materials (fresh banana/yr	RM15 million
Other Processing Costs/yr	RM1.5 million
Production of Chips (Metric Tons/yr	3,750
Price of banana chips/kg	RM6.50
Sales of Banana chips/yr	RM 24.38/million
Net Return/yr	RM7.87 million

2.1.8 Sweet Corn Project

Action/ Project No: AG 8: Sweet Corn Project	
Project Description:	<ul style="list-style-type: none"> • The project will involve about 300 hectares of sweet corn cultivation in Sri Aman. • The project will be developed with DOA as the lead agency. DOA will develop the necessary infrastructure required for sweet corn cultivation. These include sprinkler irrigation facilities. • Farmers will be involved in group cultivation of holdings with high yielding hybrid varieties such as Thai Supersweet, Honey Jean, Manis Madu, Mas Madu and N6 (Nelson Corn) • The planting program aims to cultivate sweet with hybrid varieties that can yield about 30,000 cobs per hectare per season of 2.5 months. • Sprinkler irrigation system is an important component of the project • The marketing of sweet corn will be organised through anchor companies or farmers' cooperative. • Processing of the sweet corn will be undertaken at the CPPC in Temudok <p style="text-align: center;">Commercial Sweet Corn Cultivation</p> <div style="text-align: center;">  </div> 
Link Projects:	<ul style="list-style-type: none"> • CPPC Temudok
Project Rational:	<ul style="list-style-type: none"> • In line with government policy of Increase food security and food production in Sarawak • In line with the policy of modernisation of agriculture using smart farming technology • Increase export of high-value agricultural products. • Reduce the deficit in food trade in Sarawak. The market for sweet corn is good both for the local market and overseas. • Sri Aman location in the tropical belt with an annual average rainfall of 1,500 millimetres and good soils is ideal for premium sweet corn farming. • At present, some farmers are already planting sweet corn during the offseason to boost their income. • Opportunities for contract farming with anchor companies such as Mascorn, Nelson's Franchise (M) Sdn. Bhd. etc.
Project Site:	Land Size: 300 ha Kg Selepong Beranggan (District of Sri Aman)

Action/ Project No: AG 8: Sweet Corn Project



Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

<p>Impacts/ Outcomes:</p>	<ul style="list-style-type: none"> ● Increase area of food production under food basket programme. ● Increased farmers’ income ● Production of sweet corn/yr. in 2030: 18,000,000 cobs (6,000 metric tonnes) ● Value of production in 2030:RM6.00 million ● Jobs Created: 200
<p>Outputs of Project & KPIs:</p>	<ul style="list-style-type: none"> ● Development of 300 ha of sweet corn for both the local market and export market ● Development of irrigation and drainage system ● Better use of farm mechanisation and smart farming techniques
<p>Estimated Budget:</p>	<p>RM13.5 million</p>
<p>Activities/ Components:</p>	<p>The development of the sweet corn plantations will involve several activities, including:</p> <ul style="list-style-type: none"> ● <u>Land Survey</u> The actual boundary for the development of sweet corn needs to be surveyed. ● <u>Development of basic external infrastructure</u> The basic infrastructure requirements include access roads and irrigation and drainage system. ● <u>Site Preparation</u> includes land survey, clearing existing vegetation, establishing roads and field drainage system, and sprinkler irrigation system. ● <u>Field Establishment</u>

Action/ Project No: AG 8: Sweet Corn Project

The recommended planting distance for sweet corn is between 35,000 to 42,000 plants per hectare. Adequate fertiliser needs to apply to ensure a good yield.

- **Harvesting**
Harvesting can be fully mechanised. However, it can result in harvesting losses of up to 20 percent. As such semi-mechanized harvesting is preferred whereby the corn are hand-picked and transported using tractor trailer
- **On-Farm Collecting Centres and CPPC**
Sweet corn harvested will be collected in a number of on-farm collections centres. The sweet corn will then be transported to the CPPC located in Temudok where the cobs are sorted, graded, washed, cleaned, dried, packed and GAP certified before transported in suitable vehicles.

Investors: Total funding from public funding is estimated at RM13.5 million.

- Major Irrigation infrastructure
- Major Drainage and farm roads
- Farm Collection Centre

Business Model:

- The project will be implemented based on the Cooperative Farming Model or the Nucleus Estate Land consolidation model involving NCR land.
- The Nucleus Estate Land Consolidation Model concept of Native Customary Rights (NCR) land development involves the participation of LCDA (Land Custody and Development Authority (LCDA), i.e., PELITA. Under this concept, local shareholders/ farmers hold 90 per cent of the equity while LCDA has 10 per cent equity. LCDA will then appoint land development agencies such as FELCRA and SALCRA or private sector (as Anchor Company) to manage the Ladang Rakyat base on management service charge. The Anchor Company) will also do the marketing of the produce.
- Business needs to be organised following the supply chain concept to ensure product quality and commercial sustainability.

Nucleus Estate Land Consolidation Model



- Notes:**
- 1) Consolidation of land to be managed by SPV on profit sharing basis;
 - 2) Participants receives dividends from profit of operation. They can also opt to work in the estate.

Action/ Project No: AG 8: Sweet Corn Project																																						
Project Time Frame:	Location	Budget Estimate	Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Total 2030																																
	Sri Aman District	RM13.5 mil	100 ha	100 ha	100 ha	300 ha																																
Key Success Factors:	<ul style="list-style-type: none"> Improved seeds/planting materials Efficient supply chain management for sweet corn Assured market for products by anchor company Extension activities to farmers to ensure product quality and food safety 																																					
Possible Barriers & Threats	<ul style="list-style-type: none"> Shortage of farm mechanisation facilities Lack of internet infra for smart farming Farmers are reluctant to participate in mini-estate schemes Possible shortage of irrigation water for cultivation 																																					
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2.1.9 Apiculture (Honey Bees)

Action/ Project No: AG 9: Apiculture (Honey Bees)

Project Description:

- The rural communities surrounding the forest area can utilise forest honeybee production to improve their income while also involving themselves in the protection of the forest area.
- The project involves encouraging rural people and the private sector to utilise the forest areas for honey production (apiculture) using good strains of honeybees or kelulut.
- The Focus area will be the seven villages and longhouses in the Skrang Valley, District of Lubok Antu.
- The project will be implemented involving the anchor company and the local farmers.
- About 300 farmers/entrepreneurs will eventually be trained to become beekeepers (outgrows), each having a minimum of 100 hives/colonies.
- Flowering trees will be propagated and grown by farmers as a source of flower for the bees, e.g., Acacia, starfruit, coffee.
- Each hive can be harvested every 30 days, giving a yield of 0.4 kg per hive.
- Processing of honey will be undertaken collectively at the CPPC in Temudok SME Industrial Park by Anchor Company.
- The current market price of Kelulut Honey is RM100.00/kg at farm gate

Kelulut Bee Farming and Processed Honey Products




Link Projects: ● CPPC Temudok

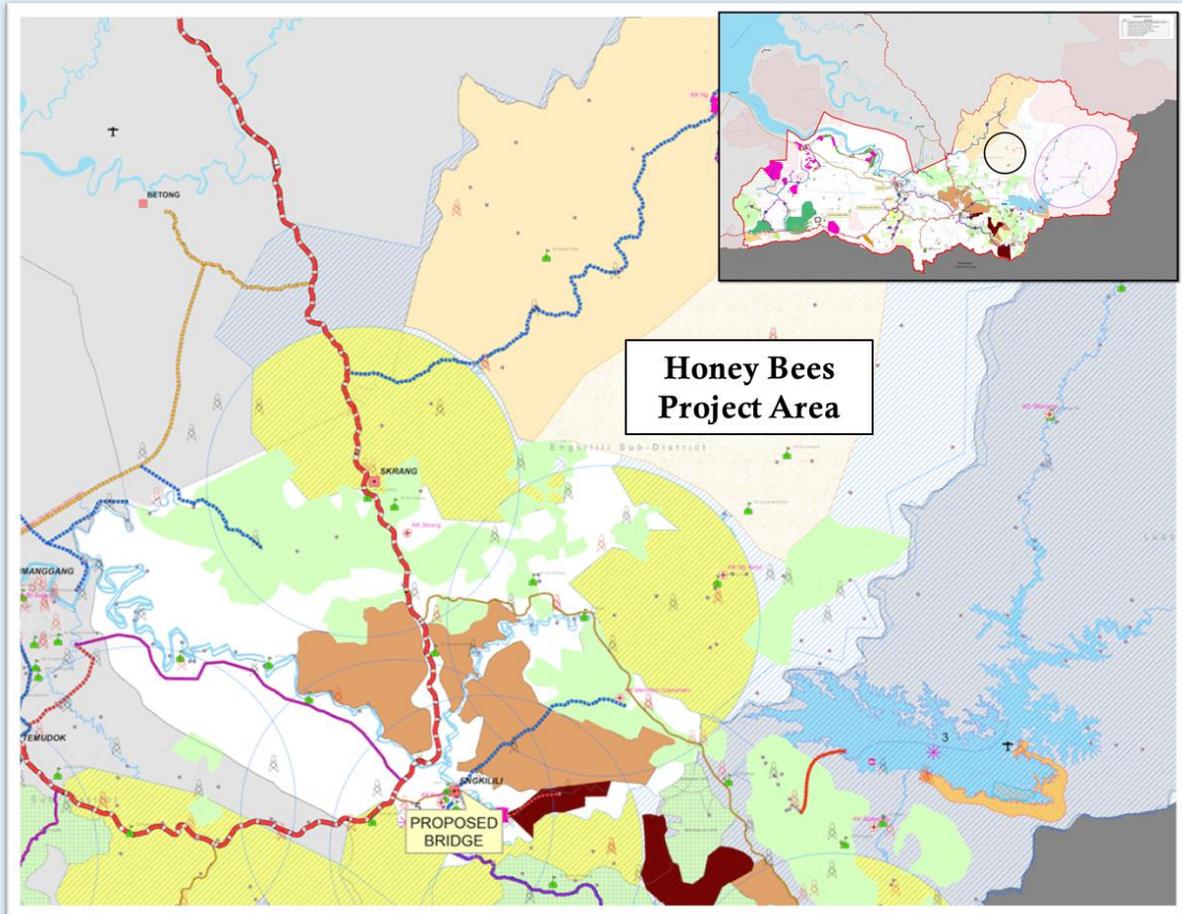
Project Rational:

- As of 2020, the total market volume of the country's kelulut honey industry stood at only RM33.6 million despite the market potential being estimated RM67.2 million (Source: Bernama 2 March 2020)
- The Kelulut honey industry in Malaysia has the potential to be a viable source of income to improve socio-economic status among smallholders in rural areas.
- Kelulut bees are easy to handle. They do not sting.
- The rural communities surrounding forest areas can utilise forest honeybee production to improve their income and protect the forest area.
- High-value product and fast income
- Potential for downstream products such as soap and beauty creams
- The sour taste of (kelulut) honey can become advantageous or 'signature' in our effort to promote the local kelulut honey extensively.

Project Site: Proposed Location: Skrang Valley, District of Lubok Antu
60,000 hives - (7 villages)

Strategic Initiative (Program/Project)	Agency	Area (Ha)	Location	Budget Estimate RM million
Apiculture (Honey Bees)	DOA Village Cooperatives	60,000 hives (7 villages)	Skrang Valley Lubok Antu	CAPEX: RM2.00 million (Hives + bee colony)

Action/ Project No: AG 9: Apiculture (Honey Bees)

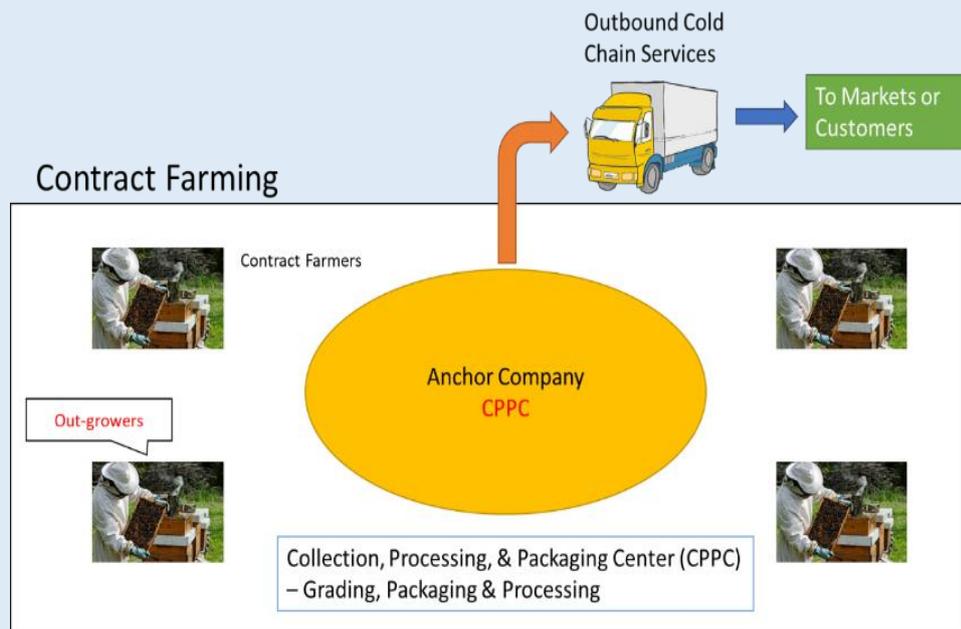


Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

<p>Impacts/ Outcomes:</p>	<ul style="list-style-type: none"> ● Gross income RM4,000/month per household @ RM100/kg ● 300 Job opportunities for local communities ● Annual production of honey of 271,800 Kg of honey in 2030 ● Price of honey (RM100/kg) ● Value of production of RM27.18 million in 2030
<p>Outputs of Project & KPIs:</p>	<ul style="list-style-type: none"> ● Establishment of 60,000 hives by 2030 ● 300 farmers trained and involved in a project
<p>Estimated Budget:</p>	<p>RM2 million</p>
<p>Activities/ Components:</p>	<p>Key Activities:</p> <ul style="list-style-type: none"> ● Selection of Anchor Company ● Selection of suitable areas for apiculture ● Selection of farmers/outgrowers ● Training of participants by DOA ● Construction of hives and supply of colonies ● The establishment of CPPC for processing and marketing
<p>Investors:</p>	<p>Funding by SADA (Hives + bee colony)</p>

Action/ Project No: AG 9: Apiculture (Honey Bees)

- Business Model:**
- The project will involve the Centralised Farming Model which utilises Anchor Companies and Outgrowers.
 - CPPC Operated by anchor company and supported by individual farmers as contract out growers.
 - The out growers will form cooperatives
 - Farmers will have a contractual agreement with the anchor company who will operate the CPPC.
 - Potential Anchor Company may include R H Bee Farms Sdn Bhd.



Project Time Frame: The project will be implemented over 10 years

Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Outcome 2030
20,000 hives (2 Villages)	20,000 hives (2 villages)	20,000 hives (2 villages)	60,000 hives

- Key Success Factors:**
- A reliable, efficient, and knowledgeable anchor company
 - Good management of project along the value chain
 - Good selection of participants
 - Efficient management of CPPC by Anchor company
 - Efficient supply chain management
 - Anchor company to supply colonies and come out with SOP (Standard Operating Procedure) for out-growers.
 - Strong and healthy bees are a critical part of profitable apiculture. To ensure that honeybees have the opportunity to gather sufficient pollen and nectar throughout the year, providing the vitamins and minerals required to maintain optimum hive strength and a viable pollinating bee force, sufficient flowering trees should be planted; these may include acacia, starfruit and coffee. Selecting plants that are good pollen and nectar sources is a major success factor in Apiculture.

- Possible Barriers & Threats**
- Lack of flowers for the honeybees
 - Pest and diseases

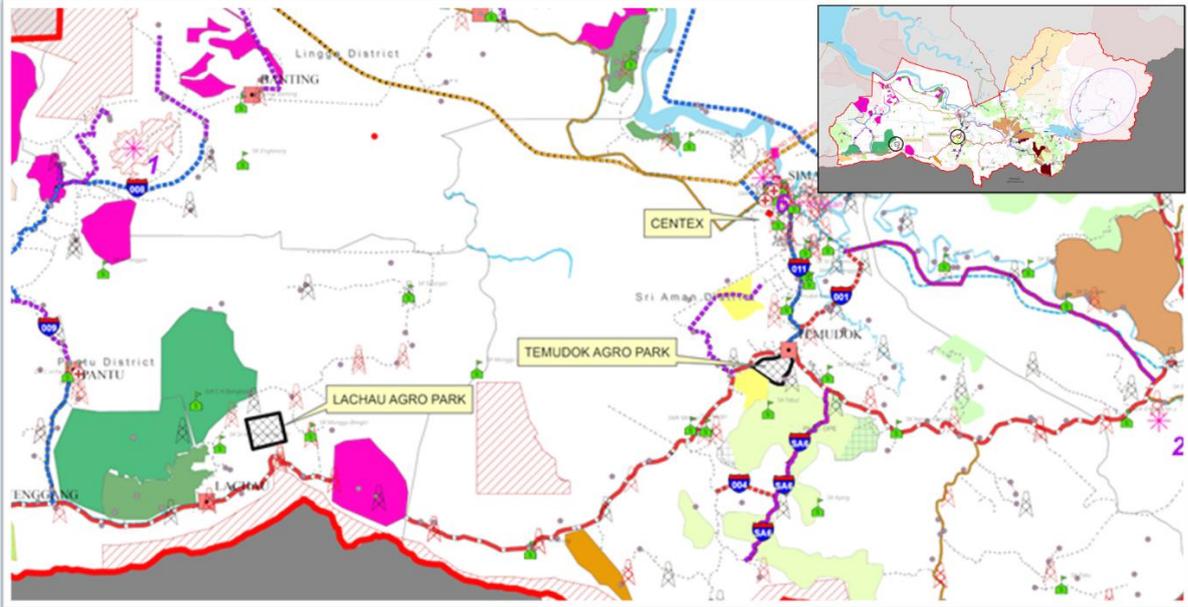
Action/ AG 9: Apiculture (Honey Bees)**Project No:**

Roles & Responsibilities:	Description			Name			Role & Responsibilities			
	Main Agencies	SADA						- Funding for the project		
		MANRED DOA						- Implementation of group farming schemes - Provision of incentives such as colonies - On-farm construction of hives - Extension services		
	Private Sector	Farmers Coop Anchor Company						Processing and marketing at CPPC		
Summary:	Apiculture									
	Number of Hives						60,000			
	No. of hives/Household						100 hives			
	Number of farmers						300			
	Yield/hive/yr.						0.4 kg			
	Volume of Production in 2030						271,800 Kg			
	Price/kg						RM100.00			
	Value of Production in 2030						RM27.18 million			
	Business Model						Outgrower contract farming with Anchor company			

2.1.10 Development of Agro Technology Parks for High-Value Agriculture

<p>Action/ Project No:</p>	<p>AG 10: Development of Agro Technology Parks for High-Value Agriculture</p>
<p>Project Description:</p>	<ul style="list-style-type: none"> ● The Agrofood Technology Park for Upstream High-Technology Agriculture clusters a few technology-driven investments in agriculture within the park. This is similar to the Agrotechnology Park developed in Singapore. ● The Agrotechnology Park (or simply Agro-Park) park will be developed in 2 regions, each about 200 hectares, on state land. <ul style="list-style-type: none"> – Lachau – Temudok ● The land will be gazetted as a Permanent Food Park ● The Park will have five components i.e. <ol style="list-style-type: none"> i. Smart farming in the fields of agriculture ii. Smart farming in the fields of livestock iii. Smart farming in the fields of aquaculture iv. R&D focusing on innovative solutions for smart farming operations v. Incubation of innovative and test new industry ideas which can be commercialised. ● The Park will invite private enterprises to establish farms in the demarcated plots of 5-10 hectare each at a reasonable fee. The agricultural industries/ products that can be targeted to use this Park can include controlled atmosphere tomatoes and chillies, mushrooms, feedlot beef, poultry and fish hatcheries, etc. ● The Agrotech-Park is proposed to be built and operated on a competitive commercial basis. ● The Park aims to produce high-quality, high-value fresh fruits and vegetables, livestock, and aquaculture products consistent with international standards for the local Marandi as export. ● The Agrotechnology Park will house modern farms that develop, adapt, and showcase advanced smart technologies and techniques. ● The Park will be provided with physical infrastructure consisting of farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water. <p style="text-align: center;">Planting of High Value Crops in Agrotech Parks</p> <div style="display: flex; justify-content: space-around;">   </div>
<p>Project Site:</p>	<p>Suitable state land in Lachau and Temudok, each about 200 ha will be identified.</p>

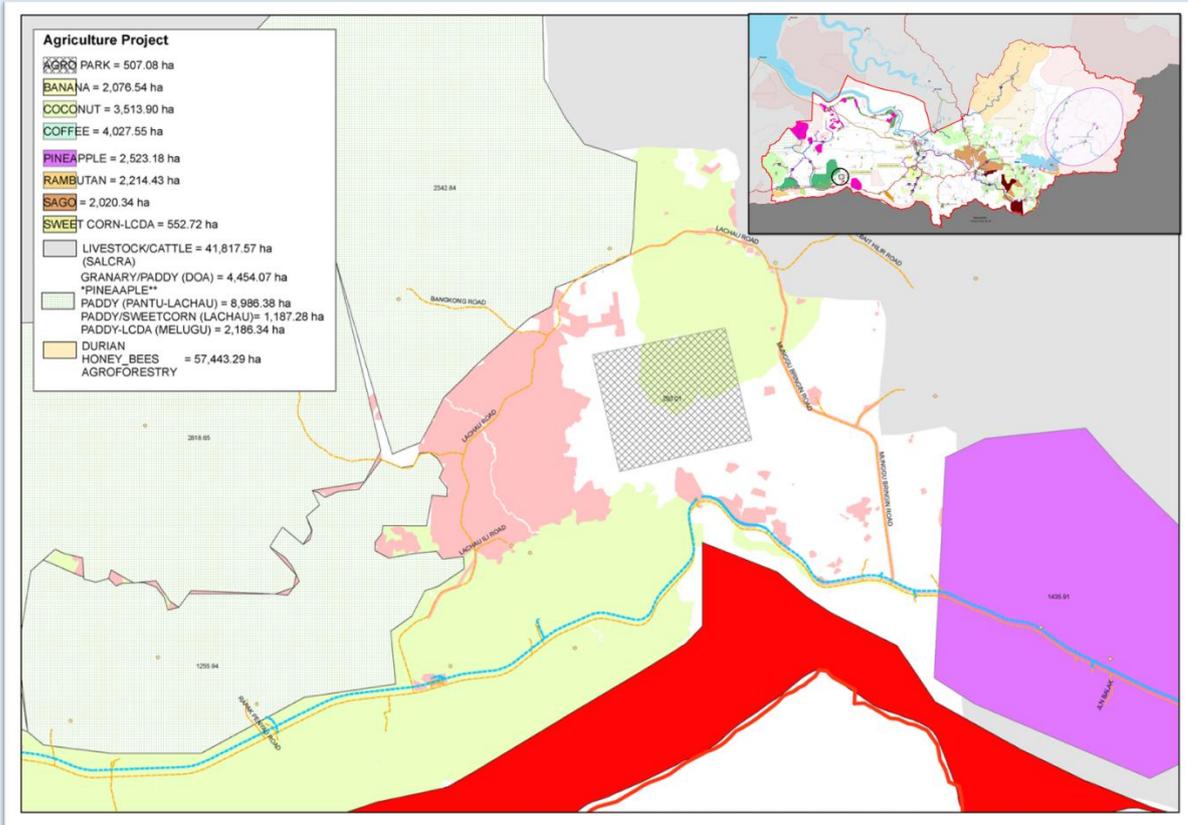
Action/ Project No: AG 10: Development of Agro Technology Parks for High-Value Agriculture



Lachau Agrotech Park (200 ha)

Source: *Daya Rancang*

Note: Base map source from UNIMAS Holdings

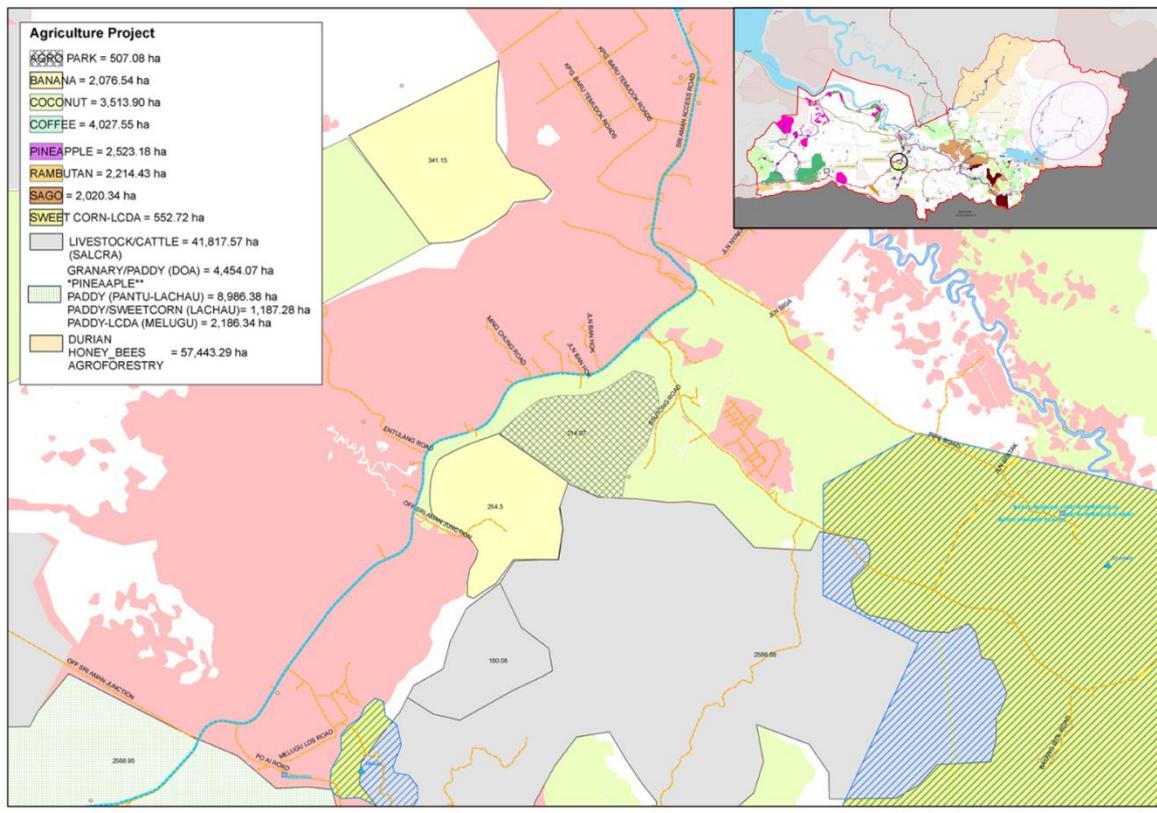


Temudok Agrotech Park 200 ha

Source: *Daya Rancang*

Note: Base map source from UNIMAS Holdings

Action/ Project No: AG 10: Development of Agro Technology Parks for High-Value Agriculture



Temudok Agrotech Park 200 ha

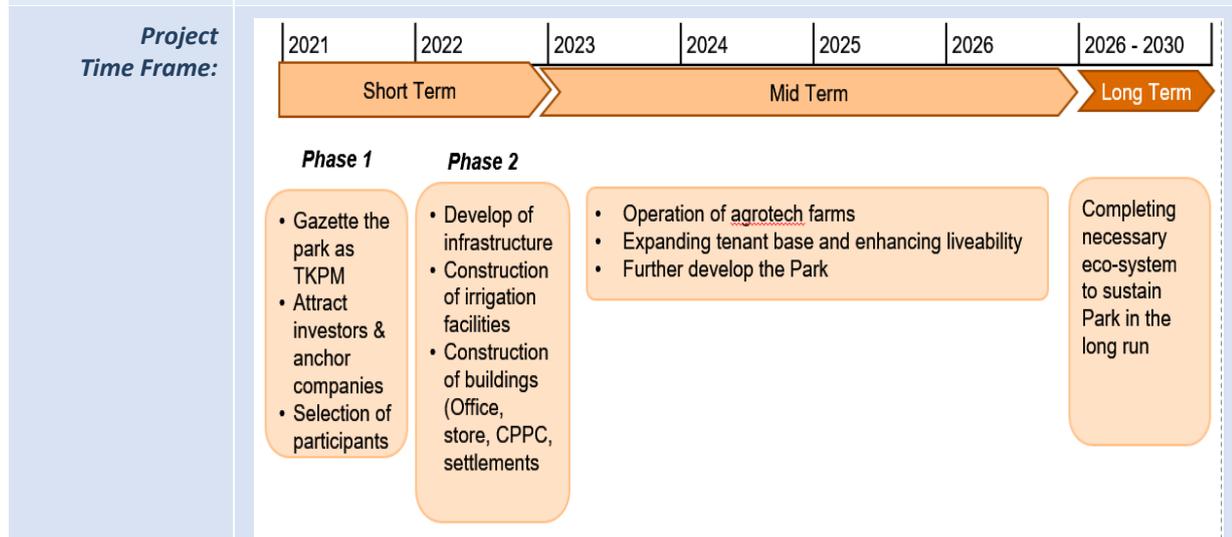
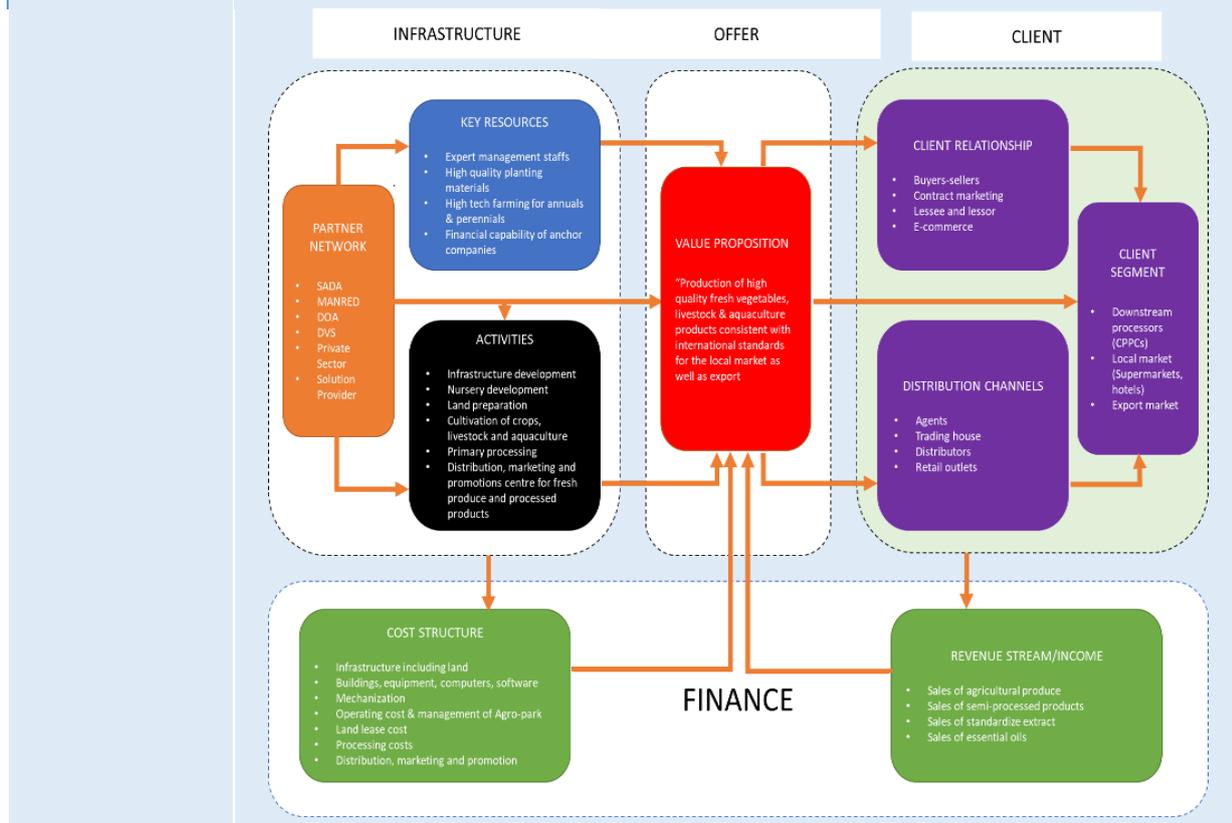
Source: Daya Rancang

Note: Base map source from UNIMAS Holdings

<p>Link Projects:</p>	<ul style="list-style-type: none"> ● CPPC Temudok ● CPPC Lachau
<p>Project Rational:</p>	<ul style="list-style-type: none"> ● Increase the self-sufficiency level (SSL) in certain food products, e.g., vegetables, fruits, mushrooms etc. ● Increase the exports of some high-value agriculture products ● To resolve the lack of constant supply to meet quality standards of large hypermarkets, supermarkets thus leading to marketing challenges that impact “off-take” and price. ● In line with government policy of Increase food security and food production in Sabah ● In line with the policy of modernisation of agriculture through the use of smart farming technology ● Increase export of high-value agricultural products ● Reduce the deficit in food trade in Sarawak
<p>Impacts/ Outcomes:</p>	<ul style="list-style-type: none"> ● Annual volume of production of at least 32,000 metric tonnes of agriculture commodities by 2030 ● Annual value of production of at least RM224 million by 2030 ● Employment generation of at least 210 in 2030
<p>Outputs of Project & KPIs:</p>	<ul style="list-style-type: none"> ● Development of 2 Agrotech Parks, i.e., in Lachau and Temudok ● Total area of 400 ha ● To create at least 80 agro-entrepreneurs in the parks

Action/ Project No:	AG 10: Development of Agro Technology Parks for High-Value Agriculture				
	<ul style="list-style-type: none"> Development of basic infrastructure in the parks. This includes irrigation ponds & primary irrigation system, drainage system, farm roads, utilities, and digital infrastructure 				
Estimated Budget:		Phase 1 2021-2023	Phase 2 2024-2026	Phase 3 2027-2030	Total
	Area	200 ha	200 ha	-	400 ha
	Production (MT/year)	16,000	32,000	32,000	32,000
	Estimated Capex (Public Sector)	10	-	-	10
	Estimated CAPEX (Private Sector)	RM35million	RM35 million	-	70 million
	Employment Generation	400	400	-	800 (30% Skilled 70% unskilled)
Activities/ Components:	<ul style="list-style-type: none"> Determine suitable areas for the development of the Agro-Technology Parks Form a technical committee under SADA to plan the development of the Parks Design the Parks with emphasis on sustainable development and an aesthetically pleasing environment Provide the Parks with the necessary infrastructure such as roads, water, irrigation facilities, electrical supply, internet, and drainage Demarcate the Park into parcels of land ranging from 4 to 5 hectares Promote the Park to potential growers and companies involved in research to showcase their new production technology Attract international companies to display their products, including biotech products 				
Investors:	Public Sector: 12.5% RM10 million Private Sector :87.5% RM70 million				
Business Model:	The business model canvas for the agro-park is shown below:				

Action/ Project No: AG 10: Development of Agro Technology Parks for High-Value Agriculture



- Key Success Factors:**
- Availability of flat to suitable undulating land for agriculture
 - Parks should be well equipped with the necessary infrastructure such as roads, water, irrigation facilities, electrical supply and drainage and internet connectivity
 - Availability of clean water supply
 - Participation of qualified and full-time investors and companies
 - Incentives such as low rentals and long-term lease arrangement
 - Minimise risks of pest and diseases and environmental pollution

- Possible Barriers & Threats**
- Disinterest of park operators due to lack of attractive incentives
 - Slow process of approvals and land matters

Action/ Project No:	AG 10: Development of Agro Technology Parks for High-Value Agriculture	
Roles & Responsibilities:	The Park will be under the jurisdiction of the project promoter, i.e., SADA. To ensure the smooth implementation of the park, DOA, MARDI, and other stakeholders will work closely together.	
	Agencies	Role & Responsibilities
	SADA	<ul style="list-style-type: none"> ● Planning, design and approval of plans for development ● Promote potential park operators. ● Provided funds for physical infrastructure consisting of buildings, collection centres, farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water. ● Monitoring and evaluation of the project
	DOA	Advisory services and Certification program
	DOF	Advisory services and Certification program
	DVS	Advisory services and Certification program
	MARDI	R&D on new technologies in smart farming
	IHL/ Universities	R&D and Incubation programmes
Summary:	-	

2.1.11 Oil Palm Project

Action/ Project No: AG 11: Oil Palm Project

Project Description:

- The project involves the establishment of a number of oil palm plantations in the area totalling 24,712 ha, the implementation of which will be in phases. The development will be SALCRA as well as MPOB on NCR land under the concept of Ladang Rakyat.

Strategic Initiative (Program/Project)	AGENCY	Location	Acreage Ha	Budget Estimate
Oil Palm – new project	SALCRA	<ul style="list-style-type: none"> Lubok Antu-Engkilili Pantu (Sebuyau) 	18,000	432,000,000
Oil Palm Replanting	SALCRA	Lubok Antu	1,712	33,897,600
Individual Oil Palm Smallholders (New Planting & Replanting) (Base on subsidy of RM 9,000/Ha subject to a maximum of 2 Ha/ HH)	Smallholders /Ministry of Plantation Industry & Commodities (MPIC) through MPOB	Balai Ringin, Bukit Begunan and Batang Ai	5,000	45,000,000
Total			24,712	510,897,600

- The oil palm plantation development would probably require the establishment of two palm oil mills with a capacity of 60-80 tons ffb/ hr. This mill will also include biogas plants to enable palm oil millers to capture methane—a greenhouse gas with huge renewable energy potential—via biogas trapping facilities and utilising palm biomass as fuel. The biomass generated from the mills can also be used for the production of bio-fertilizer.

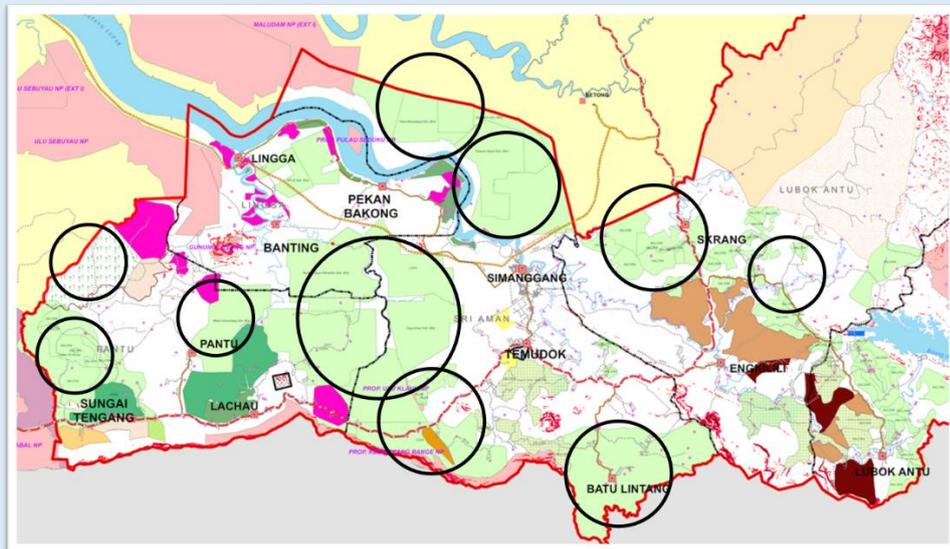
Oil Palm Development by SALCRA



Action/ Project No: AG 11: Oil Palm Project

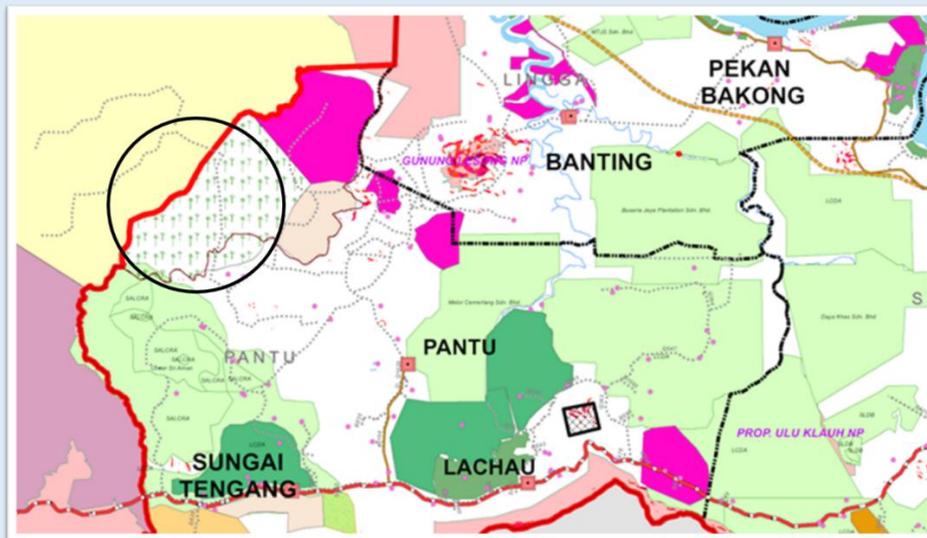
Project Site:

	LUBOK ANTU PALM OIL MILL 1 and 2	
	PROPOSED NEW DEVELOPMENT AREA	
1	JAONG EXTENSION	8, 803 HA
2	KUMPANG SILIK	12, 942 HA
3	PANJAI RUAI EXT.	442 HA
4	RAKUT and GERUNGGANG EXT.	426 HA
5	BATU BEBINI EXT.	551 HA
6	ULU KESIT	2, 415 HA
7	BUNU III EXT	608 HA
8	PENTIK EXT.	558 HA
9	BUKIT BALING and SUNGAI PENYUAN	1, 151 HA
10	SUNGAI TEMBONG	1, 248 HA
11	SUNGAI LIPAT	1, 154 HA
12	TANJUNG REMBAI	651 HA
13	SEBUYAU, PANTU	8,000 HA



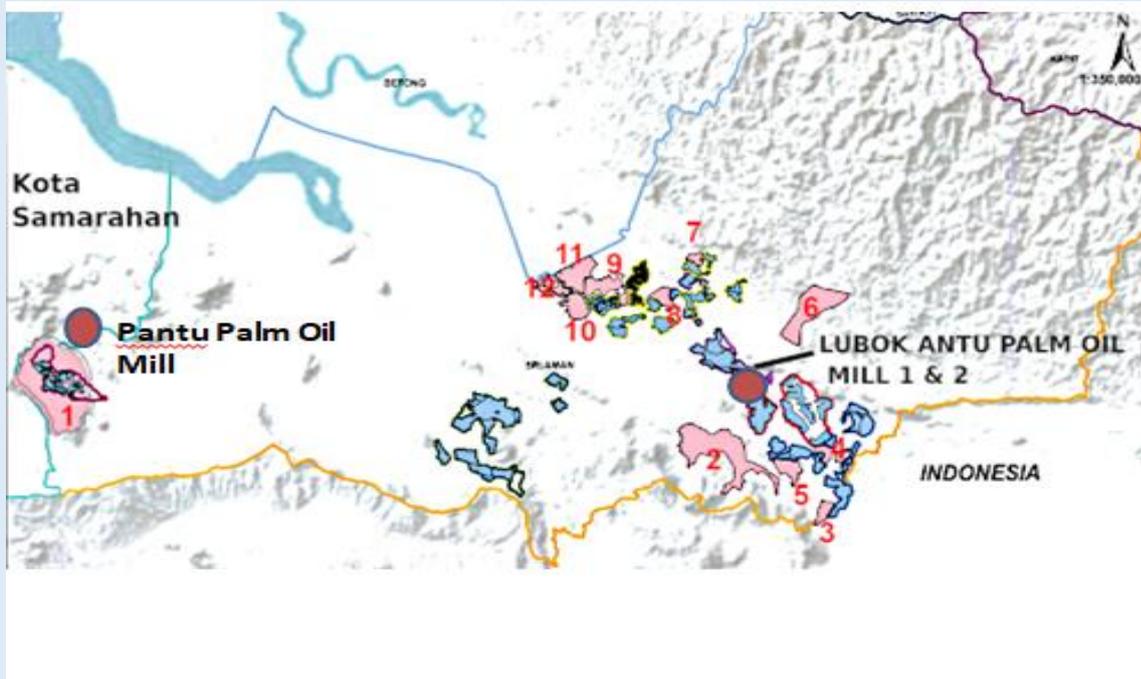
Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

New Oil Palm Area in Sebuyau (Pantu District)



Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

Action/ Project No: AG 11: Oil Palm Project



Source: UNIMAS Holdings

Link Projects:	<ul style="list-style-type: none"> ● Cattle Integration in Oil palm
Project Rational:	<ul style="list-style-type: none"> ● Availability of large tracts of suitable NCR land for oil palm development ● It will be one of the major drivers for the development of Sri Aman. ● Will be able to provide employment opportunities to the region (from plantation and mills)
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Increased production of oil palm (FFB): 441,433 metric tonnes in 2035 ● Increased production of CPO: 102,000 metric tonnes in 2035 ● Value of production of oil palm FFB at farm gate of RM176million in 2035 ● Value of production of oil palm CPO at of RM306 million in 2035 ● Jobs Created: 2,323 by 2030 ● Increased farmers Net Income/month/household: RM5,000 (from 3.0 Ha) ● Catalyst in creating the value chain of the palm oil industry as well as in the development of related supporting industries
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Cultivation of 18,000 ha of oil palm under SALCRA ● Cultivation of 5,000 ha Individual Oil Palm Smallholders (New Planting and Replanting) by MPOB ● Oil Palm replanting of 1,712 ha by SALCRA
Estimated Budget:	RM315 million
Activities/ Components:	<p>The development of the oil palm plantations will involve a number of activities, including:</p> <ul style="list-style-type: none"> ● <u>Land Survey</u> The actual boundary for the development of oil palm needs to be surveyed. ● <u>Development of Basic External Infrastructure</u> The basic infrastructure requirements include access roads and drainage systems. ● <u>Nursery Establishment</u> commences as soon as the planning phase has been completed. Good quality DXP seedlings are raised in a polybag nursery for about 12 months. Good nursery practices such as adequate watering, fertilising, and culling of seedlings with undesirable characteristics are essential for the production of vigorous planting materials. A culling rate of up to 25% is commonly practised in well-managed nurseries.

Action/ Project No:		AG 11: Oil Palm Project											
	<ul style="list-style-type: none"> ● Site Preparation includes land survey, clearing existing vegetation, establishing roads and field drainage system, terracing for hilly areas, soil conservation measures such as conservation bunds and silt pits and sowing of leguminous cover crops. ● Field Establishment activities are lining, holing, and planting polybag oil palm seedlings at a density of 136 to 148 palms per ha, depending on the soil type and terrain. Effort must be made to ensure full ground coverage by leguminous cover crops such as <i>Pueraria javanica</i> and <i>Calopogonium caeruleum</i> to minimise soil erosion through runoff and improve soil fertility through nitrogen fixation. ● Establishment of Palm oil mills and biogas facilities The oil palm plantation development will require the establishment of a palm oil mill with a capacity of 60-80 tons ffb/ hr. The mill will also include biogas plants to enable palm oil millers to capture methane, a greenhouse gas with huge renewable energy potential, via biogas trapping facilities and utilise palm biomass fuel. The biomass generated from the mills can also be used for the production of bio-fertilizer. 												
Investors:	<p>Total investment for Oil palm plantation is estimated at RM 541million.</p> <p>Capital Costs</p> <ul style="list-style-type: none"> ● Land development costs @ RM20,000/Ha = RM 511 million ● 2 Mill and biogas= RM30 million <p>Funding</p> <ul style="list-style-type: none"> – Funding of major infrastructure by SADA / SALCRA – Cultivation of oil palm – Mill and biogas 												
Business Model:	The business model for developing NCR land by SALCRA will involve the Nucleus Estate Land Consolidation Model												
Project Time Frame:	<table border="1"> <thead> <tr> <th>Year</th> <th>Short Term</th> <th>Mid Term</th> <th>Long Term</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Phasing of Planting (Cumulative area)</td> <td>-</td> <td>16,712 ha</td> <td>8,000-</td> <td>24,712 Ha</td> </tr> </tbody> </table>	Year	Short Term	Mid Term	Long Term	Total	Phasing of Planting (Cumulative area)	-	16,712 ha	8,000-	24,712 Ha		
Year	Short Term	Mid Term	Long Term	Total									
Phasing of Planting (Cumulative area)	-	16,712 ha	8,000-	24,712 Ha									
Key Success Factors:	<ul style="list-style-type: none"> ● Land free of encumbrances from native customary land claim ● Ensure sustainability in the development of oil palm through adherence to the various guidelines on steel and development under the Natural Resources and Environmental Ordinance (NREO) ● Adequate labour availability – ensure access to foreign labour ● Development of access roads ● Development of basic infrastructure such as drainage, roads and utilities power supply, utilities, telecommunication, water supply 												
Possible Barriers & Threats	<ul style="list-style-type: none"> ● Lack of funds for development by SALCRA 												
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Secondary Implementers</th> <th>Potential Role</th> <th>Description of role</th> </tr> </thead> <tbody> <tr> <td>● LCDA (Land Custody and Development Authority)</td> <td>Land Custodian</td> <td>LCDA is one of the core agencies tasked with catalysing the economic development of the NCR land in Sarawak.</td> </tr> <tr> <td>● SALCRA</td> <td>Land Development</td> <td>Management of NCR land for oil palm plantations</td> </tr> <tr> <td>● MPOB</td> <td>Land Development</td> <td>Individual Oil Palm Smallholders (New Planting and Replanting) (Based on subsidy of RM 9,000/ha subject to a maximum of 2 ha/ HH)</td> </tr> </tbody> </table>	Secondary Implementers	Potential Role	Description of role	● LCDA (Land Custody and Development Authority)	Land Custodian	LCDA is one of the core agencies tasked with catalysing the economic development of the NCR land in Sarawak.	● SALCRA	Land Development	Management of NCR land for oil palm plantations	● MPOB	Land Development	Individual Oil Palm Smallholders (New Planting and Replanting) (Based on subsidy of RM 9,000/ha subject to a maximum of 2 ha/ HH)
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Others:	1.Use of Better Planting Materials												

Action/ Project No:	AG 11: Oil Palm Project
	<p>Besides good agricultural practices, soil management and good harvesting and processing methods, the industry's competitiveness is also dependent on planting improved materials that give better yield. Existing plantations mainly uses the standard <i>dura × pisifera</i> (D & P) hybrid planting for cultivation with yields of 4 MT/ha/yr. of CPO.</p> <p>Ongoing research and development by the Malaysian Palm Oil Board (MPOB) and the industry have resulted in elite <i>dura × pisifera</i> material from conventional breeding with a yield exceeding 6 MT/ha/yr. of CPO. Further, the use of tissue culture technology has resulted in the development of clones with yields of 8–12 MT/ha/yr. of CPO. These materials will go a long way toward supporting replanting efforts on old oil palm stands and ensuring increased palm oil production without land expansion.</p> <p>2. Digital Farming</p> <p>The basic philosophy of Digital/ precision farming is to measure and manage variabilities such as yield, soil, pest and weed across the fields to enhance efficiency in the management of agricultural practices in the cropping system for optimum productivity, product quality and economic returns, and minimise environmental impact and agricultural risk.</p> <p>The mechanisation of most operations is an absolute necessity for precision/ digital farming to materialise in oil palm plantations. The machines will allow data loggers, yield monitors, GPS, sensors etc., to be fitted for data collection.</p> <p>Precision farming/ digital farming technologies are now available by making full use of drones, remote sensing, GIS, GPS and digital elevation model (DEM). Among the benefits of these technologies include:</p> <ul style="list-style-type: none"> ● To demarcate the terrain and coupled with soil maps for specific practices such as higher planting density for peat soil (160 palms per ha) and shallower soils (148 palms per ha) ● To automatically generate precise positions of the terraces for constant density planting in hilly areas ● Design of drainage system in an oil palm plantation ● Assessment of the extent and progress of pest damage in an oil palm plantation using remote sensing images where the ability to survey affected areas quickly is a big advantage in pest and disease management ● Identify the direction of the pest movement and the focal points where the next outbreak is likely to occur. This allows for differential treatments and the timing of treatments to contain and ultimately eradicate the pest. ● Allow for site-specific management of oil plantation, based on terrain and soil types, by reclassifying common soils in each field into practical management zones bordered by roads and precisely located in GPS maps for ease of implementing the prescribed remedial actions. The impact of site-specific management is high, increasing yields by as much as 30%. <p>3. Sustainable Farming</p> <p>Sustainable farming of oil palm plantations should be at the forefront of development efforts. Recommended management practices under the Natural Resources and Environmental Ordinance (NREO) include:</p> <ul style="list-style-type: none"> ● Development should be limited to slopes of less than 25°. However, small pockets of the area with the gradient of 25° to 30° located in the midst of the large area of land having gentler slopes of less than 25° may be developed; this is provided that the slopes consist of soil materials not easily erodible (higher in clay content). ● For slopes of 9° to 25°, planting should be carried out on bench terraces running along the contours. For small pockets of land with 25° to 30° slopes, in the midst of a large area of more gentle slopes of less than 25°, platform planting should be adopted. Bench terraces should be constructed with a very slight reverse gradient sloping back towards the hillside. ● Development activities that can accelerate soil erosion should be scheduled in the drier part of the year. Of significance is site clearing, terracing and road construction.

**Action/
Project No:** AG 11: Oil Palm Project

Sowing of cover crop seeds (e.g., *Mucuna* sp., *Calapogonium* sp., *Centrosema* sp.) should be timed at the beginning of the wet season.

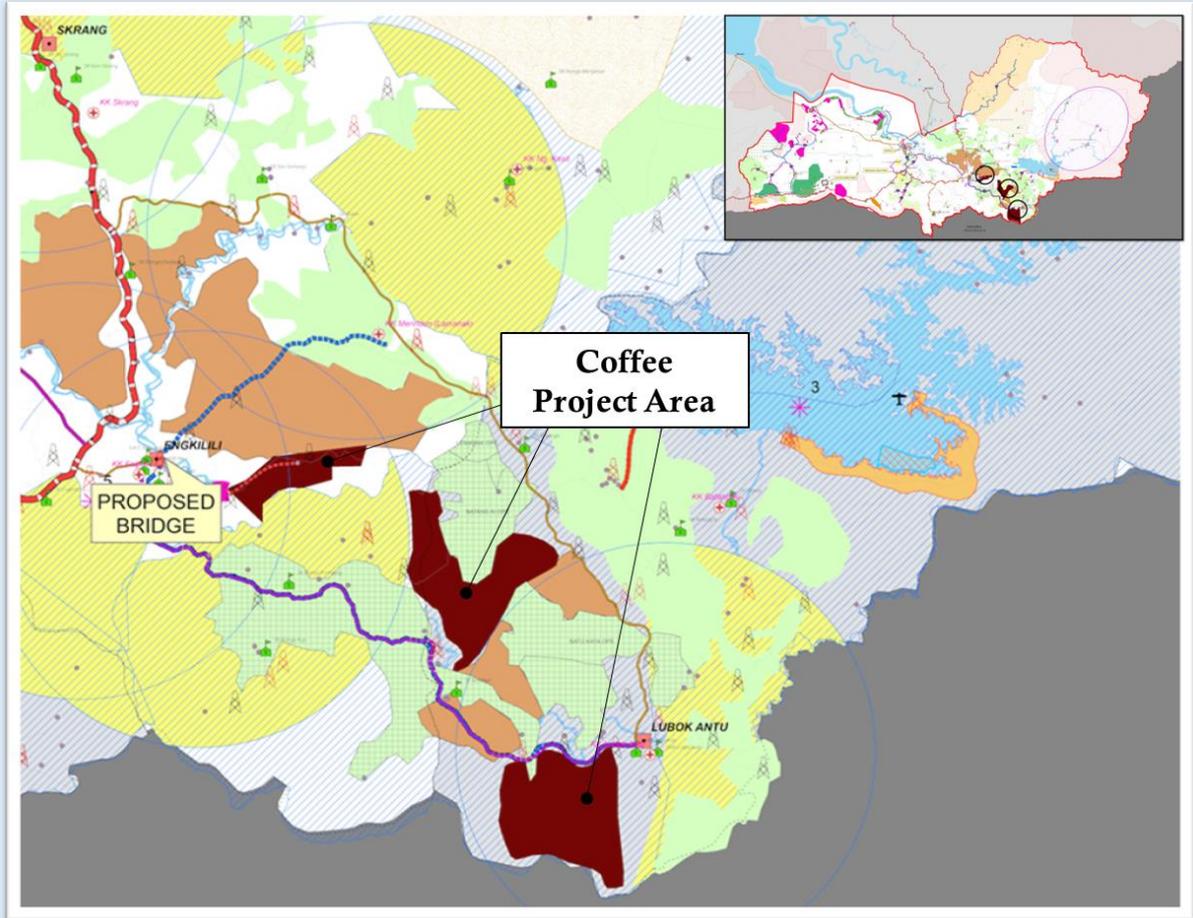
- Cover crops should be planted immediately after land clearing. The synchronisation of terracing scheduled for the drier season (generally between May and September) with the sowing of seeds of cover crops before the onset of the wetter season (generally begins in October) would potentially reduce the loss of top soils.

2.1.12 Coffee

Action/ Project No:	AG 12: Coffee Project
<p>Project Description:</p>	<ul style="list-style-type: none"> • The project will involve the cultivation of coffee in the Liberica variety (Kopi Dayak). The project will be implemented by the local farmers around their villages. • Coffee is suitable to be planted in the NCR area on the hillsides. Coffee has long been grown by the local people on a small scale. • Each household to be allocated 0.25 ha. Coffee will be planted around the villages, especially hill soils on slopes of less than 25° • DOA will organise training courses on coffee management for farmers. • The development of coffee will involve the participation of smallholders as out-growers and anchor company. The anchor company will operate the Collection, Processing and Packaging Centre (CPPC) in Temudok and the processing and marketing of coffee beans. • The target for 2030 is the cultivation of 1,000 ha. • The project will be located in the following areas: Lubuk Antu and Engkilili <p style="text-align: center;">Coffee Nursery and Planting of Coffee by Smallholders</p> <div style="display: flex; justify-content: space-around;">   </div>
<p>Link Projects:</p>	<ul style="list-style-type: none"> • CPPC Temudok • Apiculture
<p>Project Rational:</p>	<ul style="list-style-type: none"> • Coffee is an industry that is highly valued and can be enhanced for the improvement of the socio-economic situation of farmers. • Big demand for coffee in the local market as well international market. • Coffee is the second commodity mostly traded in the world, after petroleum. The main coffee producing and exporting countries are Brazil, Vietnam, Indonesia, Colombia, and India (Comtrade, 2015). Malaysia was ranked 60th worldwide, which only contribute approximately 0.16% of the world's coffee production. • The value of imports of coffee increased from RM51.59 million in 1988 to more than RM972.3 million in 2013, with an average annual growth of 17.8%. Countries that supply coffee beans to Malaysia in 2013 were Indonesia (49%), Vietnam (35%) and Brazil (6%). • In 2017, Sarawak imported about RM134.11 million of coffee beans and products and exported only RM359,213. • Coffee will be one of the main crops promoted in Sarawak under the state's agriculture transformation programme. • Liberica is a much more robust plant than Arabica, producing much bigger cherries and maturing more quickly. • Being a hardier plant than Arabica, it adapted better to the climate and terrain of Sarawak. It became known locally as <i>kopi dayak</i> and was the first cash crop to be taken up by the Iban.

Action/ Project No: AG 12: Coffee Project

Project Site:	Available Area <ul style="list-style-type: none"> • Engkilili: 664 ha • Lubuk Antu: 1,563 ha
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Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

Impacts/ Outcomes:	<ul style="list-style-type: none"> • Increased production of coffee berries: 20,000 metric tonnes in 2035 • Value of production of coffee berries at farm gate of RM30 million in 2035 • Jobs Created: 4,000 by 2030 • Revitalised the coffee industry along the value chain • Increased farmers gross Income/month/household: RM625 (from 0.25 ha). • Catalyst in creating the value chain of the coffee industry as well as in the development of related supporting industries.
Outputs of Project & KPIs:	<ul style="list-style-type: none"> • Planted area of 1,000 ha of coffee in 2030. • Development of 1,000 km of farm roads • Creation of 4,000 employment opportunities
Estimated Budget:	RM13.5 million
Activities/ Components:	<ul style="list-style-type: none"> • Land clearing • Construction of drains and bunds • Supply of planting material • Planting of coffee and intercrops • Maintenance

Action/ Project No: AG 12: Coffee Project					
	<ul style="list-style-type: none"> Collection, processing and packaging of coffee at the CPPC in Temudok 				
Investors:	Budget Estimate		Implementation/Outcome		
		Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Outcome 2030
	RM13.5 mil	200 ha	300 ha	500 ha	1,000 ha
Business Model:	<ul style="list-style-type: none"> The project will involve the Centralised Farming Model involving Anchor Company and Outgrowers. The development of coffee will involve the participation of smallholders as out-growers and anchor company. The anchor company will operate the Collection, Processing and Packaging Centre (CPPC) at Temudok and the marketing of coffee beans. <div style="text-align: center;"> </div>				
Project Time Frame:	Short Term 2021 – 2022	Mid Term 2023 – 2025	Long Term 2026 – 2030	Outcome 2030	
	200 ha	300 ha	500 ha	1,000 ha	
Key Success Factors:	<ul style="list-style-type: none"> Improved drainage infrastructure and farm roads Improved clonal planting material. Economies of scale and good agriculture practice (GAP) Group farming arrangement within the village Contract farming with Anchor Company 				
Possible Barriers & Threats	<ul style="list-style-type: none"> Fluctuation in the prices of coffee Pests and diseases Labour for harvesting of coffee 				
Roles & Responsibilities:	Description	Name	Role & Responsibilities		
	Main Agencies	SADA	<ul style="list-style-type: none"> Planning, design and approval of plans for development Provided funds for physical infrastructure. One-off subsidy to farmers Monitoring and evaluation of the project 		
		MANRED DOA	<ul style="list-style-type: none"> Implementation of group farming schemes Provision of planting materials Extension services 		

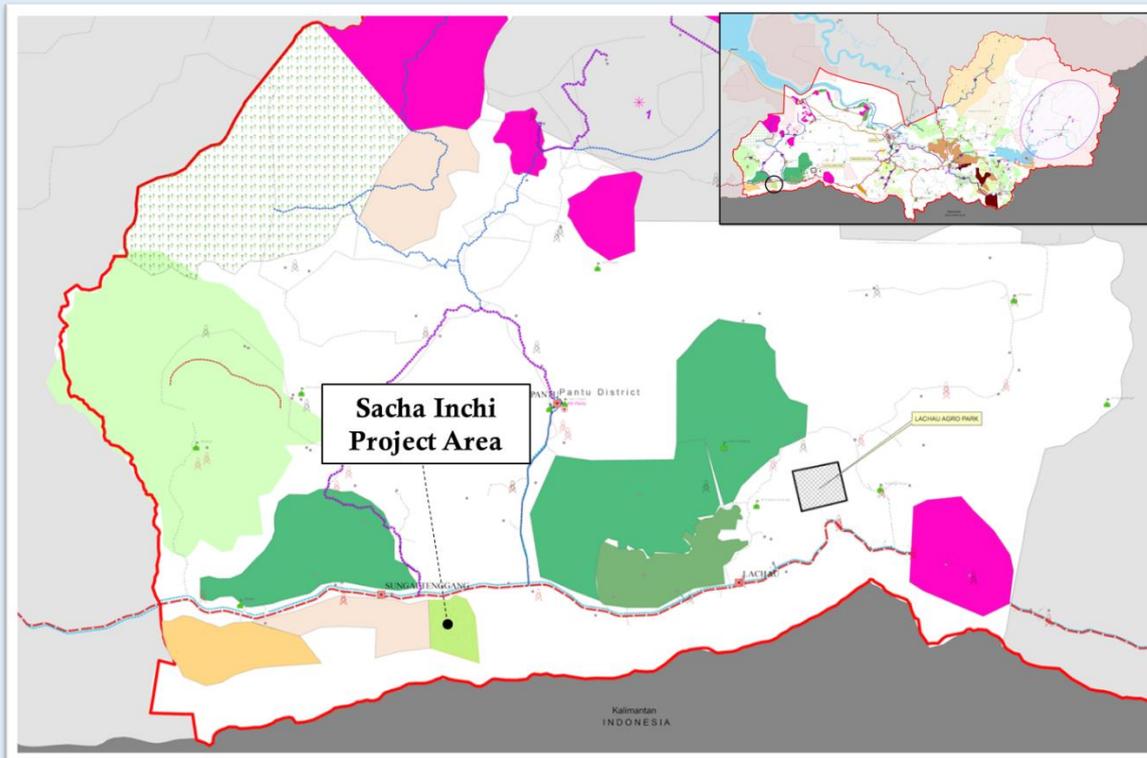
**Action/
Project No:** AG 12: Coffee Project

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2.1.13 Sacha Inchi Project

Action/ Project No: AG 13: Sacha Inchi Project	
Project Description:	<ul style="list-style-type: none"> • Sacha Inchi is suitable to be planted in Sri Aman along the hillside. The local farmers are already venturing into this crop in Pantu. At present, about 40 ha has already been planted in Sapak, Pantu. • The Target acreage for Pantu is 500 Ha involving 500 households. Each household to be allocated 1 ha. • The crop will be planted under the organic farming concept. • The seeds of inchi have high protein, and the oil is rich in the fatty acids omega-3, omega-6 and omega 9. • The project will be implemented under the group farming / cooperative concept. • The development of Sacha Inchi will involve the participation of smallholders as out-growers and anchor company who will operate the CPPC in Lachau. • Sacha Inchi beans will be processed into Sacha Inchi oil for the export market. <p style="text-align: center;">Sacha Inchi Farm, Fruits and Standardized Extract Oil</p> <div style="display: flex; flex-wrap: wrap; justify-content: center;">     </div>
Link Projects:	<ul style="list-style-type: none"> • CPPC Lachau
Project Rational:	<ul style="list-style-type: none"> • Sacha Inchi oil is valued as a nutritional supplement because it contains a high concentration of polyunsaturated fatty acids, making it an excellent source for Omega 3 (alpha-linolenic acid) and Omega 6 (linoleic acid) and Omega 9. It contains no cholesterol. • The oil is highly demanded in the world market as a plant-based speciality food (Vegan omega). • The plant is widely grown in Thailand, Vietnam and China. • RISDA is promoting the crop as a supplementary crop for rubber smallholders. • The crop is easy to grow and start to bear fruits within a year. The plant can last up to 29 years. • The oil from the fruit is high value with prices averaged RM150-RM200/kilo
Project Site:	The Project will be located near Pantu, along the Pan Borneo Highway.

Action/ AG 13: Sacha Inchi Project
Project No:



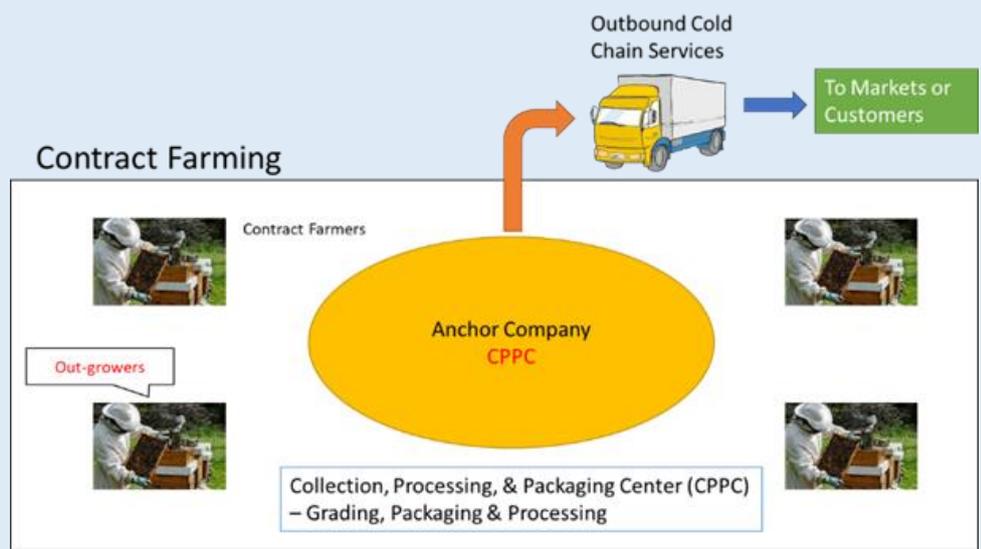
Source: Daya Rancang

Note: Base map source from UNIMAS Holdings

Impacts/Outcomes:	<ul style="list-style-type: none"> ● Production of 1,000 tons of dry seed (yield of 2 tons/ha) by 2030 valued at RM15 million/yr. ● Production of 370 tons of oil @37% extraction rate ● Production of standardised oil valued at RM55.50 million in 2030. ● A new source of income for farmers in Sri Aman ● Provide employment opportunities for 300 farmers ● Tourism attraction for Sri Aman ● Provide opportunities for value-added activities
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Planted area of 500 ha by 2030 involving 500 farmers. ● Development of main irrigation and drainage system ● Planting Density: 1,200 plants/ha ● Establishment of collection and processing centre in Lachau
Estimated Budget:	<p>RM6 million</p> <ul style="list-style-type: none"> ● Planting material ● Land preparation ● Irrigation facilities
Activities/Components:	<p>Major Activities:</p> <ul style="list-style-type: none"> ● Land clearing ● Construction of drains and bunds ● Supply of planting material ● Planting of Sacha Inchi ● Maintenance ● Collection, processing and packaging of Sacha Inchi at the CPPC in Lachau ● Processing of standardised oil extraction
Investors:	-
Business Model:	<ul style="list-style-type: none"> ● The project will involve the Centralised Farming Model involving Anchor Company and Outgrowers. The project will be based on Outgrowers-contract farming with an anchor company.

Action/ Project No: AG 13: Sacha Inchi Project

- Business needs to be organised following the supply chain concept to ensure product quality and commercial sustainability.
- Anchor company to ensure the structural integrity of the value chain.
- Anchor company will provide the seeds and inputs, and the products will be sold back to the company at an agreed price even before planting begins.
- The contract farming system will encourage farmers to take up the technology and farm management packages for rice seed and rice production to ensure purity, authenticity, and traceability of produce.
- Recommended Anchor Company: Sarawak Sacha Inchi Valley (Maidin Kunji Koya)



Project Time Frame:	2021	2022	2023	2024	2025	2026	2027-2030	
		Short Term		Mid Term			Long Term	
	Phase 1 <ul style="list-style-type: none"> • Perimeter survey • Prepare design and physical plan of Sacha Inchi area • Construction of drainage system Phase 1 • Selection of anchor companies • Selection of participants • Planning of planting materials • Cultivation of 100 ha • Construction of CPPC 		Phase 2 <ul style="list-style-type: none"> • Construction of drainage infrastructure Phase 2 • Cultivation of 200 ha 			Phase 3 <ul style="list-style-type: none"> • Expansion of cultivation areas • Value added products 		

- Key Success Factors:**
- Improved irrigation and drainage infrastructure
 - Availability of Improved seeds
 - Participation of anchor company for processing and marketing
 - Development of modern methods of standardised oil extraction

- Possible Barriers & Threats**
- Pest and diseases
 - Competition in terms of quality of produce from Thailand and Vietnam
 - The reluctance of farmers to grow the new crop

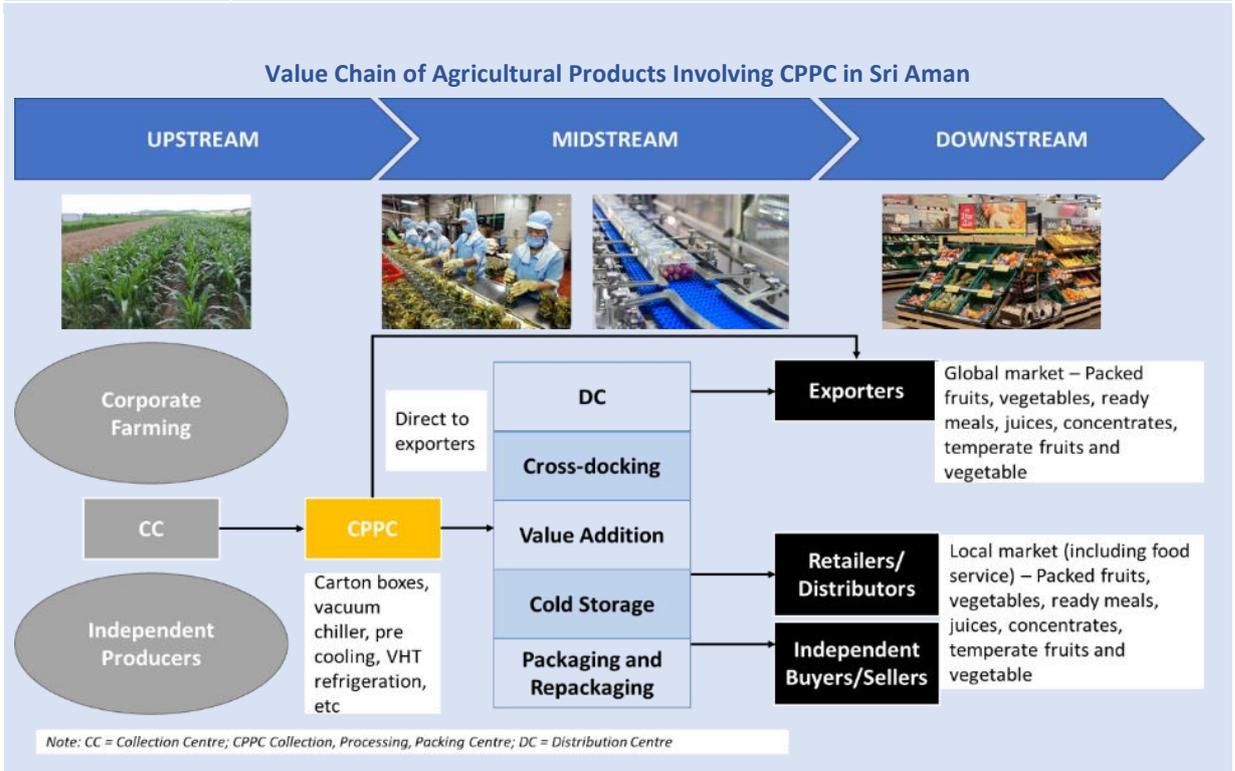
**Action/
Project No:** AG 13: Sacha Inchi Project

Roles & Responsibilities:	Agencies		Roles & Responsibilities	
		SADA		<ul style="list-style-type: none"> ● Planning and implementation of a project ● Funds for the development of infrastructure
	DOA		<ul style="list-style-type: none"> ● Organisation of farmers under the project ● Training and extension ● Supply of quality seeds 	
	Farmers Association		<ul style="list-style-type: none"> ● Supply of agricultural inputs 	
	Anchor Company		<ul style="list-style-type: none"> ● Purchase of sachu inchi beans from farmers under contract farming system ● Establishment of collection and processing centre 	
Summary:	Sacha Inchi			
	Total Area		500 ha	
	Variety		High yielding variety	
	Planting density/ plants/ha		1,200	
	Economic Life (years)		25	
	Maturity Period		Eight months	
	Yield/ha/year (dry pods)		Two metric tonnes	
	Price/kg (dry seeds)		RM15	
	Average total production/yr. (dry seed)		1,000 metric tonnes	
	Average Total revenue/yr. from dry seed		RM15.00 million	
	Price of Standardized Oil		RM150/kg	
	Production of standardised oil		370 metric tonnes	
	Value of Production of standardized extract oil in 2030		RM55.50 million	
	Number of households involved		500	
	Farm Size/Household		1 ha (1,200 trees)	
Business Model		Outgrowers/contract farming with Anchor Company		
Gross HH Income/month		RM2,500		

2.1.14 Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok

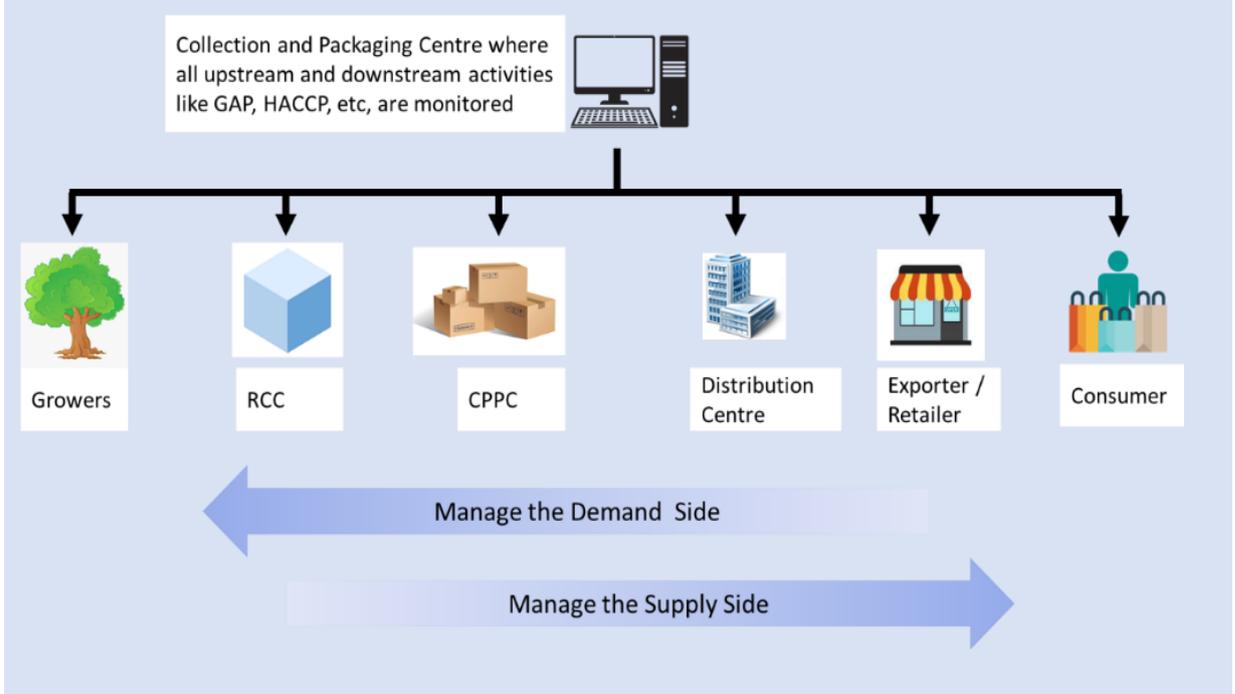
Action/ Project No:	Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok
<p><i>Project Description:</i></p>	<ul style="list-style-type: none"> ● The project involves the establishment of Collection, Processing and Packaging Centres (CPPCs) in Lachau and Temudok for primary and secondary processing of agricultural produce from the Sri Aman Division. ● The CPPC in Temudok will be located next to the Temudok Agro-Park. This will minimize handling and transportation of perishable high value crops in the Park, especially vegetables and short term fruits. The CPPC will also facilitate further processing of the crops grown in the Sri Aman/ Engkelili/ Lubok Antu (eg coconut) in the Industrial Park to be established in Temudok. ● Proposed components and size of physical infrastructure in the CPPC will depend on the volume of production of vegetables, fruits, pineapple, bananas, pepper, honey etc., for mid-stream processing or downstream processing, availability of raw materials and the number of target groups involved in the project. ● Building for the CPPC will include, among others, office space, exhibition, promotion and product marketing area, lecture/ training room, and quality control labs (microbiology and food contaminants) ● Components of the CPPC will include: <ul style="list-style-type: none"> – Cold room facilities to store raw materials and processed produce. – Factory units (30’ X 60’) complete with secondary processing facilities and equipment for incubation of micro-processors. – Packaging and storage space for processed products – Unloading and Loading Bay – Central treatment and sewerage system – Parking space – Utilities including electricity, water and telephones. ● Salient Features of the CPPC: The Scheme of setting up of CPPC will have the following components: (i) Minimum land requirement will be 10 ha. (ii) Minimum Processing Facilities at the firm level, which may include facilities for weighing, cleaning, sorting, grading, packing, pre-cooling, Controlled Atmosphere (CA)/ Modified Atmosphere (MA), Cold Storage, Dry Warehouses and IQF. (iii) Mobile Pre-cooling trucks and reefer trucks may be suitable for transportation of the perishable agricultural produce/ horticulture/ dairy/meat/fish produce. ● The CPPC will be build based on a modular design to allow for future expansion. ● The potential investor to manage the CPPC will depend on the projects undertaken. ● The progress of the CPPC will depend on production volume and should be built in a modular fashion based on needs. Otherwise, it may become a ‘white elephant project. ● The CPPC will act as a nerve centre for the following activities: <ul style="list-style-type: none"> – Sorting and grading, – Processing – Packaging – Palletizing – Cold Chain services – Retail and export management – Distribution ● The CPPC need to be installed with an exchange portal (Agribazaar). The use of ICT and Communication Portal, as depicted below, is important for bottom-up and top-down and a more open and speedy trade (agricultural and food exchange). It is an important tool to manage the supply chain at the CPPC in the following way: <ul style="list-style-type: none"> – Develop Dedicated Intelligent Supply Chain Management system – Manage the critical points along the value chain. – Improve the communications along the value chain. – Institute the cooperation between the constituents in the value chain – Understand closer the needs of consumers.

Action/ Project No:	Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok
	<ul style="list-style-type: none"> – Get all parties involved in adopting the international food safety standards starting with MGAP. – Encourage forward and backward integration to reduce layers of distribution.



Collection, Grading, Packing and Logistic Activities at the CPPC

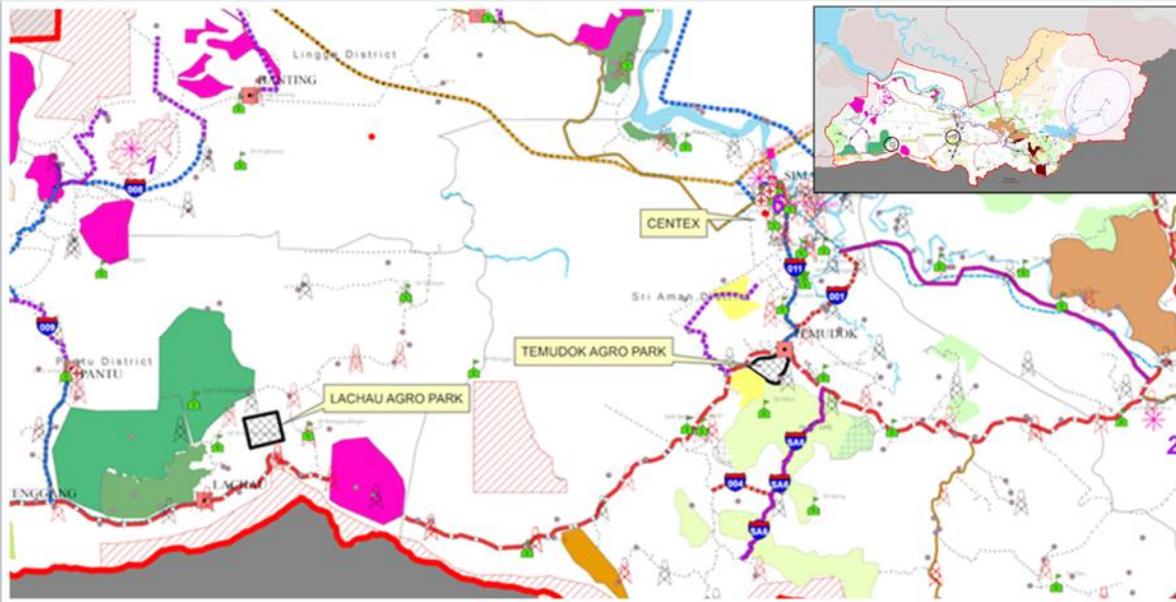
A MODEL OF INFORMATION-BASED SUPPLY CHAIN FOR AGRICULTURE PRODUCE



**Action/
Project No:** Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok



Project Site: Suitable state land in Lachau and Temudok, each about 10 ha will be identified.

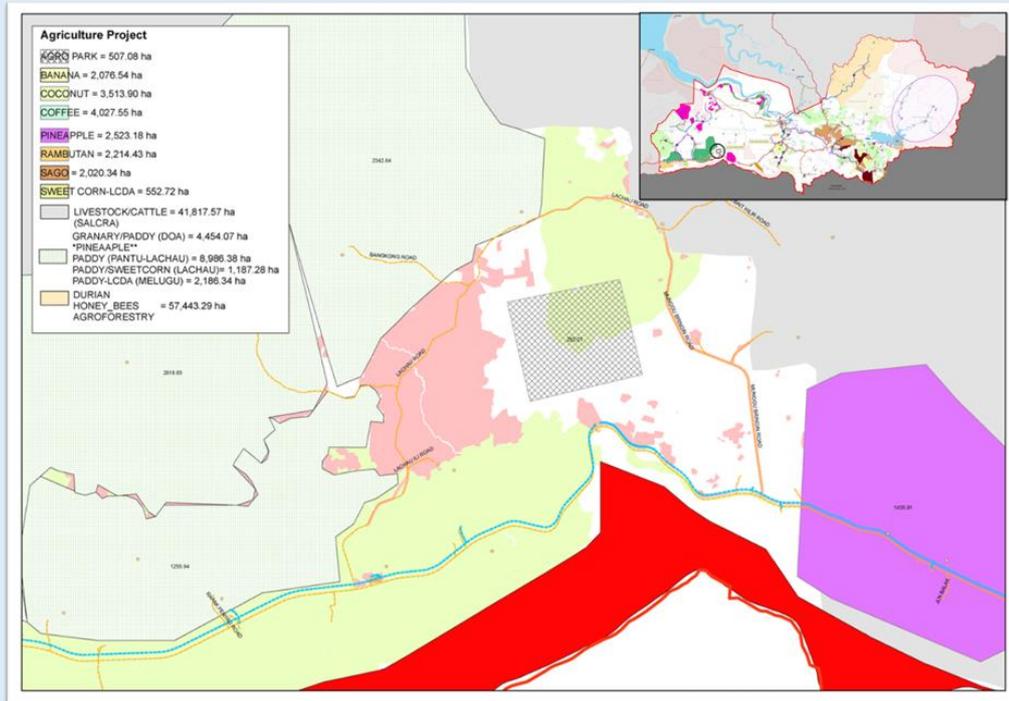


Source: Daya Rancang

Note: Base map source from UNIMAS Holdings

Action/ Project No: Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok

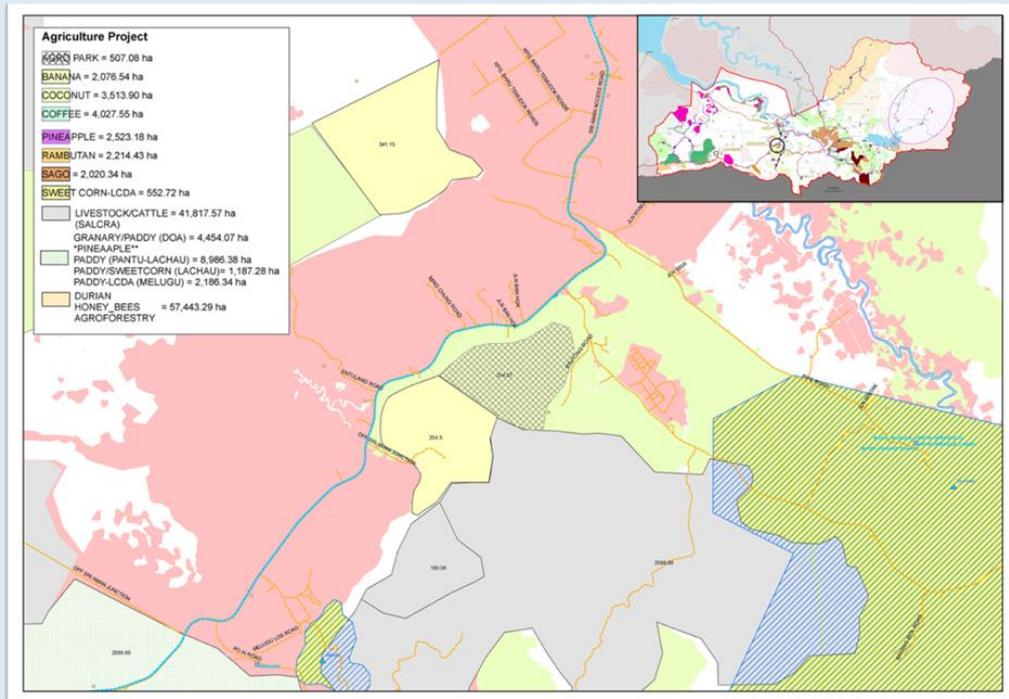
Lachau CPPC (10 Ha)



Source: Daya Rancang

Note: Base map source from UNIMAS Holdings

Temudok CPPC 10 ha



Source: Daya Rancang

Note: Base map source from UNIMAS Holdings

Action/ Project No:		Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok																																															
Project Rational:	<ul style="list-style-type: none"> The project is in line with the government’s policy for improving the agriculture supply chain to ensure efficient marketing of agricultural products both for the local market and export market. The projects are also in line with the Sarawak Digital Economic Strategy 2018-2022, i.e., installing IoT for Collection, Processing and Packaging Centre. <ul style="list-style-type: none"> Establish for efficient distribution system for agriculture inputs and products. Intelligent Supply Chain Management, Logistic The on-farm Collection and Packaging Centre (CPC) will facilitate the anchor company to manage the supply and demand sides of their produce. The CPPC would act as a one-stop centre for sanitary and phytosanitary (SPS) certification, custom documentation, extension and advisory services, information centre, GAP, and HACCP certification and accreditation. The CPPC will also be connected through the exchange portal to trading houses, supermarkets, exporters, efficiency, production planning, inventory control and trading, and negotiations. 																																																
Impacts/ Outcomes:	<table border="1"> <thead> <tr> <th>CPPC Complex Lachau</th> <th>Annual Expected Volume in 2035</th> <th>Annual Estimated Revenue, 2035 (RM mil)</th> <th>CPPC’s Profit; 25% of Revenue, 2035 (RM mil)</th> <th>Final Product of CPPC</th> </tr> </thead> <tbody> <tr> <td>1. Paddy/Rice mill</td> <td>39,000 mt</td> <td>117.00</td> <td>29.25</td> <td>Rice</td> </tr> <tr> <td>2. Pineapple</td> <td>56,000 mt</td> <td>238.55</td> <td>59.64</td> <td>MD2 Pineapple</td> </tr> <tr> <td>3. Swiftlet</td> <td>2.4 mt</td> <td>14.40</td> <td>3.60</td> <td>Edible Bird Nest (EBN)</td> </tr> <tr> <td>4. Rambutan</td> <td>4,000 mt</td> <td>12.00</td> <td>3.00</td> <td>Rambutan Anak Sekolah</td> </tr> <tr> <td>5. Sacha inchi</td> <td>222 mt</td> <td>22.2</td> <td>5.55</td> <td>Oil</td> </tr> <tr> <td>6. Vegetables/Fruits</td> <td>16,000 mt</td> <td>64.00</td> <td>16.00</td> <td>Fresh Vege and Fruits</td> </tr> <tr> <td>Total</td> <td></td> <td>468.15</td> <td>101.04</td> <td></td> </tr> </tbody> </table>					CPPC Complex Lachau	Annual Expected Volume in 2035	Annual Estimated Revenue, 2035 (RM mil)	CPPC’s Profit; 25% of Revenue, 2035 (RM mil)	Final Product of CPPC	1. Paddy/Rice mill	39,000 mt	117.00	29.25	Rice	2. Pineapple	56,000 mt	238.55	59.64	MD2 Pineapple	3. Swiftlet	2.4 mt	14.40	3.60	Edible Bird Nest (EBN)	4. Rambutan	4,000 mt	12.00	3.00	Rambutan Anak Sekolah	5. Sacha inchi	222 mt	22.2	5.55	Oil	6. Vegetables/Fruits	16,000 mt	64.00	16.00	Fresh Vege and Fruits	Total		468.15	101.04					
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Outputs of Project & KPIs:	<ul style="list-style-type: none"> Establishment of 2 CPPC complex in Lachau and Temudok IoT set up in each of the CPPC Involvement of 11 Anchor Companies 																																																
Activities/ Components:	<p>The development of the CPPC will involve a number of activities, including:</p> <ul style="list-style-type: none"> <u>Land Survey</u> The actual boundary for the development of the CPPC needs to be surveyed. <u>Development of basic external infrastructure by government</u> The basic infrastructure requirements include access roads, drainage system, water and utilities. 																																																

Action/ Project No: Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok

- Site Preparation includes land survey, clearing of existing vegetation, the establishment of roads and field drainage system, terracing, soil conservation measures by Anchor Company.
- Construction of CPPCs by Anchor Companies
- Purchase of Equipment and machinery by anchor companies
- Operation of CPPCs

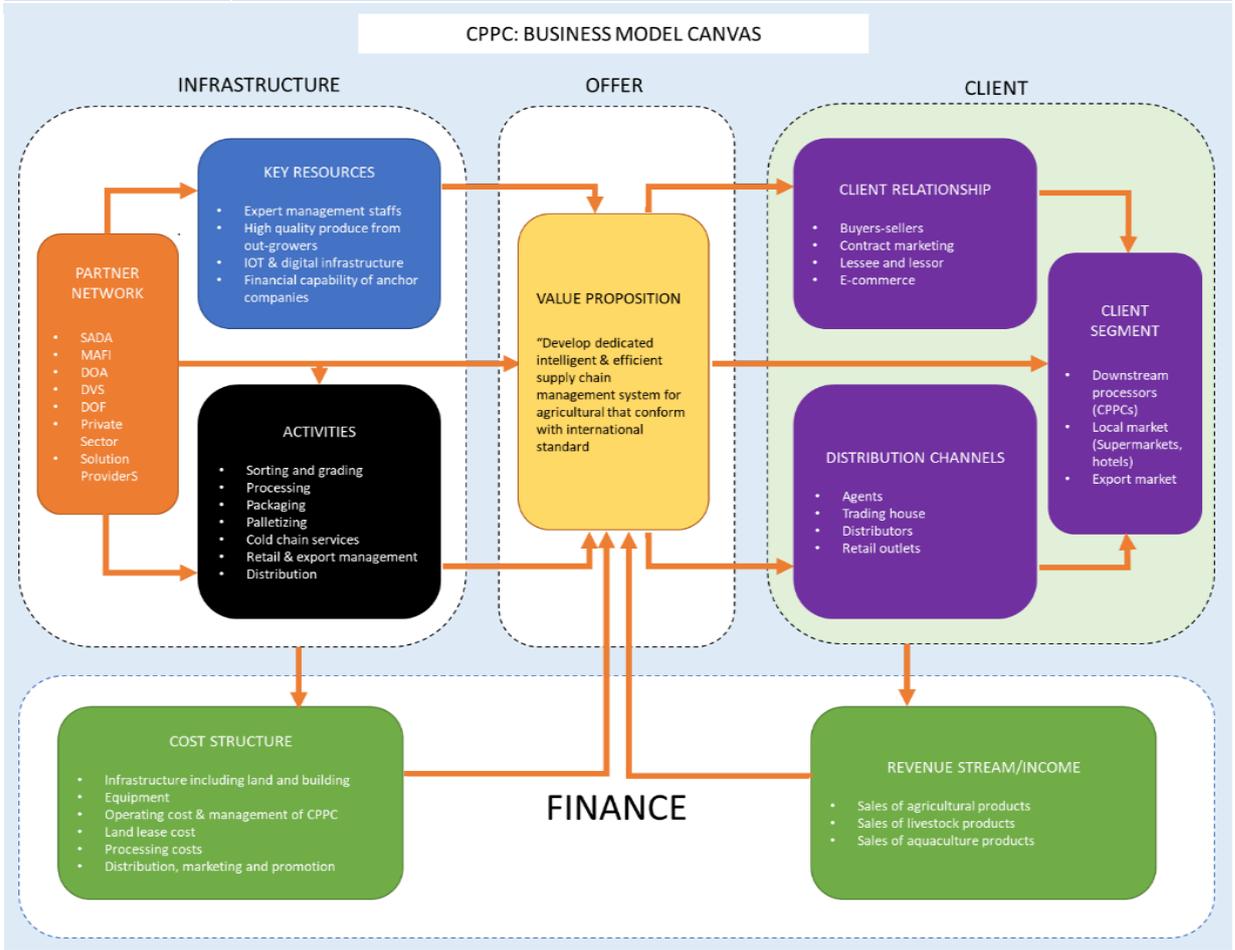
Estimated Budget: The CPPC is expected to involve 10 hectares each and a budget of RM20 million for infrastructure development, i.e., land clearing, access roads, fencing, waste disposal system, water, electricity, and main admin building.

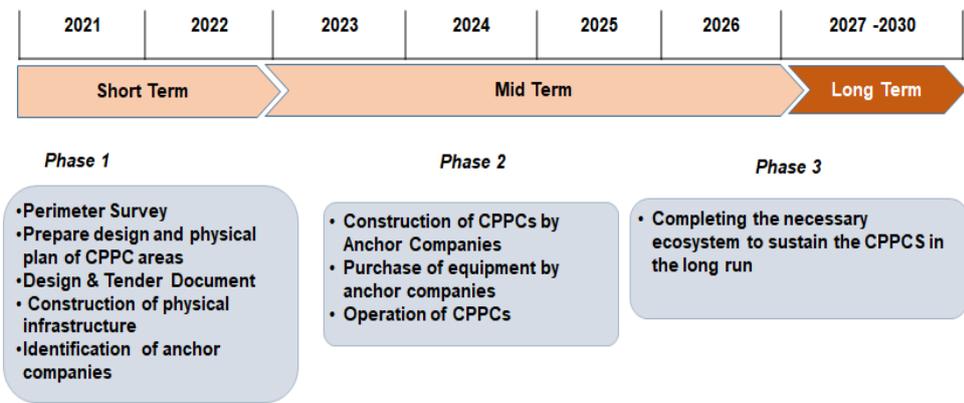
The actual construction of each CPPC and equipment will be borne by the private sector.

	Phase 1 2021-2023	Phase 2 2024-2026	Phase 3 2027-2030	Total
Area	10 ha (CPPC Lachau)	10 ha (CPPC Temudok)	-	20 ha
Estimated Public CAPEX	RM10 million	RM10 million	-	20 million
Employment Generation	100	110	-	210 (30% Skilled 70% unskilled)

Investors: Public Sector: 20% RM20 million
Private Sector: 80% RM80 million

Business Model: The business model canvas for the CPPC is shown below:



Action/ Project No:	Establishment of a Collection, Processing and Packaging Centres (CPPC) at Lachau and Temudok																													
<p>Project Time Frame:</p>	<p>This is an indicative timeline assuming no significant delay to the project. This plan does not consider the timeline required for setting up the basic infrastructure, which is assumed to be readily available for executing this trigger project.</p>  <table border="1" style="width:100%; text-align:center; border-collapse: collapse;"> <tr> <td style="width:12.5%;">2021</td> <td style="width:12.5%;">2022</td> <td style="width:12.5%;">2023</td> <td style="width:12.5%;">2024</td> <td style="width:12.5%;">2025</td> <td style="width:12.5%;">2026</td> <td style="width:12.5%;">2027 -2030</td> </tr> <tr> <td colspan="3">Short Term</td> <td colspan="3">Mid Term</td> <td>Long Term</td> </tr> <tr> <td colspan="3">Phase 1</td> <td colspan="3">Phase 2</td> <td>Phase 3</td> </tr> <tr> <td colspan="3"> <ul style="list-style-type: none"> • Perimeter Survey • Prepare design and physical plan of CPPC areas • Design & Tender Document • Construction of physical infrastructure • Identification of anchor companies </td> <td colspan="3"> <ul style="list-style-type: none"> • Construction of CPPCs by Anchor Companies • Purchase of equipment by anchor companies • Operation of CPPCs </td> <td> <ul style="list-style-type: none"> • Completing the necessary ecosystem to sustain the CPPCS in the long run </td> </tr> </table>		2021	2022	2023	2024	2025	2026	2027 -2030	Short Term			Mid Term			Long Term	Phase 1			Phase 2			Phase 3	<ul style="list-style-type: none"> • Perimeter Survey • Prepare design and physical plan of CPPC areas • Design & Tender Document • Construction of physical infrastructure • Identification of anchor companies 			<ul style="list-style-type: none"> • Construction of CPPCs by Anchor Companies • Purchase of equipment by anchor companies • Operation of CPPCs 			<ul style="list-style-type: none"> • Completing the necessary ecosystem to sustain the CPPCS in the long run
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<p>Key Success Factors:</p>	<ul style="list-style-type: none"> ● CPPC to be built on a need basis by anchor company. ● Availability of agricultural produce under the various proposed projects ● Land free of encumbrances from native customary land claim ● Anchor company involvement – production and marketing ● Efficient management of CPPC by Anchor companies ● Efficient supply chain management by anchor companies ● Anchor company to come out with SOP for out-growers to ensure quantity, quality and timeliness of produce. ● Loyalty of out-growers to supply their produce to the CPPC. ● The success of the economic development of the CPPC will require infrastructure development in the area. These include: <ul style="list-style-type: none"> – Flood Mitigation measures and drainage schemes – Main Roads – Power supply – Water supply – Telecommunication – Internet facilities 																													
<p>Possible Barriers & Threats</p>	<ul style="list-style-type: none"> ● Disinterest of park operators due to lack of attractive incentives ● Slow process of approvals and land matters ● Anchor company may want to build their CPPC on-site near 																													
<p>Roles & Responsibilities:</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:35%;">Agencies</th> <th>Role & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>SADA</td> <td> <ul style="list-style-type: none"> ● The CPPC will be under the jurisdiction of the project proponent, i.e., SADA. To ensure the smooth implementation of the park, DOA, MARDI, and other stakeholders will work closely together. ● Planning, design, and approval of plans for development ● Promote potential park operators ● Provided funds for physical infrastructure consisting of buildings, farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water ● Monitoring and evaluation of the project </td> </tr> <tr> <td>DOA</td> <td>Advisory services and Certification program</td> </tr> <tr> <td>DOF</td> <td>Advisory services and Certification program</td> </tr> <tr> <td>DVS</td> <td>Advisory services and Certification program</td> </tr> <tr> <td>Anchor Companies</td> <td>CPPC building and Equipment</td> </tr> </tbody> </table>		Agencies	Role & Responsibilities	SADA	<ul style="list-style-type: none"> ● The CPPC will be under the jurisdiction of the project proponent, i.e., SADA. To ensure the smooth implementation of the park, DOA, MARDI, and other stakeholders will work closely together. ● Planning, design, and approval of plans for development ● Promote potential park operators ● Provided funds for physical infrastructure consisting of buildings, farm roads, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water ● Monitoring and evaluation of the project 	DOA	Advisory services and Certification program	DOF	Advisory services and Certification program	DVS	Advisory services and Certification program	Anchor Companies	CPPC building and Equipment																
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**Action/
Project No:** Establishment of a Collection, Processing and Packaging Centres (CPPC)
at Lachau and Temudok
Summary:

CPPC	
Total Area	500 ha
Variety	High yielding variety
Planting density/ plants/ha	1,200
Economic Life (years)	25
Maturity Period	Eight months
Yield/ha/year (dry pods)	Two metric tonnes
Price/kg (dry seeds)	RM15
Average total production/yr. (dry seed)	1,000 metric tonnes
Average Total revenue/yr. from dry seed	RM15.00 million
Price of Standardized Oil	RM150/kg
Production of standardised oil	370 metric tonnes
Value of Production of standardising oil in 2030	RM55.50 million
Number of households	500
Farm Size/Household	1 ha (1,200 trees)
Business Model	Outgrowers/contract farming with Anchor Company

SECTION 2.2 LIVESTOCK

2.2.1 Livestock Development (Cattle) through Systematic Cow-Calf Management in Oil Palm Plantations

Action/ Project No:	LV 1: Livestock Development (Cattle) through Systematic Cow-Calf Management in Oil Palm Plantations
<p><i>Project Description:</i></p>	<ul style="list-style-type: none"> ● The project involves the integration of cattle under Systematic Cow-Calf Management in Oil Palm Plantations. About 10,000 ha of plantation under SALCRA will be involved. ● Assuming a stocking rate of 1 cattle in 5 hectares, the carrying capacity will be 2,000 animals. ● Cattle integration in oil palm plantation offers one of the best options towards increasing local beef supply. The integration of cattle in oil palm is a form of mixed farming where the combinations of the two commodities can be synergised to optimally utilise the same piece of land. The two commodities, when properly integrated, can contribute towards a sustainable food production system. ● It is proposed that the cow-calf system be implemented to develop the cattle population. Under this system, the initial stock of cattle is the breeding cow, i.e. the fertile two-year cows weighing above 250kg. The breeder bulls are fertile 3-year-old males weighing above 300kg. The ratio of bulls to cows is 1:20. ● Grazing Management The application of strategic rotational grazing management through the use of mobile electrical fencing (or virtual fencing) is a dynamic process in which cattle grazing will be adjusted to suit the operational requirement of the estate. The movement of cattle within the estate will be synchronised with such estate common agronomic practices. The agronomic practices will involve a rotational grazing period; for example, 20 animals per herd in a 1 Ha ‘paddock’ for a period of 7 days. ‘Paddock then left fallow for min 100 days). This however will depend on pasture type, and other factors. For mobile electric fencing this approach would require min 400 m electric fence x 100 ‘paddocks’ = 40 km of fencing. ● To ensure proper implementation of the system, proper training at all levels is required. ● In the long-term DVS will also need to undertake R&D which will focus on crossbreeding local and exotic breeds, selection of good traits to improve the breeding stock. There is also a need to study the pasture’s ecosystem to ensure a good supply of nutrition for the cattle. This will include biodiversity studies and the introduction of new shade-tolerant pasture species. R&D will also look into the technology of reducing the mortality rate. Long-term research on the effect of integration of oil palm can also provide insight into future practices. ● To ensure safety and disease control, sanitary and phytosanitary, SPS measures have to be undertaken. The implementation of these measures is done through scheduled visits to farms by DVS officers. ● Financial services should also be made available, including banks that can provide loans up to 70 per cent of project costs. ● The present marketing will also need to be improved by establishing a ‘cattle marketing centre’ in Engkilili to match suppliers and traders.

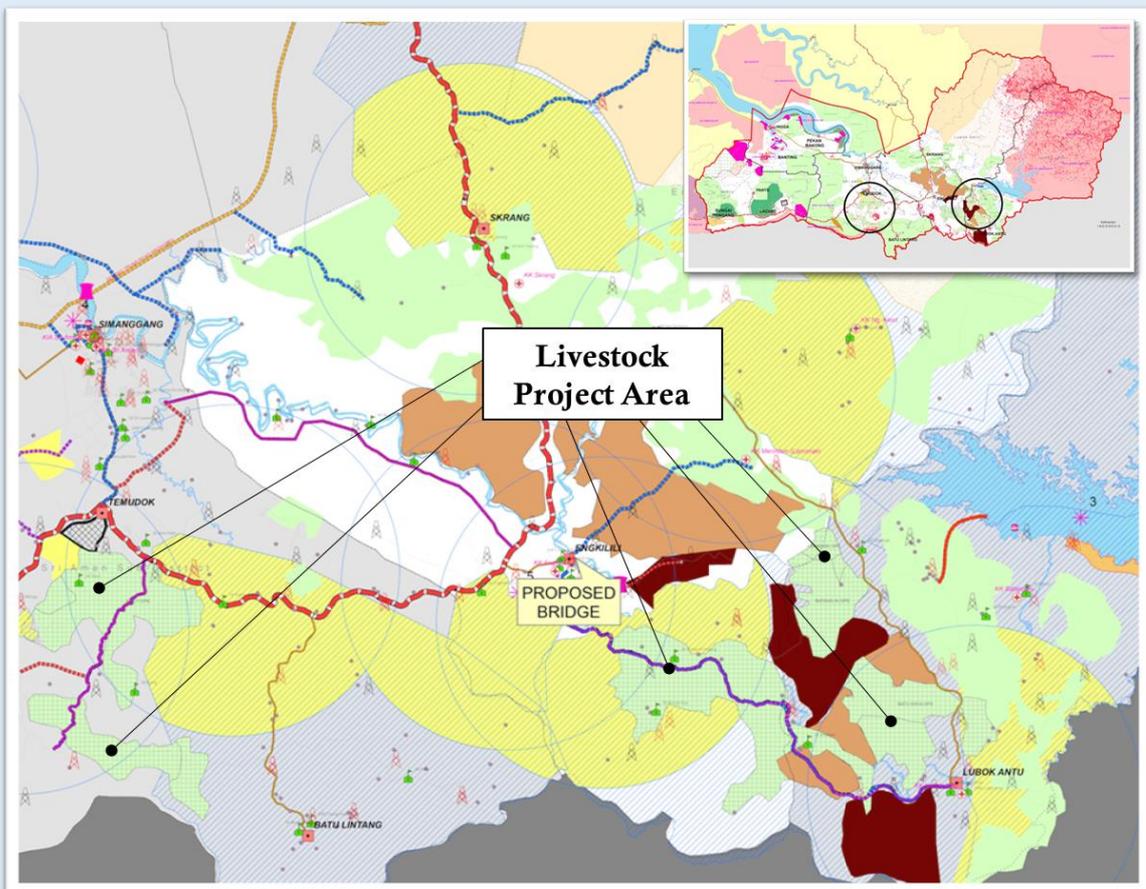
Action/ Project No: LV 1: Livestock Development (Cattle) through Systematic Cow-Calf Management in Oil Palm Plantations

Project Site: The total area proposed for this project is the SALCRA oil palm plantation totalling 10,000 hectares.

Cattle Integration in FELDA Schemes and MARDI's Improved Kedah-Kelantan Breed



- Lubok Antu
- Batu Lintang



Source: Daya Rancang
 Note: Base map source from UNIMAS Holdings

Link Projects: ● AG 11 Oil Palm Project

- Project Rational:**
- In line with government policy to increase the self-sufficiency in cattle meat.
 - Food security, especially in animal proteins.
 - Reduce import bill.
 - Act as breeder multiplier farms to improve progeny quality as well as increase the base population of breeder animals.
 - Produce feeder animals for feed lot by the local community.

Action/ Project No:	LV 1: Livestock Development (Cattle) through Systematic Cow-Calf Management in Oil Palm Plantations																											
	<ul style="list-style-type: none"> ● Increase farm productivity and farm family income. ● Promote full utilisation of mature oil palm areas by letting cattle graze on vegetation that otherwise is considered weeds. ● Save the cost of weedicide application and is environment friendly ● Ensure integration benefits both for the production of oil palm as well as cattle ● Eliminate the need to open new land for grazing. ● It is environmentally friendly as it reduces herbicide use by offering biological weed control, reducing labour requirement, palm productivity not being compromised, and optimised available resources (land and feedstuff). ● It is synergistic, cost-effective and augurs well toward sustainable agriculture. 																											
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Annual production of 280 metric tons of beef ● Increase the value of cattle production by RM10 million by 2030. ● Increase employment of 100 																											
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● 10,000 ha of oil palm plantation integrated with cattle ● The cattle population of 2,000 animals by 2030 																											
Estimated Budget:	RM 5 million																											
Activities/ Components:	<ul style="list-style-type: none"> ● Determine suitable areas for integration of cattle under oil palm: SALCRA. ● Purchase of breeder animals by SALCRA ● Cattle breeding programs: MARDI, DVS and SALCRA ● Identify livestock farmers for group feedlot projects: SALCRA. ● Provide the necessary infrastructure and equipment for multiplier farms: SALCRA ● Establishment of Market outlet: SALCRA ● Disease control and vaccination by DVS 																											
Investors:	<p>Budget RM5.00 million (SALCRA)</p> <ul style="list-style-type: none"> ● Purchase of breeder animals ● Fencing ● Holding yard ● Buildings (Cattle Shed, Marketing Centre) <table border="1"> <thead> <tr> <th colspan="2"></th> <th colspan="5">Implementation/Outcome</th> </tr> <tr> <th>Location</th> <th>Budget Estimate</th> <th>Short Term 2021 – 2022</th> <th>Mid Term 2023 – 2025</th> <th>Outcome 2025</th> <th>Long Term 2026 – 2030</th> <th>Outcome 2030</th> </tr> </thead> <tbody> <tr> <td>Sri Aman</td> <td>RM5 mil</td> <td>RM2.5 mil -Fencing* -Holding Yard -Crush Yard</td> <td>RM1.5 mil -Purchase of Livestock</td> <td>-70% calving rate</td> <td>RM1mil -Maintenance</td> <td>Production of feeder animals and breeder animals for sale</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● To reduce the costs of fencing, the modern technology of ‘virtual fencing’ using GPS may be adopted 									Implementation/Outcome					Location	Budget Estimate	Short Term 2021 – 2022	Mid Term 2023 – 2025	Outcome 2025	Long Term 2026 – 2030	Outcome 2030	Sri Aman	RM5 mil	RM2.5 mil -Fencing* -Holding Yard -Crush Yard	RM1.5 mil -Purchase of Livestock	-70% calving rate	RM1mil -Maintenance	Production of feeder animals and breeder animals for sale
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**Action/
Project No:** LV 1: Livestock Development (Cattle) through Systematic Cow-Calf Management in Oil Palm Plantations

Business Model:	BUSINESS MODEL CANVAS: INTEGRATION OF CATTLE IN OIL PALM PLANTATION				
	Key Partner <ul style="list-style-type: none"> ● SADA ● SALCRA ● MANRED ● DVS 	Key Activities <ul style="list-style-type: none"> ● Infrastructure Development ● Oil Palm Cultivation ● Integration of cattle in oil palm plantation ● Sale of cattle ● Distribution 	Value Proposition <ul style="list-style-type: none"> ● Production of high-quality animals/ beef, consistent with the international standard for the local market as well as export ● Increase income to local participants 	Customer Relationship <ul style="list-style-type: none"> ● Buyer-sellers ● Contract marketing ● Lessee and lessor ● E-commerce ● Auction market 	Customer Segments <ul style="list-style-type: none"> ● Downstream Processors ● Korban market ● Local Market (Wholesale Market, Supermarkets, Hotels, export Market (for beef))
	Key Resources <ul style="list-style-type: none"> ● Breeder animals ● Feeder animals ● Agriculture input ● Mechanisation ● Cattle marketing centre ● Smart Farming System ● Technicians and Workers 		Channels <ul style="list-style-type: none"> ● Collection centre ● Agreement between AC and CF / CO 		
	Cost Structure <ul style="list-style-type: none"> ● Infrastructure including land development. ● Buildings, equipment's, computers, software ● Purchase of animals ● Mechanisation ● Operating cost ● Land lease and finance cost ● Processing costs ● Distribution, marketing and promotion 		Revenue Streams <ul style="list-style-type: none"> ● Sales of culled breeder animals ● Sales of breeder animals ● Sales of feeder animals ● Sales of semi-processed products 		
Project Time Frame:	Short Term 2021 – 2022 <ul style="list-style-type: none"> - 2,000 Ha - 400 animals - Fencing - Holding Yard - Crush Yard 	Mid Term 2023 – 2025 <ul style="list-style-type: none"> 4,000 Ha 800 animals 	Long Term 2026 – 2030 <ul style="list-style-type: none"> 4,000 Ha 800 animals 	Outcome 2030 <ul style="list-style-type: none"> - 10,000 Ha plantation - 2,000 animals 	
Key Success Factors:	<ul style="list-style-type: none"> ● Availability of mature oil palm areas ● For cow-calf system: one calf per year born and survives. ● Commitment of decision-makers ● Trained and experienced personnel ● Disease-free and fertile animals ● Tagging and Farm records ● Paddocks and corral facilities ● Systematic integration 				
Possible Barriers & Threats	<ul style="list-style-type: none"> ● The attitude of the plantation management, which lacks the expertise in animal husbandry and is unable to see the benefits derived from such a farming system. ● Newly introduced cattle need to be 'conditioned' to adjust themselves to new environments and new feeding regimes that are physiologically stressful, especially for imported cattle. ● Lack of suitable breeder and feeder cattle for integration 				

Action/ Project No:		LV 1: Livestock Development (Cattle) through Systematic Cow-Calf Management in Oil Palm Plantations																			
Roles & Responsibilities:	Agencies	Roles & Responsibilities																			
	SADA	<ul style="list-style-type: none"> ● Planning and Execution of the project ● Monitoring and evaluation 																			
	SALCRA	<ul style="list-style-type: none"> ● Implementation of project 																			
	DVS	<ul style="list-style-type: none"> ● Disease control ● GAP certification 																			
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2.2.2 Swiftlet Commercial Farming in Lingga and Seduku

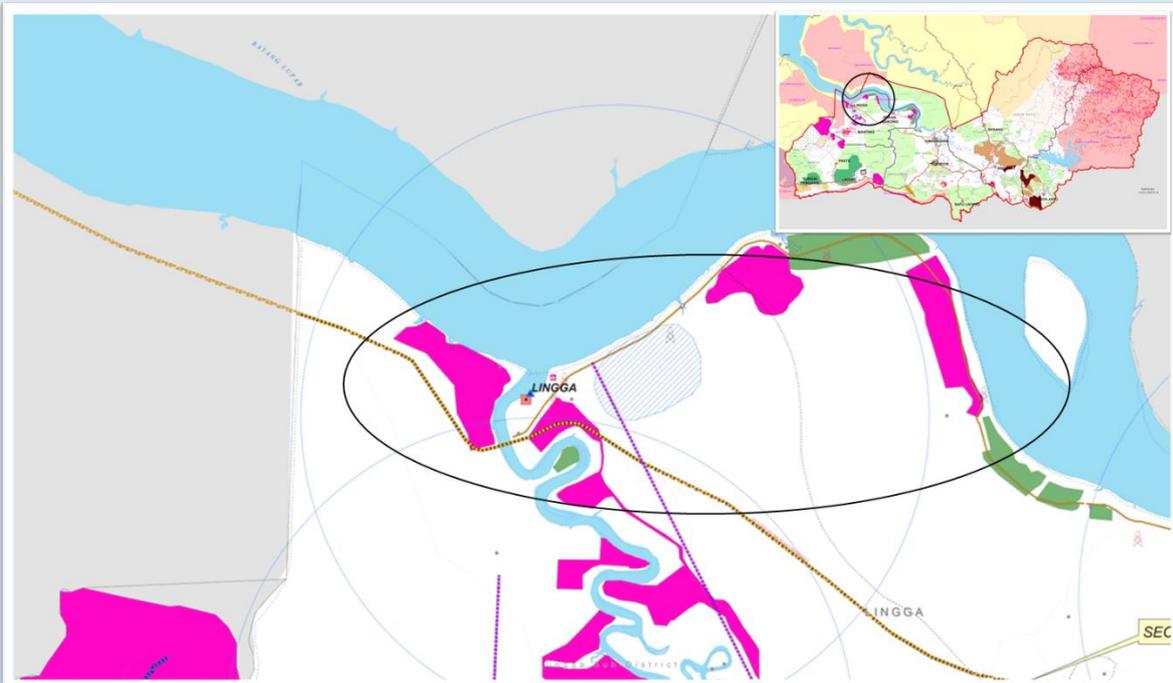
Action/ Project No: LV 2: Swiftlet Commercial Farming in Lingga and Seduku

**Project
Description:**

- The edible swiftlet birds' nest is a new industry in Sarawak. The industry receives widespread acceptance all over Sarawak, including in the coastal areas of Sri Aman. It is one business that involved a small initial capital investment that could generate enormous returns in the future. The commercial cultivation of Edible birds nest not only can generate good income for farmers but also capable of becoming a successful value-added product in Sri Aman.
- The project involves upgrading the swiftlet farming industry in Lingga/Seduku based on SOP developed by the Department of Veterinary Services. This includes licensing use of RFID and GAP.
- This project consists of 100 birdhouses (each 3 Storey building 40' X 60') and one bird nest processing unit.
- The project will be located in Lingga and Seduku, involving 50 village cooperatives. It will be implemented on a cooperative model involving rural communities. Each cooperative will have two birdhouses.
- Each cooperative will consist of at least ten members.
- The land required will either be located in NCR land or leased from private land.
- The bird nests collected from the 100 birdhouses will be sold to the processing plant after undergoing the grading process at the collection point. Processing will be done in accordance with Good Manufacturing Practices (GMP).
- The end product will be standardised, analysed, labelled, and branded before exporting.
- To enable the project to proceed smoothly, the government has to provide infrastructures such as road, water, and electricity supplies.
- The bird's nest premises will be registered/licensed under Sarawak Forest Corporation (SFC)
- Implementation of the project will be under the Sarawak Veterinary Services Department.

A Typical Birds Nest House and Processing Activities



Action/ Project No: LV 2: Swiftlet Commercial Farming in Lingga and Seduku	
Project Site:	Lingga and Seduku, Sri Aman
	
<p>Source: Daya Rancang Note: Base map source from UNIMAS Holdings</p>	
Link Projects:	<ul style="list-style-type: none"> AG 14: Establishment of CPPC
Project Rational:	<ul style="list-style-type: none"> It is one business that involved a rather small initial capital investment that could generate enormous returns in the future. High prices of edible birds' nest @ Rm15,000/kilo. A kilogramme of untreated bird's nests now fetches RM3,000 to RM3,200, and treated ones, RM4,000 to RM6,000 in 2020 Many operators have already involved in swiftlet farming in Lingga Sri Aman and swiftlet population are quite high Big export market of edible birds' nest (EBN) in China. The export of EBN from Malaysia amounted to RM3.00 billion in 2019
Impacts/ Outcomes:	<ul style="list-style-type: none"> Increase in income of rural communities in Lingga and Seduku by RM1,500/month. Increase in export of EBN. Increase employment of 150 persons
Outputs of Project & KPIs:	<ul style="list-style-type: none"> 100 birdhouses, one bird nest processing unit Establishment of 50 village cooperatives in Lingga and Seduku area Target volume of production in 2030: 24 kg X 100 = 2.4 Tonnes of raw bird nest Target value of production in 2030 @ RM5,000/kg: RM12 million
Estimated Budget:	<p>RM15 million</p> <p>Component of Costs:</p> <ul style="list-style-type: none"> Birdhouse @RM140,000/bird house Equipment @RM10,000
Activities/ Components:	<ul style="list-style-type: none"> Establishment of Village Cooperatives Training of rural youths/SME/cooperatives on the management of swiftlet farms Identification and formulation of projects Construction of birdhouses Establishment of bird's nest processing centre

Action/ Project No: LV 2: Swiftlet Commercial Farming in Lingga and Seduku															
Investors:	-														
Business Model:	<ul style="list-style-type: none"> ● The project will be based on the Cooperative Farming Model ● The outgrowers will form village level cooperatives, based on 2 bird house per cooperative ● About 50 village-level cooperatives will be established ● Cooperatives will have a contractual agreement with the anchor company that will operate the bird's nest processing centre to be located at the CPPC in Lachau. <div style="text-align: center; border: 2px solid orange; border-radius: 20px; padding: 10px; margin: 10px 0;"> </div>														
Project Time Frame:	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 12.5%;">2021</td> <td style="width: 12.5%;">2022</td> <td style="width: 12.5%;">2023</td> <td style="width: 12.5%;">2024</td> <td style="width: 12.5%;">2025</td> <td style="width: 12.5%;">2026</td> <td style="width: 12.5%;">2027-2030</td> </tr> <tr> <td colspan="2" style="background-color: #FFC000; color: white;">Short Term</td> <td colspan="3" style="background-color: #FFC000; color: white;">Mid Term</td> <td colspan="2" style="background-color: #FFC000; color: white;">Long Term</td> </tr> </table> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%; border: 1px solid #ccc; border-radius: 10px; padding: 5px;"> <p>Phase 1</p> <ul style="list-style-type: none"> • Planning of project • Establishment of village cooperatives • Selection of anchor companies • Selection of participants • Training of participants/cooperatives • Construction of 50 bird houses • Construction of processing centre </div> <div style="width: 30%; border: 1px solid #ccc; border-radius: 10px; padding: 5px;"> <p>Phase 2</p> <ul style="list-style-type: none"> • Construction of 50 bird houses </div> <div style="width: 30%; border: 1px solid #ccc; border-radius: 10px; padding: 5px;"> <p>Phase 3</p> <ul style="list-style-type: none"> • Expansion of bird houses • Value added products </div> </div>	2021	2022	2023	2024	2025	2026	2027-2030	Short Term		Mid Term			Long Term	
2021	2022	2023	2024	2025	2026	2027-2030									
Short Term		Mid Term			Long Term										
Key Success Factors:	<ul style="list-style-type: none"> ● Survey and issuance of title for NCR land ● Knowledge and Skills in the management of the bird's nest ● Suitable location of the birdhouses ● Design of the bird's nest house. These include four main factors, i.e., air temperature, relative humidity, ventilation, and light intensity. ● Understanding the equipment, the specifications and properly operate the sitting raw bird's nest and installing equipment for the bird's nest. ● Prevention of natural enemies harmful to the nest ● Development of basic infrastructure such as roads 														
Possible Barriers & Threats	<ul style="list-style-type: none"> ● Delay in establishing village coop to undertake the project. ● Delay in identifying investors to establish a bird's nest processing centre at the CPPC. ● High costs of construction of birds' nest's house ● Low population of birds and low productivity due to unsuitable location of the birdhouse and poor design of birdhouses. 														

Action/ Project No:		LV 2: Swiftlet Commercial Farming in Lingga and Seduku	
		<ul style="list-style-type: none"> ● Export ban of the product by importing countries due to poor quality of products 	
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	SADA	<ul style="list-style-type: none"> ● Planning and Execution of the project ● Establishment of village cooperatives ● Funding for project 	
	Sarawak Forestry Corporation (SFC)	<ul style="list-style-type: none"> ● Licencing of premises 	
	DVS	<ul style="list-style-type: none"> ● Training of farmers on swiftlet nest farming ● Construction of birds' houses ● GAP certification 	
	Anchor Company	<ul style="list-style-type: none"> ● Establishment of birds' nest processing centre ● Marketing of edible birds' nest ● Supply chain management 	
Summary:	Swiftlet		
	Total Number of Bird House	100	
	Number of Communities Involved	50	
	Business Model	Village Cooperative Model	
	The yield of birds' nest/house	24 kg	
	Price of untreated bird nest/kg	RM3,000 to RM3,200	
	Price of treated bird nest/kg	RM4,000 to RM6,000	
	Volume of Production at Farmgate in 2030	2.4 metric tonnes	
	Value of production at Farmgate	RM14.40 million	
	Employment generated	150	

SECTION 2.3 FISHERIES AND AQUACULTURE

2.3.1 Development of Recreational Fisheries at Batang Ai Reservoir

<i>Action/ Project No:</i>	FH 1: Development of Recreational Fisheries at Batang Ai Reservoir
<i>Project Description:</i>	There is potential for the development of recreational fisheries activities at the Batang Ai reservoir, where the establishment of a recreational fisheries jetty can provide a focal point for the activity. A dedicated jetty would attract more anglers to participate in angling, in turn involving nearby communities in ancillary activities such as shops and eateries, provision of guide services, etc.
<i>Project Site:</i>	Batang Ai reservoir
<i>Link Projects:</i>	-
<i>Project Rational:</i>	<p>Recreational fishing is an activity that attracts people, regardless of race, gender or income level and can often influence the economy of an area. A variety of fishing opportunities exist in the Malaysian waters, in habitats that range from offshore, coastlines, mangroves, islands, rivers, streams, reservoirs as well as ex-mining pools. Data from MIER suggest that there are as many as 2 million anglers, and the activity may have an economic value up to RM 1.5 billion annually. In Sarawak, recreational fisheries studies undertaken part of the Miri Integrated Shoreline Management Plan by the Department of Irrigation and Drainage (DID) indicated that angling activity is significant, where the total recreational fisheries effort amounted to 75,291 person-days annually with a total economic value estimated at RM6.23 million.</p> <p>Sri Aman was known for the Pesta Benak, which attracts tourists from within and outside of Sarawak. With this great potential, Sri Aman could also be developed into an attraction for recreational fisheries, which could greatly enhance visitor flow to the Division.</p> <p>Recreational fisheries can also be tied to the Batang Ai reservoir as well. Outside of the caged fish, there is a significant feral population of tilapia in the reservoir, which for ecological and biosecurity purposes, need to be controlled. The promotion of Batang Ai reservoir as a recreational fishing destination would enhance its visitor appeal. Having fishing competitions (based on the number of feral Tilapia that are captured) and timing it with events such as the Pesta Benak would considerably enhance the visitor appeal of the Division and reduce the biosecurity risks to the aquaculture industry in the reservoir. This, in turn, would become revenue for the Sri Aman division, which could be used to expand the development of the recreational fisheries within the division.</p>
<i>Project Benchmark:</i>	Malaysia is known for its angling activities, though currently, detailed data on the industry is not available. However, there were already several fish landing points within Malaysia where fishing is the major economic driver. These include Kg. Permatang in Perak and Kuala Rompin in Pahang and Kuala Besut in Terengganu.
<i>Impacts/ Outcomes:</i>	<p>The main outcome from the development of recreational fishing at the Sri Aman division is as follow:</p> <ul style="list-style-type: none"> ● Eco-tourism and economic improvement <ul style="list-style-type: none"> – The main selling point from the development of the recreational fisheries activities would be the increase of economic activity and revenue capture to the surrounding area. ● Employment opportunities <ul style="list-style-type: none"> – New job opportunities would be available as the recreational activity development would mostly employ the local people due to their knowledge of the area and, at the same time, to improve their income. ● Knowledge and training

Action/ Project No:		FH 1: Development of Recreational Fisheries at Batang Ai Reservoir																															
		<ul style="list-style-type: none"> – Training programs for suitable people to become boat operators and others would need to be conducted to bring local communities into the recreational fisheries business. 																															
Outputs of Project & KPIs:		<p>The main outputs from the proposed development of recreational fishing in the Sri Aman division would be:</p> <ul style="list-style-type: none"> ● Recreational fishing infrastructure such as jetty, staircase, platform, berthing pier, slipway, public toilet, etc., are either installed or upgraded. A recreational fishing information kiosk would also be constructed. Additionally, a coin-lock based storage cabinet would also be installed. This would lead to an increased number of anglers using boat service from the jetty. ● At least ten dedicated recreational fishing boats are upgraded with their safety equipment (life jacket, emergency radio, first aid kit), GPS navigation, and other facilities such as icebox, live bait compartment and rooftop. ● At least ten boat operators have been licenced and insured to carried recreational fishing activity. The boats would need to possess safety features consistent with legal requirements for the same. <p>Recreational fisheries would be promoted to the public through printed or electronic media.</p>																															
Estimated Budget:		<table border="1"> <thead> <tr> <th>Activity</th> <th>2021 - 2022</th> <th>2023 - 2025</th> <th>2026 - 2030</th> </tr> </thead> <tbody> <tr> <td>1. Estimated Capital Expenditure (RM Million)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>– Construction of the recreational fisheries infrastructure,</td> <td>1.50</td> <td>0.02</td> <td>0.02</td> </tr> <tr> <td>– Preparation of equipment and tools,</td> <td></td> <td></td> <td></td> </tr> <tr> <td>– Development of marketing plans</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2. Estimated Operating Expense (RM Million)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>– Include maintenance and utilities</td> <td>-</td> <td>0.01</td> <td>0.01</td> </tr> </tbody> </table>				Activity	2021 - 2022	2023 - 2025	2026 - 2030	1. Estimated Capital Expenditure (RM Million)				– Construction of the recreational fisheries infrastructure,	1.50	0.02	0.02	– Preparation of equipment and tools,				– Development of marketing plans				2. Estimated Operating Expense (RM Million)				– Include maintenance and utilities	-	0.01	0.01
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Activities/ Components:		<p>The major project activities would be as follow:</p> <ul style="list-style-type: none"> ● Recreational fishing infrastructure Infrastructure is necessary for anglers who wish to visit Batang Ai reservoir to conduct fishing activities. Among the types of infrastructure that must be built are a proper jetty, ramp, toilets, and sufficient rubbish bins. Additionally, a recreational fishing information kiosk also needs to be constructed, which can provide information in a proper manner such as schedule of boat services for angling activity, rental rate, location of angling, etc. A conventional pay locker also must be provided, which can be used by the anglers to keep their personal items for short-term periods. – Equipment and Tools Basic equipment and tools must be provided, such as a boat, GPS, icebox, emergency radio, life jacket, and first aid kit. ● Marketing Plan ● It is necessary to develop and implement appropriate marketing strategies to promote opportunities for recreational fishing in the Sri Aman division. As such, methods that can be used are through website, pamphlets, leaflets, roadshows, Exhibitions, and magazines. Social media can also promote recreational fishing activity in the Sri Aman division, such as Whatsapp, Instagram and Facebook. 																															
Investors:		The Sarawak state government would support the funding for the recreational fisheries development.																															
Revenue Source:		The source of revenue would be from the payment of the anglers to use the boats and the recreational fisheries infrastructures, which would be included when they sign up for the																															

Action/ Project No:		FH 1: Development of Recreational Fisheries at Batang Ai Reservoir																		
	<p>angling activity. Based on the boat rentals of RM150 per day, there would be two (2) trips per week, the total revenue in a year could reach about RM156,000.00. It is pertinent to note that would amount to being direct accrual by boat operators. It also does not include other economic activities that recreational fishers would support.</p>																			
Project Time Frame:	<table border="1"> <thead> <tr> <th rowspan="2">Activity</th> <th colspan="2">Year</th> </tr> <tr> <th>Start</th> <th>Complete</th> </tr> </thead> <tbody> <tr> <td>1. Land clearing</td> <td>2021</td> <td>2021</td> </tr> <tr> <td>2. Establishment of recreational fisheries jetties</td> <td>2021</td> <td>2023</td> </tr> <tr> <td>3. Upgrade boat and enhancing boat operator skills. - upgrade equipment and tools of 10 dedicated recreational fishing boat - Provision of licenses, insurances, and safety training for ten boat operators</td> <td>2021</td> <td>2022</td> </tr> <tr> <td>4. Marketing (exposure of recreational fisheries activity to the public through printed or electronic media)</td> <td>2021</td> <td>2030</td> </tr> </tbody> </table>			Activity	Year		Start	Complete	1. Land clearing	2021	2021	2. Establishment of recreational fisheries jetties	2021	2023	3. Upgrade boat and enhancing boat operator skills. - upgrade equipment and tools of 10 dedicated recreational fishing boat - Provision of licenses, insurances, and safety training for ten boat operators	2021	2022	4. Marketing (exposure of recreational fisheries activity to the public through printed or electronic media)	2021	2030
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4. Marketing (exposure of recreational fisheries activity to the public through printed or electronic media)	2021	2030																		
Enablers:	<p>Among the required input to ensure the success of this strategy includes:</p> <ul style="list-style-type: none"> ● Acquisition of a suitable site for the proposed jetty ● The ability for the boat operator to collaborate and well maintain the infrastructures and facilities provided to them ● The amount of loan provides by particular financial agencies for the boat operators to upgrade their boat and engine ● Adequate number of boats that are equipped to carry anglers safely and comfortably ● Participation of trained boat operators as well as the local community ● Strong marketing and promotional support 																			
Possible Barriers & Threats	<p>Main possible barriers to this proposed strategy include:</p> <ul style="list-style-type: none"> ● Lack of involvement from the local community <ul style="list-style-type: none"> – The local community would be the one to provide the manpower and knowledge to ensure that the strategy would provide revenue into the division. Additionally, the local community would also be the one to be benefiting from the spillover effect of the economy, and thus, their involvement is the main criteria to ensure the realization of this strategy. ● Weak marketing support <ul style="list-style-type: none"> – The strategy strongly depends on a comprehensive marketing strategy to attract the anglers to come to Sri Aman. 																			
Roles & Responsibilities:	<p>The main implementation agency would be the Sri Aman District Council, which would oversee the construction and the operation of the proposed development. However, participation by the local committee would also be encouraged, where they could also gain revenue either directly from recreational fisheries activities and the economic spill over due to the increasing numbers of anglers and tourists.</p>																			

Action/
Project No:

FH 1: Development of Recreational Fisheries at Batang Ai Reservoir



Example of Recreational Fisheries Infrastructure and Facilities

2.3.2 Exploring the Potential of the Adjoining Kalimantan Market for Supply of Additional Products

Action/ Project No:	FH 2: Exploring the Potential of the Adjoining Kalimantan Market for Supply of Additional Products															
Project Description:	Lubok Antu straddles the boundary with Indonesia with the town of Badau in West Kalimantan, Indonesia. This could potentially create market links in which products between the two countries could be exchanged, creating more potential in terms of selling and buying items that were not available in the respective countries. This can support not only the local fisheries/aquaculture industry but also attract tourists from within as well as outside of Sarawak. The absence of data from the Kalimantan side of the border means, however, the actual potentials and development direction that is engendered cannot be established before such a study is carried out.															
Project Site:	Lubok Antu															
Link Projects:	-															
Project Rational:	Sri Aman straddles the border with Kalimantan, in particular the Kapuas River Basin. There can be substantial synergies between the two countries that can and, should, be explored. This would create a market that could be potentially tapped between the two countries, and thus creating greater economic return to both countries.															
Project Benchmark:	<p>An example of such cross-border linkages would be Kuala Perlis, a hub for fish caught in Malaysian waters (particularly off Langkawi) and Satun in Thailand. A smaller market at Wang Kelian (Perlis) also sees fish from Thailand retailed in a border market, though volumes traded here are much smaller than in Kuala Perlis.</p> <div style="display: flex; justify-content: center; gap: 20px;">   </div> <p style="text-align: center;">Wang Kelian Border Market</p>															
Impacts/ Outcomes:	The main outcome of the study would be the potential for the trading of fish and fisheries products between the two countries.															
Outputs of Project & KPIs:	The main output would be an assessment of trading potential between Malaysia and Indonesia for fish and fish products.															
Estimated Budget:	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Activity</th> <th style="text-align: center;">2021 – 2022</th> <th style="text-align: center;">2023 – 2025</th> <th style="text-align: center;">2026 - 2030</th> </tr> </thead> <tbody> <tr> <td>Estimated Capital Expenditure (RM Million) – <i>Assessment study</i></td> <td style="text-align: center;">0.05</td> <td style="text-align: center;">0.05</td> <td></td> </tr> <tr> <td>Estimated Operating Expense (RM Million) – <i>Include labour payment, electrical and utilities.</i></td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> </tbody> </table>	Activity	2021 – 2022	2023 – 2025	2026 - 2030	Estimated Capital Expenditure (RM Million) – <i>Assessment study</i>	0.05	0.05		Estimated Operating Expense (RM Million) – <i>Include labour payment, electrical and utilities.</i>	-	-	-			
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Estimated Operating Expense (RM Million) – <i>Include labour payment, electrical and utilities.</i>	-	-	-													
Activities/ Components:	The major activities will be an assessment study of the supply/demand potential for fish and fisheries products within the context of a broader cross-border trading environment between Malaysia and Indonesia using Lubuk Antu as a gateway.															

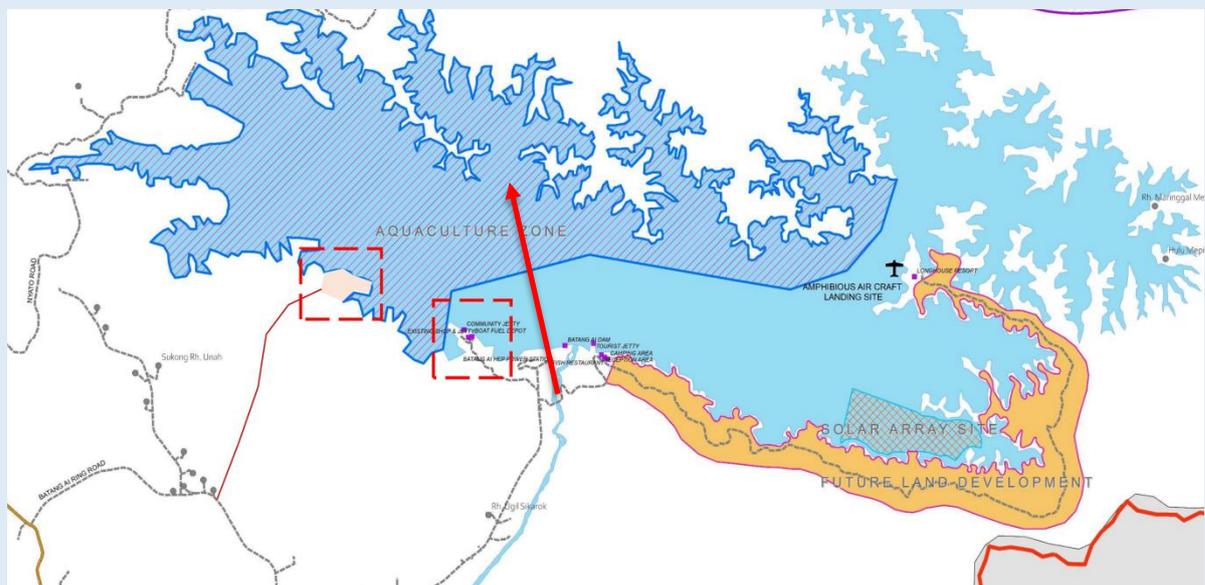
Action/ Project No:		FH 2: Exploring the Potential of the Adjoining Kalimantan Market for Supply of Additional Products	
Investors:	The source of the funding will come from SADA.		
Revenue Source:	The cost of the assessment study can be defrayed by imposing a cess on the products that are ultimately traded.		
Project Time Frame:	Activity		Year
		Start	Complete
	1. Implementation of a trade zone	2021	2022
	2. Development of shop lots for business owners	2022	2022
Enablers:	The main enablers would be links with traders on the Indonesian side that can provide timely and accurate information on trading potentials and their willingness to invest.		
Possible Barriers & Threats	-		
Roles & Responsibilities:	The assessment study should be undertaken by SADA, with inputs from the Royal Malaysian Customs Department (KASTAM and Malaysian Quarantine and Inspection Services (MAQIS).		

2.3.3 Expansion of the Aquaculture Industry at Batang Ai Reservoir, with a View of Creating Value Added Spin-Offs

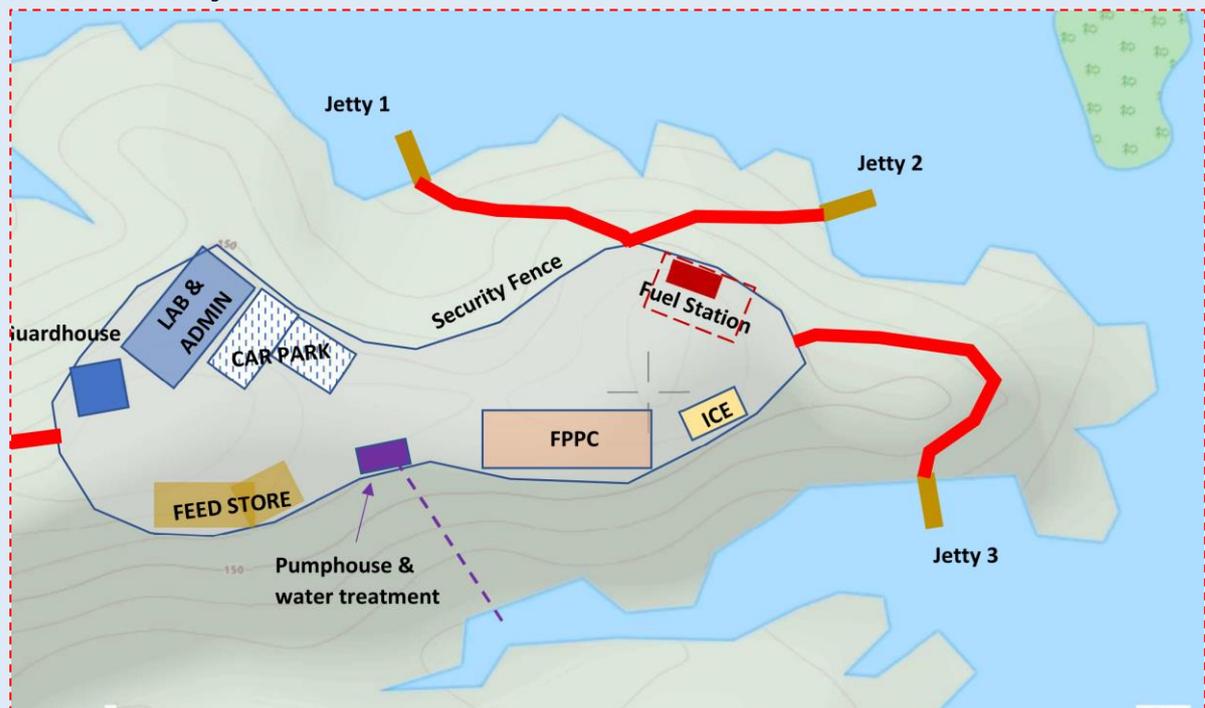
Action/ Project No: AQ 1: Expansion of the Aquaculture Industry at Batang Ai Reservoir, with a View of Creating Value Added Spin-Offs

Project Description: Though the aquaculture activity within Batang Ai has been undertaken for some time, even larger players such as Borneo Eco Fish Sdn. Bhd. are not vertically integrated. This means that there is very little value-adding to the fish coming out of the reservoir. The establishment of value-adding industries (specifically processing) is dependent on having a sufficient volume of feedstock. Current production volumes are insufficient for the purpose. The expansion of cage culture activity within the reservoir would enable a greater volume of output which, in turn, can engender an industry cluster centred around farmed fish.

Project Site: Batang Ai



Source: UNIMAS Holdings



Source: UNIMAS Holdings

Action/ Project No:	AQ 1: Expansion of the Aquaculture Industry at Batang Ai Reservoir, with a View of Creating Value Added Spin-Offs
Link Projects:	-RO 7 – New road to Aquaculture fish landing site.
Project Rational:	<p>Currently, there are already cage culture activities undertaken within the Batang Ai reservoir, where most of the cages at the reservoir have been self-financed by individual owners. Additionally, large scale culture operations have also been carried out by various companies and corporate bodies. This area can become a major producer of freshwater fish and can become a major driver of the agriculture sector in Sri Aman.</p> <p>There are still areas which could be developed into cage culture areas, where it is projected that an additional about 14,000 standard cages would be developed up to 2030. It is anticipated that future expansion would be driven by large companies that would have the necessary technology and capacity to undertake intensive farming of tilapia using mechanised systems and electronic monitoring of farming conditions. This would demand substantial capital inputs that economies of scale can only justify. Participation by local communities is still possible, acting as satellite farms to the main operators. Towards this end, the DOA is sponsoring 50 nos of 30-cage farms that can potentially play this role.</p>
Project Benchmark:	Borneo Eco Fish Sdn. Bhd. is one of the largest culturists operating in Batang Ai reservoir, in which all their products have MyGAP certification. Their products have been exported to Singapore, indicating they are hygienically packed and comply with Singapore’s stringent food standards. This indicates that companies that ultimately undertake aquaculture in Batang Ai can comply with international food standards.
Impacts/ Outcomes:	<p>The main outcome from the Fisheries Processing and Packaging Centre (FPPC) would be as follows:</p> <ul style="list-style-type: none"> ● Economic improvement ● The main selling point from the development of the cage culture expansion and the Fisheries Processing and Packaging Centre (s) would be the economy’s improvement due to increased production and better packaging and marketing of farmed fish coming out of Batang Ai. Employment opportunities. ● Greater employment opportunities would be available, especially for the locals, since the cage culture expansion and the Fisheries Processing and Packaging Centre (s) would require manpower. ● Knowledge and training. To produce a high-quality product, improvements in the operation of cages and the processing centre is required. Training would also increase the knowledge transfer to local communities.
Outputs of Project & KPIs:	<p>The main outputs would be:</p> <ul style="list-style-type: none"> ● 10,000 cages culture operating within Batang Ai reservoir by 2030. ● Fisheries Processing and Packaging Centre (FPPC) 

**Action/
Project No:** AQ 1: Expansion of the Aquaculture Industry at Batang Ai Reservoir, with a View of Creating Value Added Spin-Offs



Examples of Cage Cultures Operations



Example of Processing Equipment and Processed Products

Action/ Project No:	AQ 1: Expansion of the Aquaculture Industry at Batang Ai Reservoir, with a View of Creating Value Added Spin-Offs
	<ul style="list-style-type: none"> ● Strong marketing and promotional support
Possible Barriers & Threats	<p>Main possible barriers to this proposed strategy include:</p> <ul style="list-style-type: none"> ● Lack of involvement from the local community <ul style="list-style-type: none"> – The local community would be the one to provide the manpower and knowledge to ensure that the strategy would provide revenue into the division. Additionally, the local community would also be the one to be benefiting from the spillover effect of the economy, and thus, their involvement is the main criteria to ensure the realisation of this strategy. ● Weak marketing support <ul style="list-style-type: none"> – The strategy strongly depends on a comprehensive marketing strategy to attract the anglers to come to Sri Aman.
Roles & Responsibilities:	<p>The main implementation agency would be the Inland Fisheries Branch of the Department of Agriculture, which would oversee the operation and compliances of both proposed developments.</p>

2.3.4 Integration of ‘Smart Farming’ Systems in Aquaculture using Remote Monitoring and Management Systems

Action/ Project No:	AQ 2: Integration of ‘Smart Farming’ Systems in Aquaculture using Remote Monitoring and Management Systems
Project Description:	Smart Farming refers to a spectrum of digitally based activity that enables better monitoring of production quality, environmental management, and husbandry efficiencies and enhances market access and logistics. Where the aquaculture industry is concerned, smart farming would encompass water quality monitoring systems, response mechanisms and production schedule.
Project Site:	-
Link Projects:	-
Project Rational:	<p>Due to the increase in demand and awareness of environmental protection, a smart farming system is advocated to monitor and manage the aquaculture industry in Batang Ai. Manual methods of undertaking such a monitoring regime are slow and often only yield snapshot indications that do not enable environmental challenges to be forecast. This means that the response time for undertaking mitigation measure is too long to be useful.</p> <p>A new intelligent aquaculture model using the internet employing artificial intelligence, big data, cloud computing, Internet of Things (IoT), and other technologies would allow more modern and effective monitoring of environmental quality and production. For instance, installation of water quality sensors would enable water quality to be continuously monitored, and any changes can be reported directly for immediate action; camera sensors can be used to observe any significant changes in the behaviour of fish; automatic fish feeder can be used to ensure the right amount of feed is dispensed as required.</p>
Project Benchmark:	<p>Malaysia has been encouraging the aquaculture industry to implement digital technology into their operations. PCB Biotech Sdn. Bhd. is one of the companies based in Sabah that has applied the “Sistem Perladangan Akuakultur Pintar” (Smart Aquaculture System, SAS) to their operations to reduce costs and time their production. The SAS increased the total production and ensured the safety of the environment and fish due to the advancement in monitoring and maintaining the water quality. This model can serve as a benchmark for the aquaculture activities carried out at Batang Ai to produce better quality fish.</p> <div> </div> <p style="text-align: center;">Aquaculture Pond using the SAS Technology</p>
Impacts/Outcomes:	The main outcome from this project would be an increment of production from aquaculture due to the improvement of water quality and better management of aquaculture. This will help support the demand for food from local communities and other states in Malaysia and other countries, i.e., China and Singapore.

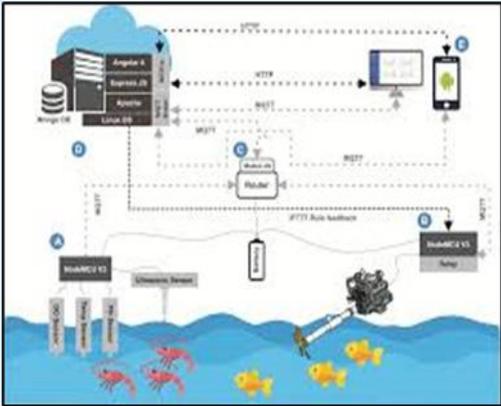
Action/ Project No: AQ 2: Integration of ‘Smart Farming’ Systems in Aquaculture using Remote Monitoring and Management Systems

Outputs of Project & KPIs: The main output will be the implementation of smart farming aquaculture for the aquaculture activities currently operating within Batang Ai. An estimated 100 culturists would be installed with the ‘smart farming’ system, each costing about RM5,000. Additionally, there would also be jobs created, particularly on the repair and maintenance personnel.

Example of Smart Farming System:



Automatic Fish Feeding Device



Water Quality Monitoring System

Estimated Budget:	Activity	2021 – 2022	2023 – 2025	2026 - 2030
	Estimated Capital Expenditure (RM Million) – Include construction of the telco tower and installation of a sensor system, camera, and automatic feeder		0.50	-
	Estimated Operating Expense (RM Million) – Include labour payment, electrical and utilities.	-	-	-

Activities/ Components: The major activities would be the construction of telco tower and installation of sensor system on aquaculture.

Investors: The source of the funding will come from the Sarawak state.

Revenue Source: No revenue is expected from this action plan.

Action/ Project No:		AQ 2: Integration of 'Smart Farming' Systems in Aquaculture using Remote Monitoring and Management Systems		
Project Time Frame:	Activity		Year	
			Start	Complete
	1.	Construction of telco tower	2021	2023
	2.	Installation of water quality sensor system, camera and automatic fish feeder on aquaculture	2023	2023
	3.	Establishing a connection to the computer in Kuching	2023	2023
	4.	Operation of aquaculture monitoring	2023	-
Enablers:	Among the required input to ensure the success of this strategy includes: <ul style="list-style-type: none"> ● Detailed experiments using the sensor on the fish before applying to the aquaculture as baseline data ● Continuous maintaining of the sensor to ensure all the equipment work properly 			
Possible Barriers & Threats	Main possible barriers to this proposed strategy include: <ul style="list-style-type: none"> ● The poor connection of the internet at a certain time will interrupt the data recording and reporting. ● Lack of data collection on aquaculture technology will limit the data processing and interpretation of information regarding the changes in fish behaviour. 			
Roles & Responsibilities:	The monitoring of aquaculture will be operated by the aquaculture operators within Batang Ai reservoir. However, it could be supervised by the Inland Fisheries division under the Department of Agriculture, Sarawak.			

2.3.5 Masterplan for the Economic Development of Tagang Site

Action/ Project No:	Masterplan for the Economic Development of Tagang Site																							
Project Description:	There are 17 tagang projects in the Division, of which 10 are currently active. The focus on the past was on community-based management of inland fisheries resources, with no programmed link to the greater economy of which it is part of. As pointed out earlier, there is potential for these sites to be developed for tourism and recreation. A masterplan that looks at these sites in terms of their overall economic potentials should thus be pursued.																							
Project Site:	-																							
Link Projects:	-																							
Project Rational:	There was no effort to mainstream the tagang's natural assets as recreational and tourism products. This project will provide the basis for their development, where possible, as economic assets to the regional economy and consequently, of the communities that depend on them.																							
Project Benchmark:	<p>Major benchmark would be the number of visitors to each tagang site including:</p> <ul style="list-style-type: none"> • The numbers undertaking fishing • The numbers undertaking adventure exercises • The number just enjoying the riverscape <p>Included in this data tabulation would be:</p> <ul style="list-style-type: none"> • The number of day trippers and their expenditure. • The number staying overnight (where local accommodation can be made available) and their expenditure. 																							
Impacts/ Outcomes:	The main outcome from the study would be the potential for development of tourism and recreational products at community level for the Division.																							
Outputs of Project & KPIs:	The main output would be an assessment of the potential for the tagang projects in Sri Aman to play a role in the overall economy of the Division.																							
Estimated Budget:	<table border="1"> <thead> <tr> <th>Activity</th> <th>2021 – 2022</th> <th>2023 – 2025</th> <th>2026 - 2030</th> </tr> </thead> <tbody> <tr> <td>Estimated Capital Expenditure (RM Million)</td> <td>0.05</td> <td></td> <td></td> </tr> <tr> <td>– Preliminary meetings and documentation Masterplan Study (17 sites @ RM10,000 per site)</td> <td>0.17</td> <td></td> <td></td> </tr> <tr> <td>Estimated Operating Expense (RM Million)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>– Include labor payment, electrical and utilities.</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Activity	2021 – 2022	2023 – 2025	2026 - 2030	Estimated Capital Expenditure (RM Million)	0.05			– Preliminary meetings and documentation Masterplan Study (17 sites @ RM10,000 per site)	0.17			Estimated Operating Expense (RM Million)				– Include labor payment, electrical and utilities.	-	-	-			
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Activities/ Components:	The major activities will be an assessment study current status of the tagang projects and the natural capital that prevails at the site, the manner in which that capital can be best be managed and the potential economic returns involved.																							
Investors:	The source of the funding will come from SADA or from EPU (S).																							
Revenue Source:	The cost of the assessment study can be defrayed by imposing a fee on visitors that avail of the various facilities that would be on offer.																							

Action/ Project No:			Masterplan for the Economic Development of Tagang Site	
Project Time Frame:	Activity	Year		
		Start	Complete	
	1. Design of the Masterplan	2022	2023	
	2. Masterplan study	2023	2024	
Enablers:	The main enables would be promotion of the sites and links with tourism agencies that can facilitate this.			
Possible Barriers & Threats	The potential unwillingness of local communities to accept a significant flow of outsiders. There needs to be active social engagement to prevent this.			
Roles & Responsibilities:	The assessment study should be undertaken by SADA, with inputs from Inland Fisheries Branch of the Agriculture Department, the Resident's Office and other relevant planning agencies.			

SECTION 2.4 TOURISM

Table 2.1: Tourism Focal Areas & Strategies

Focal Area	Strategy	Actions	Est Budget
Product Development	Focus new product development efforts on high priority attractions that have good tourism potential and tailor these products to specific market demand segments.	11	RM36,000,000
Community-Based Tourism	Encourage the development of alternative forms of homestays such as kampung stays, community-managed camp sites, and add-on tours, activities and services. These variations of the traditional homestay model should target appropriate market segments.	7	RM 8,400,000
Conserving Natural Tourism Assets	Protect natural assets and utilize these sites for high value-added ecotourism activities.	5	RM22,100,000
Branding	Allocate more marketing resources to promoting attractions and experiences in Sri Aman Division and develop new adventure and sports events.	9	RM985,000
Accessibility	Continue to improve access to high priority tourism attractions but be mindful that road access can degrade high-value ecotourism sites and lead to reduced income for local communities.	7	RM1,900,000
TOTAL		39	RM69,385,000

2.4.1 Product Development

Focus new product development efforts on high priority attractions that have good tourism potential and tailor these products to specific market demand segments. There are eleven actions under product development. Many of these focus on developing products for domestic tourists.

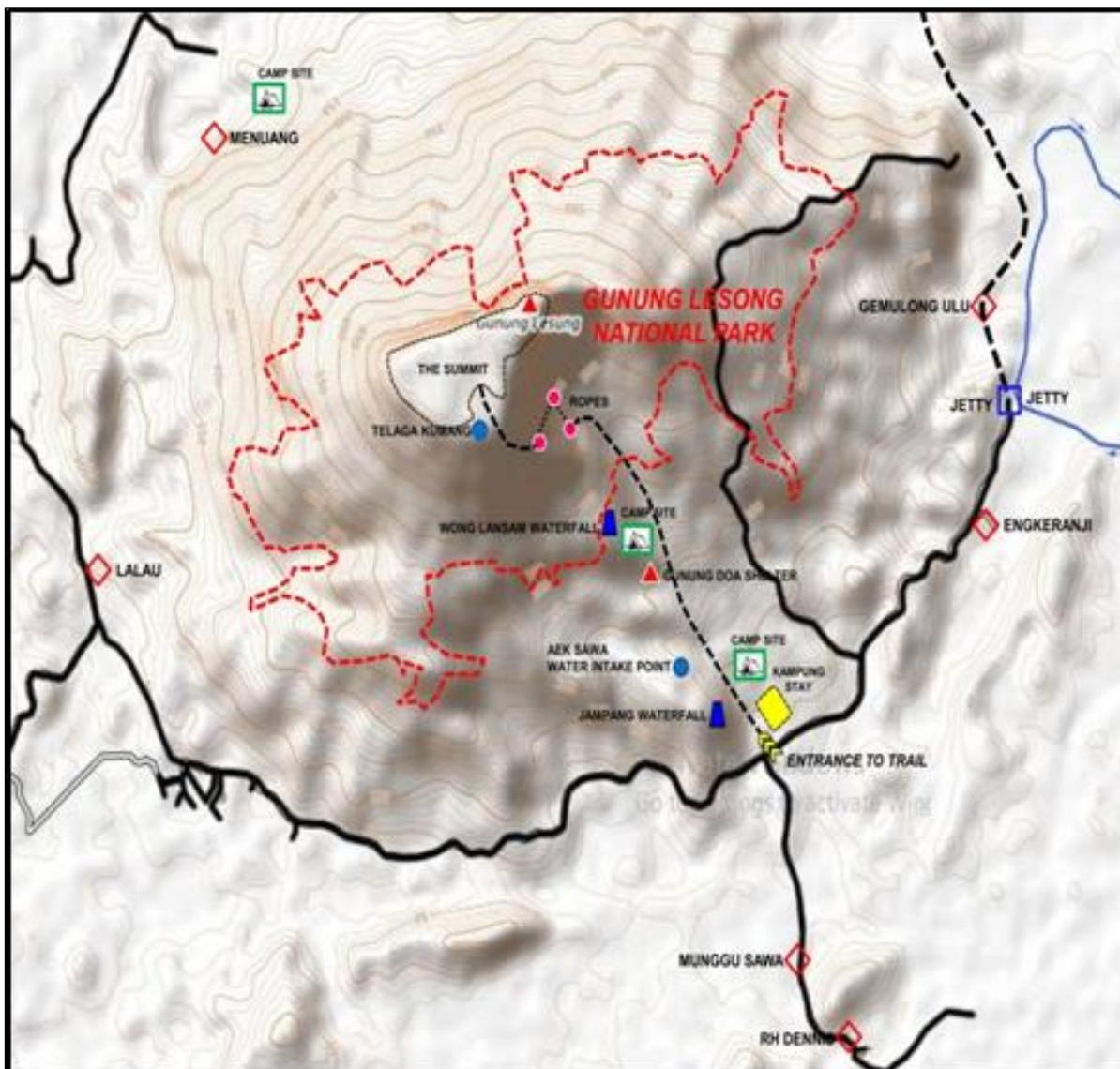
Table 2.2: Summary of Product Development Recommendations

No.	Action
S1-1	Develop the Gunung Lesong-Lingga Ecotourism Cluster with initial focus on building park HQ facilities (office, staff quarters, interpretation centre, etc.) and community-managed accommodation (CBT)
S1-2	Promote Sri Aman Division as a camping destination and develop five high quality camping sites with a full range of facilities.
S1-3	Develop specific sites / attractions for domestic tourists and local residents of Sri Aman division, particularly for families and the youth travel segment.
S1-4	Develop a Rainforest Field Studies Centre at Batang Ai National Park and partner with a local and foreign university to manage the centre and research activities.
S1-5	Allocate sufficient funds for local recreation and picnic spots so that local councils can maintain facilities and keep them clean.
S1-6	Continue to fund local events and festivals (e.g., Pesta Benak).
S1-7	Develop visitor centre style attractions (e.g., handicraft centre, cultural centre) in Simanggang Town, not in small towns where use and visitation will be limited.
S1-8	Continue to allocate funds to preserve heritage sites such as Fort Arundell, Lingga Bazaar, etc.) as part of a Sarawak's wider policy of investing in important cultural & heritage assets.
S1-9	Develop agro-tourism products around the fish cage culture at Batang Ai as an add-on tour / new attraction.
S1-10	Promote fishing at Batang Ai Lake as a leisure activity and way of dealing with the lake's 'feral' fish problem.
S1-11	Set Aside Land at Batang Ai for Future Lakeside Tourism Development (A Lakeside Tourism Corridor)

Further details of each action are outlined in following sections.

2.4.1.1 Development of Gunung Lesong-Lingga Ecotourism Cluster

Strategic Focus Area: S1: Product Development	
Action/Project No:	S1-1 Development of Gunung Lesong-Lingga Ecotourism Cluster
Project Description:	Develop the Gunung Lesong-Lingga Ecotourism Cluster with initial focus on building park HQ facilities (office, staff quarters, interpretation centre, etc.), community-managed accommodation, trekking trails and roads and other infrastructure to improve access to the park and attractions.
Project Site:	Various, see individual project components. A suitable site for the park HQ would be near the entrance to the current summit trail



Source: UNIMAS Holdings

Link Projects:	<ul style="list-style-type: none"> • S2-1, community-managed stand-alone accommodation at base of summit trail. • S1-2, campsites at base of summit trail and Munggu Sawa. • S3-2, wildlife corridor between Gunung Lesong and Sebuyau National Parks • S3-3, wildlife surveys at Gunung Lesong NP & surrounding forest. • S2-6, cultural heritage centre at Gunung Lesong. • Road from Pantu to Gunung Lesong • Boat jetties on Sg Seterap
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Strategic Focus Area: S1: Product Development	
Target Market:	Core market will be local domestic tourists (Sarawakians). 70-80% of visitors to G. Lesong NP will likely be local tourists. This is a similar market mix as Kubah NP, G. Gading NP and Matang Wildlife Centre. Domestic visitors will also form the largest demand segment for other attractions in the cluster. The cluster should be able to attract small numbers of foreign arrivals (e.g. Europe, Singapore, Australia). However, this will be in the second half of the master plan period when tourism has recovered and a full range of facilities and accommodation has been developed.
Project Rational:	<ul style="list-style-type: none"> • Unlock the tourism potential of Gunung Lesong and surrounding villages and towns • Create economic opportunities for local communities • Tap into growing domestic tourism demand • Build infrastructure and facilities to be 'market ready' when international tourism returns
Impacts/Outcomes:	<ul style="list-style-type: none"> • Road access to Gunung Lesong National Park, thereby opening up a new ecotourism product • Jetty infrastructure to support boat-based tours • Park infrastructure • Employment and business opportunities for local residents • Pioneering new forms of community-based tourism • Training for community
Estimated Budget:	<ul style="list-style-type: none"> • Road, as budgeted under existing plans. • Park HQ (RM 6 million) • Car park (RM 500,000) • Community-managed stand-alone accommodation at G. Lesong (RM 750,000, see Action S2-1) • Park trail network (RM 500,000) • Boat jetties, as budgeted under existing plans • Tidal bore viewing platforms, as budgeted under existing plans • Community capacity building (RM 300,000) • Cultural Heritage Centre (RM 2 million, see Action S2-6)
Activities/Components:	<ul style="list-style-type: none"> • Road from Pantu to Gunung Lesong (to summit trail entrance, near Munggu Sawa) • Park HQ (staff quarters, office, interpretation centre, public toilets, etc). Obvious site is near current summit trail which is likely to be focus of visitor activity • Car park at base of summit trek (near Munggu Sawa) • Community-managed stand-alone accommodation (see Action S2-1) and campsite (Action S1-2), both located at entrance to summit trail, near Munggu Sawa • Improve park trail network • Boat jetties (Banting & location on Sg Seterap near G Lesong, e.g. near Sumulung or Engkeranji) • Tidal bore viewing platforms • Camp site near Kpg Menuang (See Action S2-2) • Community capacity building • Cultural Heritage Centre
Investors:	<p>Public Sector: 100%. Investment mostly consists of the provision of basic infrastructure (e.g. roads) and park facilities.</p> <p>Private sector investment should occur later when infrastructure is in place and accessibility has improved.</p>
Business Model:	See individual project components (e.g. S2-1, etc.)
Project Time Frame:	Medium to Long-Term

Strategic Focus Area: S1: Product Development																	
Key Success Factors:	<ul style="list-style-type: none"> Improved accessibility (the Pantu-Gunung-Lesong Road is critical to open up the area for tourism) Tourist accommodation situated close to the park and main attractions Community buy-in and support for tourism initiatives Forest / land that surrounds Gunung Lesong National Park remains intact and open to tourists Targeted marketing and promotion 																
Possible Barriers & Threats	<ul style="list-style-type: none"> Availability of land in a suitable location for accommodation and other tourism facilities Decline in local domestic tourism demand when borders re-open (i.e. a sustained post-covid outbound tourism boom) Slow recovery in international tourism and arrivals to Sarawak Habitat degradation in non-protected forest that surround the park Hunting in and around the park could diminish opportunities for developing wildlife watching 																
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>SFC</td> <td>Park management and development of park facilities</td> </tr> <tr> <td>Ministry of Infrastructure</td> <td>Building infrastructure (roads, jetties, etc.)</td> </tr> <tr> <td>Sri Aman Resident Office</td> <td>Coordination</td> </tr> <tr> <td>MTCP Sarawak</td> <td>Overseeing development of stand-alone accommodation and capacity building</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Promotion</td> </tr> <tr> <td>Tour Operators</td> <td>Sales and marketing</td> </tr> <tr> <td>Gunung Lesong Community-Based Ecotourism Committee</td> <td>Management of accommodation and provision of tourism services</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	SFC	Park management and development of park facilities	Ministry of Infrastructure	Building infrastructure (roads, jetties, etc.)	Sri Aman Resident Office	Coordination	MTCP Sarawak	Overseeing development of stand-alone accommodation and capacity building	Sarawak Tourism Board	Promotion	Tour Operators	Sales and marketing	Gunung Lesong Community-Based Ecotourism Committee	Management of accommodation and provision of tourism services
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MTCP Sarawak	Overseeing development of stand-alone accommodation and capacity building																
Sarawak Tourism Board	Promotion																
Tour Operators	Sales and marketing																
Gunung Lesong Community-Based Ecotourism Committee	Management of accommodation and provision of tourism services																

2.4.1.2 Promote Sri Aman Division as a Camping Destination

Strategic Focus Area: S1: Product Development	
Action/Project No:	S1-2 Promote the Sri Aman Division as a Camping Destination
Project Description:	Promoting the Sri Aman Division as a camping destination and develop five high quality camping sites with a full range of facilities. Each camp site to include camping area, BBQ or fire pits, toilet and shower block, picnic tables, kitchen sinks, dining hut, rubbish bins, car parking area, etc
Project Site:	<p>Kampung Menuang A potential site is near the stream at the start of Menuang-Langgir trail.</p> <p>Gunung Lesong NP Potential sit is near the base of the existing summit trail, near the road junction to Munggu Sawa.</p> <p>Wong Ajong</p> <p>Batang Ai Lakeside (within existing recreational area or at a site to the north of the current tourist jetty).</p> <p>Banting (site to be determined after road has been completed).</p>
Link Projects:	<ul style="list-style-type: none"> S2-2, campsite at Kampung Menuang S2-1, Munggu Sawa campsite as part of wider CBT 'kampung stay' project S2-3, Wong Ajong development

Strategic Focus Area:		S1: Product Development	
Target Market:	The core target market is local domestic tourists. As tourism recovers the camp sites should also be to attract foreign tourists (e.g. budget travellers).		
Project Rational:	<ul style="list-style-type: none"> • Quick win, can roll out up in 2021/2022 at some locations • Create economic opportunities for local communities • Tap into growing demand from domestic tourists • Caters to youth travel market • Facilitates ecotourism as some locations (e.g. Gunung Lesong, Banting, etc.) 		
Impacts/Outcomes:	<ul style="list-style-type: none"> • Development of 5 campsites with full facilities • At least 3 campsites to be managed by local communities as part of CBT Projects • Campsites provide revenue for local communities • Sri Aman Division established as leading camping destination in Sarawak 		
Estimated Budget:	RM 2.5 million. Average of RM 500,000 per camp site. Some sites (e.g. Kpg Menuang) will require lower budgets than other sites.		
Activities/Components:	<ul style="list-style-type: none"> • Pioneer a new concept of a 'homestay' camp site near Kpg Menuang • Munggu Sawa campsite (part of a wider CBT 'kampung stay' project, see Action S2-1) • Wong Ajong (part of a wider CBT project, see Action S2-3) • Batang Ai lakeside • Banting (medium term, when road is complete) 		
Investors:	Public Sector: 100%.		
Business Model:	Campsites could be managed by local councils as part of recreational areas (e.g. if the Batang Ai lakeside campsite is located within the existing public park / recreational area). Other campsites could be part of a community-based tourism projects. There is no one-size-fits-all for CBT projects. Suggested business models are listed under individual project listings (see S2-1, S2-2, S2-3, etc. below).		
Project Time Frame:	Short to Medium-term.		
Key Success Factors:	<ul style="list-style-type: none"> • Site selection, campsites must be close to attractions • Budgets must be allocated to maintenance • Community buy-in and support for tourism initiatives • Generation of revenue for local communities (e.g. via user fee system) • Targeted marketing and promotion (focused on local domestic market) 		
Possible Barriers & Threats	<ul style="list-style-type: none"> • Poor management / lack of maintenance • Inadequate refuse collection (especially at weekends) • Availability of suitable land close to attractions 		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	MTCP Sarawak		Oversee development and provide capacity building
	Local Communities		Management of campsites
	Sri Aman Resident's Office		Coordination
	Local Councils		Refuse collection at all sites. Management of campsites at certain locations
	Sarawak Tourism Board		Marketing and Promotion

2.4.1.3 Develop Attractions and Recreational Areas for Domestic Tourists

Strategic Focus Area: S1: Product Development	
Action/Project No:	S1-3 Develop Attractions and Recreational Areas for Domestic Tourists
Project Description:	Develop specific sites / attractions for domestic tourists and residents of Sri Aman division, particularly for families and the youth travel segment.
Project Site:	-
Link Projects:	<ul style="list-style-type: none"> • S1-1, 2, 5 and 10 (product development) • S2-1, 2, 3 and 4 (community-based tourism) • S4-7, 8 and 9 (events)
Target Market:	-
Project Rational:	<ul style="list-style-type: none"> • Create economic opportunities for local communities • Tap into growing demand from domestic tourists • Caters to youth and family travel market • Builds greater resilience for State's tourism industry
Impacts/Outcomes:	<ul style="list-style-type: none"> • A portfolio of attractions and facilities for domestic tourists
Estimated Budget:	See individual projects (S1-1, S1-2, etc).
Activities/Components:	<ul style="list-style-type: none"> • Projects are listed under other Actions (e.g. S1-1 and 2, etc.).

2.4.1.4 Develop a Rainforest Field Studies Centre at Batang Ai National Park

Strategic Focus Area: S1: Product Development	
Action/Project No:	S1-4 Develop a Rainforest Field Studies Centre at Batang Ai National Park
Project Description:	Develop a Rainforest Field Studies Centre in Batang Ai National Park and partner with a local and foreign university to manage the centre and research activities.
Project Site:	The centre must be located within Batang Ai National Park itself (NOT at Nanga Delok or a site outside the park). (Note: An existing facility at Nanga Delok is underutilized. It is in the wrong location for a field research centre as researchers want to be based within a protected area and not have to commute to the research site).
Link Projects:	-
Target Market:	Foreign and local researchers. This project will only be sustainable if there is a solid partnership with a foreign university. This will ensure a steady flow of paying researchers and volunteers. Ideally, the university will be from a country that is already a core source market for Sarawak (e.g. UK, Singapore, Australia, etc.).
Project Rational:	<ul style="list-style-type: none"> • Create economic opportunities for local communities • Develops SAVE (Scientific, Academic, Volunteer and Educational) Tourism niche • Creates a partnership with an overseas university and a pipeline of researchers and volunteers • Reduces seasonality
Impacts/Outcomes:	<ul style="list-style-type: none"> • Development of a rainforest field studies centre • Strong partnership between SFC, foreign university and UNIMAS that strengthens research and collaboration • Opportunities for local and foreign researchers • Employment generation for local communities

Strategic Focus Area:		S1: Product Development									
		<ul style="list-style-type: none"> • Presence of field centre and researchers could lead to reduced hunting within the protected area • PR and branding opportunities for Sarawak 									
Estimated Budget:		RM 17 million.									
Activities/Components:		<ul style="list-style-type: none"> • Lecture / teaching room • Laboratory • Library • Office space • Accommodation (mix of studio rooms with desk / work space for scientists, twin bed rooms and 4-bed hostel rooms; all rooms with ensuite bathroom) • Kitchen and communal dining area • Boat jetty • Telecom Tower (internet connection) • Solar power 									
Investors:		Public Sector: 100%.									
Business Model:		Government funding with SFC as asset owner as centre will be located within the national park. Then centre could be managed by SFC, UNIMAS and a foreign university via a private company / JV arrangement. It is essential that a foreign university is involved as this will guarantee that the centre receives paying overseas researchers (both undergraduate and postgraduate). There will be a tariff of fees for accommodation, meals, local guides, boat transportation, etc. The bulk of revenue will be derived from this. The centre should also be able to generate revenue from sponsorship, film location fees and donations. Further details are provided in the financial analysis.									
Project Time Frame:		Medium to Long- term.									
Key Success Factors:		<ul style="list-style-type: none"> • Partnership with a foreign university that can ensure a flow of researchers • Location within the national park • Facility mix suitable for both short and long-term researchers • Accommodation and user fee structure that generates revenue for operational costs • Fast permit approval process for foreign researchers 									
Possible Barriers & Threats		<ul style="list-style-type: none"> • Difficulty finding a suitable overseas partner university. • Competition from established field centres in Sabah (e.g. Danum Valley, Danau Girang) and well-funded new facilities (e.g. Imbank Canyon). 									
Roles & Responsibilities:		<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>SFC</td> <td>Lead agency</td> </tr> <tr> <td>Foreign University</td> <td>Partner - International research institution</td> </tr> <tr> <td>UNIMAS</td> <td>Partner - Local research institution</td> </tr> </tbody> </table>		Agencies	Roles & Responsibilities	SFC	Lead agency	Foreign University	Partner - International research institution	UNIMAS	Partner - Local research institution
Agencies	Roles & Responsibilities										
SFC	Lead agency										
Foreign University	Partner - International research institution										
UNIMAS	Partner - Local research institution										

2.4.1.5 Allocate Sufficient Funds for Local Recreation Areas

Strategic Focus Area:		S1: Product Development							
Action/Project No:	S1-5	Allocate Sufficient Funds for Local Recreation Areas							
Project Description:	Allocate sufficient funds for local recreation and picnic spots so that local councils can maintain facilities and keep them clean.								
Project Site:	Local recreation areas and tourism attractions, including the new project recommended in this report (e.g. Wong Ajong, etc)								
Link Projects:	<ul style="list-style-type: none"> • S1-1, 2 and 3 • S2-1, 2, 3 and 4 								
Project Rational:	<ul style="list-style-type: none"> • Provide recreational sites for local residents of Sri Aman Division. • Ensures clean and well-maintained facilities and beauty spots 								
Impacts/Outcomes:	<ul style="list-style-type: none"> • Clean and well-maintained recreation and tourism areas 								
Estimated Budget:	RM 1 million per annum, or as needed based on the number of recreational sites managed by councils.								
Activities/Components:	<ul style="list-style-type: none"> • Maintenance of facilities • Refuse collection (particularly at weekends) 								
Investors:	Public Sector: 100%.								
Project Time Frame:	Short to Long-term.								
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Resident's Office</td> <td>Coordination</td> </tr> <tr> <td>Local Councils</td> <td>Refuse collection and maintenance</td> </tr> </tbody> </table>			Agencies	Roles & Responsibilities	Resident's Office	Coordination	Local Councils	Refuse collection and maintenance
Agencies	Roles & Responsibilities								
Resident's Office	Coordination								
Local Councils	Refuse collection and maintenance								

2.4.1.6 Local Events and Festivals

Strategic Focus Area:		S1: Product Development									
Action/Project No:	S1-6	Local Events and Festivals									
Project Description:	Continue to fund local events and festivals (e.g. Pesta Benak).										
Target Market:	Local residents, domestic and international tourists.										
Project Rational:	<ul style="list-style-type: none"> • Part of wider destination branding and marketing • Promotes individual attractions (e.g. Benak) • Creates business opportunities • Events and festivals are important for local towns and communities 										
Estimated Budget:	As budgeted under MTCP										
Investors:	Public and private sector. Varies depending on type of event.										
Project Time Frame:	Short to Long-Term										
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>MTCP</td> <td>Funding</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Marketing support</td> </tr> <tr> <td>Private companies</td> <td>Event organisers and sponsorship</td> </tr> </tbody> </table>			Agencies	Roles & Responsibilities	MTCP	Funding	Sarawak Tourism Board	Marketing support	Private companies	Event organisers and sponsorship
Agencies	Roles & Responsibilities										
MTCP	Funding										
Sarawak Tourism Board	Marketing support										
Private companies	Event organisers and sponsorship										

2.4.1.7 Develop an Iban Cultural Centre in Simanggang Town

Strategic Focus Area:		S1: Product Development										
Action/Project No:	S1-7	Develop an Iban Cultural Centre in Simanggang Town										
Project Description:	Develop visitor centre style attractions (e.g. handicraft centre, cultural centre, etc.) in Simanggang Town, not in small towns where use and visitation will be limited.											
Project Site:	Town centre site. The centre could be located in the proposed peace park in Simanggang.											
Target Market:	Local residents, domestic and international tourists.											
Project Rational:	<ul style="list-style-type: none"> • Provides another anchor attraction for Simanggang • Sri Aman is an Iban heartland • Promotes local culture and handicrafts • A central attraction is likely to attract more visitors than multiple centres in small towns • Central facility can also service and support communities elsewhere in the Division (e.g. handicraft development) 											
Impacts/Outcomes:	<ul style="list-style-type: none"> • New Cultural Centre to serve the Division • Creates an anchor attraction in Simanggang • Centre to service and support communities elsewhere in the Division. 											
Estimated Budget:	RM 8 million											
Activities/Components:	Iban Cultural Heritage Centre (or Sri Aman Cultural Heritage Centre). To include galleries, F&B outlets, event / performing arts space, handicraft centre, co-working space for young entrepreneurs, guest house / AirBnB style rooms, etc.											
Investors:	Public Sector: 100%.											
Business Model:	Government as asset owner with facilities / retail / F&B space to be leased to private sector											
Project Time Frame:	Medium to Long-Term											
Key Success Factors:	<ul style="list-style-type: none"> • Inclusion of revenue generating space such as F&B outlets, retail, event space, etc. • Support for local communities and entrepreneurs (e.g. handicraft producers) etc. • Increased visitation to Simanggang town by domestic tourists when the Pan Borneo Highways is complete and travel times are reduced • More foreign tourists visit Simanggang (rather than by-passing the town on the way to other attractions as occurs now) • Increased promotion of Simanggang to domestic tourists 											
Possible Barriers & Threats	<ul style="list-style-type: none"> • Foreign tourists continue to 'by-pass' Simanggang Town. • Increased arrivals from local domestic tourists do not materialise. 											
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>MTCP</td> <td>Lead agency</td> </tr> <tr> <td>Sarawak Crafts Council</td> <td>Management of centre</td> </tr> <tr> <td>Resident's Office</td> <td>Supporting</td> </tr> <tr> <td>Sarawak Museum</td> <td>Supporting</td> </tr> </tbody> </table>		Agencies	Roles & Responsibilities	MTCP	Lead agency	Sarawak Crafts Council	Management of centre	Resident's Office	Supporting	Sarawak Museum	Supporting
Agencies	Roles & Responsibilities											
MTCP	Lead agency											
Sarawak Crafts Council	Management of centre											
Resident's Office	Supporting											
Sarawak Museum	Supporting											

2.4.1.8 Continue to Invest in Cultural and Heritage Assets

Strategic Focus Area:		S1: Product Development	
Action/Project No:	S1-8	Continue to Invest in Cultural and Heritage Assets	
Project Description:	Continue to allocate funds to preserve heritage sites as part of a Sarawak's wider policy of investing in important cultural and heritage assets (e.g. Existing Fort Arundell project). In view of the historic value and planned road / access improvements, funds for renovation / restoration work at Banting Church should be considered. An assessment of the building should be conducted.		
Project Rational:	<ul style="list-style-type: none"> • Preservation of cultural heritage. 		
Estimated Budget:	As budgeted or required after an evaluation of needs (e.g. Banting Church).		
Investors:	Public Sector: 100%.		
Project Time Frame:	Short to Long-term.		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	MTCP		Project coordination
	Sarawak Museum		Implementation

2.4.1.9 Develop Agro-Tourism Products and Experience Centre Around Fish Cage Culture at Batang Ai

Strategic Focus Area:		S1: Product Development	
Action/Project No:	S1-9	Develop Agro-Tourism Products and Experience Centre Around Fish Cage Culture at Batang Ai	
Project Description:	Develop agro-tourism products and experiences around the fish cage culture at Batang Ai as an add-on tour / attraction.		
Project Site:	Existing fish cage areas at Batang Ai and the resort (or a site located close to the current jetty)		
Target Market:	Local residents, domestic and international tourists.		
Project Rational:	<ul style="list-style-type: none"> • Leverage existing assets / operations • Develops additional economic activity and value added • Adds another tourism product / experience • Promotes local fresh produce • Creates employment opportunities 		
Impacts/Outcomes:	<ul style="list-style-type: none"> • New lake-based activity / tour • New dining experience that promotes local produce • Jobs for local residents 		
Estimated Budget:	Depends on the size and scale of the operation and private sector feasibility assessment.		
Activities/Components:	<ul style="list-style-type: none"> • Set up a specialty fish restaurant on the shores of Batang Ai (or at the Longhouse Resort if this re-opens) to promote Batang Ai's fish fresh produce and local cuisine. 		

Strategic Focus Area: S1: Product Development															
	<ul style="list-style-type: none"> Examine the viability of offering guided tours of the fish cages and processing facility at Batang Ai. (This activity could be linked to or combined with dining at the fish restaurant. For example, tourists visit the fish cages and 'catch' a fish for their lunch / dinner). 														
Investors:	Public Sector: 100%.														
Business Model:	Private sector operation.														
Project Time Frame:	Short to Medium-term.														
Key Success Factors:	<ul style="list-style-type: none"> Suitable boats with good safety standards. Creation of interesting tour / activity. Marketing and promotion and partnerships with tour operators. 														
Possible Barriers & Threats	<ul style="list-style-type: none"> None envisaged. 														
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Fish Cage Operators</td> <td>Host tours operated by the Resort or tour operators</td> </tr> <tr> <td>Batang Ai Longhouse Resort</td> <td>Manage and operate tours to fish cages</td> </tr> <tr> <td>Ministry of Modernization of Agriculture (Agro-Tourism Unit)</td> <td>Support</td> </tr> <tr> <td>Department of Agriculture (Inland Fisheries Division)</td> <td>Support</td> </tr> <tr> <td>Tour operators</td> <td>Sales and marketing</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Promotion</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Fish Cage Operators	Host tours operated by the Resort or tour operators	Batang Ai Longhouse Resort	Manage and operate tours to fish cages	Ministry of Modernization of Agriculture (Agro-Tourism Unit)	Support	Department of Agriculture (Inland Fisheries Division)	Support	Tour operators	Sales and marketing	Sarawak Tourism Board	Promotion
	Agencies	Roles & Responsibilities													
	Fish Cage Operators	Host tours operated by the Resort or tour operators													
	Batang Ai Longhouse Resort	Manage and operate tours to fish cages													
	Ministry of Modernization of Agriculture (Agro-Tourism Unit)	Support													
	Department of Agriculture (Inland Fisheries Division)	Support													
	Tour operators	Sales and marketing													
Sarawak Tourism Board	Promotion														
Benchmark:	Combined fish farms and restaurants are quite common in Australia. Examples include Cookabarra Restaurant in NSW, Australia. This business includes a working Barrumundi fish farm, restaurant and function space. True Blue Marron in Western Australia is marron farm that offers tours and tastings of the freshwater crayfish raised on the farm.														

2.4.1.10 Promote Recreational Fishing at Batang Ai Lake

Strategic Focus Area: S1: Product Development	
Action/Project No:	S1-10 Promote Recreational Fishing at Batang Ai Lake
Project Description:	Promote recreational fishing at Batang Ai Lake as a leisure activity
Project Site:	Batang Ai Lake
Target Market:	Domestic and international tourists
Project Rational:	<ul style="list-style-type: none"> Adds another leisure activity / experience Helps to control 'feral' fish problem at lake If fishing activities are boat-based (rather than shore-based) it will generate income for local communities (boat hire, local guide fees, etc).
Impacts/Outcomes:	<ul style="list-style-type: none"> New tourism product. Festival that promotes local produce. Job opportunities.
Estimated Budget:	<ul style="list-style-type: none"> Fishing Festival, RM 250,000

Strategic Focus Area: S1: Product Development															
	<ul style="list-style-type: none"> Community based lake fishing tours, RM 200,000 for 3 fiberglass boats and engines, training and marketing support 														
Activities/Components:	<ul style="list-style-type: none"> Batang Ai Fishing Festival Boat based fishing tours 														
Investors:	Fishing Tours – Private sector: 100% Festival - Public Sector: 30%, Private Sector: 70%.														
Business Model:	<p>If the Longhouse Resort re-opens it would be the best entity to operate fishing tours. The Resort could run these trips as a private business as part of their tour and activity desk. The Resort would directly employ local residents as boatmen and fishing guides.</p> <p>An alternative approach would be for the Resort to partner with a longhouse and set up a CBT project, perhaps with assistance of the Department of Agriculture / Fisheries. Soft loans and grants could be provided to the longhouse to purchase boats, fishing equipment, lifejackets, etc. The Resort would then market fishing trips and contract the longhouse CBT project to provide fishing tour services.</p> <p>The fishing festival could be sponsored by the fish farms and organised the Department of Agriculture with support from MTCP / STB.</p>														
Project Time Frame:	Short to Medium-term.														
Key Success Factors:	<ul style="list-style-type: none"> Suitable boats with good safety standards Creation of interesting fishing tour / activity Marketing and promotion and partnerships with tour operators Community involvement in festival and tours 														
Possible Barriers & Threats	<ul style="list-style-type: none"> Non-envisaged. 														
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Longhouse Resort</td> <td>Operation of fishing tours</td> </tr> <tr> <td>Sarawak Rivers Board</td> <td>Supervision and licencing</td> </tr> <tr> <td>Department of Agriculture</td> <td>Organise Fishing Festival</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Promotion</td> </tr> <tr> <td>Tour Operators</td> <td>Sales and marketing of tours</td> </tr> <tr> <td>Fish Cage Operators</td> <td>Sponsors of fishing festival</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Longhouse Resort	Operation of fishing tours	Sarawak Rivers Board	Supervision and licencing	Department of Agriculture	Organise Fishing Festival	Sarawak Tourism Board	Promotion	Tour Operators	Sales and marketing of tours	Fish Cage Operators	Sponsors of fishing festival
Agencies	Roles & Responsibilities														
Longhouse Resort	Operation of fishing tours														
Sarawak Rivers Board	Supervision and licencing														
Department of Agriculture	Organise Fishing Festival														
Sarawak Tourism Board	Promotion														
Tour Operators	Sales and marketing of tours														
Fish Cage Operators	Sponsors of fishing festival														

2.4.1.11 Set Aside Land at Batang Ai for Future Lakeside Tourism Development (A Lakeside Tourism Corridor)

Strategic Focus Area: S1: Product Development	
Action/Project No:	S1-11 Set Aside Land at Batang Ai for Future Lakeside Tourism Development (A Lakeside Tourism Corridor)
Project Description:	<p>Batang Ai has potential for lakeside tourism development. During the SADA Labs there were various suggestions to develop lakeside tourism projects such as hotels, golf courses and holiday homes at Batang Ai. Other planning studies have also proposed developing tourism around the lake. However, the timing of the development of lakeside tourism will be critical to its success. Now is not an ideal time to develop lake tourism at Batang Ai.</p> <p>Many of the suggested lakeside projects are currently not economically viable. The pandemic has devastated tourism in Sarawak and the industry faces a long road to</p>

Strategic Focus Area: S1: Product Development							
	<p>recovery. At present, new lakeside resorts and hotels and other leisure developments at Batang Ai will not attract sufficient demand to justify the investment. However, such developments may become viable in 10-15 years' time, i.e. beyond the master plan period.</p> <p>As such, a significant area of lakeside land at Batang Ai should be set aside for future tourism development. This lakeside tourism corridor will form a land bank for future tourism development as and when it becomes economically viable</p>						
Project Site:	Shoreline land located from the current tourist jetty to the Aiman Longhouse Resort. See map.						
Link Projects:	<ul style="list-style-type: none"> • S1-3, 4, 9 and 10 • S2-5 • S3-1, 4 and 5 • S5-2, 3, 5, 6 and 7 						
Project Rational:	<ul style="list-style-type: none"> • Preserves the long-term tourism potential of the lake by establishing a 'tourism land bank' • Prevents this land being used by other industries that might degrade the tourism potential of the lake • Recognizes the reality that new lakeside hotels are unlikely to be feasible in the master plan period • Looks beyond the master plan period • Allows time to gather a better picture of the impact of future developments in neighboring Kalimantan (e.g., new Indonesian capital) and whether these developments will create opportunities for tourism in Sarawak 						
Impacts/Outcomes:	<ul style="list-style-type: none"> • The establishment of lakeside tourism land bank for future use • Preserves of a key tourism asset until new tourism developments become economically viable 						
Estimated Budget:	Not applicable						
Activities/Components:	<ul style="list-style-type: none"> • Reserve shoreline land at Batang Ai for future tourism development • Create a lakeside tourism corridor for the future • Sub-divide land into suitable land / investor plots (optional at this stage, ideally this would be done following a lake tourism master planning exercise that maps out parkland, hotel zones, facilities, etc.) 						
Investors:	Not applicable in master plan period. Developments such as hotels will only become economically feasible in 10-15 years' time						
Project Time Frame:	Medium-term to Long term						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Land and Survey Office / EPU</td> <td>Allocating land for future tourism development</td> </tr> <tr> <td>Sarawak Energy</td> <td>Coordination as manager of the catchment area</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Land and Survey Office / EPU	Allocating land for future tourism development	Sarawak Energy	Coordination as manager of the catchment area
	Agencies	Roles & Responsibilities					
	Land and Survey Office / EPU	Allocating land for future tourism development					
Sarawak Energy	Coordination as manager of the catchment area						

2.4.1.12 Summary of Tourism Product development Projects

The product development projects are summarised in the table below.

Table 2.3: Summary of Product Development Projects and Costs

No.	Action	Est Budget	Timing
S1-1	Develop the Gunung Lesong-Lingga Ecotourism Cluster with initial focus on building park HQ facilities (office, staff quarters, interpretation centre, etc.) and community-managed accommodation (CBT)	RM8,050,000	S-M
S1-2	Promote the Sri Aman Division as a camping destination and develop five high quality camping sites with a full range of facilities	RM2,500,000	S-M
S1-3	Develop specific sites / attractions for domestic tourists and local residents of the Sri Aman division, particularly for families and the youth travel segment		
S1-4	Develop a Rainforest Field Studies Centre at Batang Ai National Park and partner with a local and foreign university to manage the centre and research activities	RM17,000,000	M-L
S1-5	Allocate sufficient funds for local recreation and picnic spots so that local councils can maintain facilities and keep them clean		
S1-6	Continue to fund local events and festivals (e.g. Pesta Benak)		
S1-7	Develop visitor centre style attractions (e.g. handicraft centre, cultural centre) in Simanggang Town, not in small towns where use and visitation will be limited	RM8,000,000	M-L
S1-8	Continue to allocate funds to preserve heritage sites such as Fort Arundell, Lingga Bazaar, etc.) as part of a Sarawak's wider policy of investing in important cultural and heritage assets		
S1-9	Develop agro-tourism products around the fish cage culture at Batang Ai as an add-on tour / new attraction		
S1-10	Promote fishing at Batang Ai Lake as a leisure activity and way of dealing with the lake's 'feral' fish problem	RM450,000	S-M
S1-11	Set Aside Land at Batang Ai for Future Lakeside Tourism Development (A Lakeside Tourism Corridor)		
TOTAL		RM36,000,000	

2.4.2 Community – Based Tourism

Encourage the development of alternative forms of homestays such as kampong stays, community managed camp sites, and add-on tours, activities and services. These variations of the traditional homestay model should target appropriate market segments. There are six actions under community-based tourism.

Table 2.4: Summary of Community-Based Tourism Recommendations

No.	Action
S2-1	Pioneer a CBT kampung stay with ‘stand-alone’ accommodation at the base of the current summit trek at Gunung Lesong (Kpg Munggu Sawa)
S2-2	Pioneer a community-managed ‘homestay’ camping site at the northern borders of G. Lesong (Kpg Menuang)
S2-3	Develop a community-based tourism project, camp site and associated facilities at Wong Ajong, Engkilili
S2-4	Develop a ‘kampung stay’ project with ‘stand-alone’ accommodation at Banting when the village is accessible by road
S2-5	Continue to promote private sector led, community focused ecotourism operations at Batang Ai
S2-6	Develop a Cultural Heritage Centre at Gunung Lesong
S2-7	CBT Capacity Building

Further details of each action are outlined in the following sections.

2.4.2.1 Develop a Kampung Stay with ‘Stand Alone’ Accommodation at Gunung Lesong

Strategic Focus Area: S2: Community-Based Tourism	
Action/Project No:	S2-1 Develop a Kampung Stay with ‘Stand Alone’ Accommodation at Gunung Lesong
Project Description:	 <p>VILLAGE STAY 2 ACRE LOT ENCLOSURE SPACE: 80' x 100' WATERWAY: 30' x 100' TOTAL: 300' x 100'</p> <p>Source: Daya Rancang</p>

Strategic Focus Area: S2: Community-Based Tourism	
	Pioneer a Community-Based Tourism (CBT) kampung stay with 'stand-alone' accommodation at the base of the current summit trek at Gunung Lesong (Kpg Munggu Sawa)
Project Site:	A site near the entrance to the current summit trek would be an ideal location for this project. It overlooks at small stream and is close to the road.
Link Projects:	<ul style="list-style-type: none"> • S1-1, developing Gunung Lesong as a tourism destination • S1-2, promoting Sri Aman as a camping destination • S1-3, developing sites / attractions for domestic tourists
Target Market:	Domestic and international tourists
Project Rational:	<ul style="list-style-type: none"> • Provides income for local communities • Kampung stays and 'stand-alone' accommodation provide more income per tourist than traditional homestays • Currently there is no proper accommodation at Gunung Lesong National Park. • The base of the current summit trek is an ideal location for this project and is a short distance away from Kpg Munggu Sawa. • Project is in line with MOTAC's policy of upscaling Malaysia's homestay experience by developing community managed 'stand-alone' accommodation. • Premier 'kampung stays' likely to appeal to Singaporeans and other Asian Markets more than a traditional homestay product.
Impacts/Outcomes:	<ul style="list-style-type: none"> • New tourist accommodation • Creation of a new CBT project • Job and business opportunities for local communities.
Estimated Budget:	<ul style="list-style-type: none"> • Kampung Stay Accommodation, RM 750,000 • Camp site, RM 500,000 (Note: capacity building budget allocated under S1-1)
Activities/Components:	<ul style="list-style-type: none"> • 2 blocks of mini-longhouses, each having 5 rooms with ensuite bathrooms and individual verandahs • Kitchen and dining area • Camp Site (Part of Action S1-2, an initiative to develop a portfolio of camp sites in Sri Aman division)
Investors:	Public Sector: 100%
Business Model:	<ul style="list-style-type: none"> • CBT project managed by cooperative / community association. Initial funding from government. • Accommodation at national parks in Sarawak is usually funded by the government and then managed by SFC. Accommodation is built within the park boundaries. • Instead of following the traditional model, the government could fund the cost of building chalet-style accommodation and let these facilities be managed by the local community via the existing 'Gunung Lesong Community-Based Ecotourism Committee' (GLCBEC). This committee includes representatives from all 9 villages that surround the park. The initiative would therefore be a CBT project that generates revenue for local communities. • Land close to the entrance of the current summit hike could be leased from the land owner by the GLCBEC so that the accommodation is built at a convenient and appropriate site for tourists. • Revenue from accommodation, camping, food and beverage and other fees would be shared amongst all villages of the GLCBEC. Work could be allocated on a rotation basis by the GLCBEC as is often done in other successful CBT projects (e.g. the Ulu Ai Project). Budgets would be set aside for maintenance of the project.

Strategic Focus Area: S2: Community-Based Tourism											
	<ul style="list-style-type: none"> This would be a pioneering project for government supported community-based tourism in Sarawak. If successful, the model could be used at other locations in the State. Capacity building could be provided by MTCP in partnership with Sarawak's tour operator association. Marketing support could be provided by STB in the initial start-up phase. 										
Project Time Frame:	Short to Medium-Term										
Key Success Factors:	<ul style="list-style-type: none"> Suitable site location close to the park and attractions Appropriately designed accommodation and facilities that put the guest experience first and offer a 'sense of place' Community buy-in and strong local organisation to manage project Government support (e.g. capacity building) in start-up phase Strong partnerships with private sector operators to market the tours Effective promotion to local domestic market 										
Possible Barriers & Threats	<ul style="list-style-type: none"> Obtaining a suitable site or getting a long lease (most land is NCR) Lack of agreement / cohesion amongst the multiple communities in the Gunung Lesong Community-Based Ecotourism Committee. Managing community expectations (CBT projects often take time to bear fruit). Slow recovery of tourism industry could limit demand (and revenue) in initial years of project. 										
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>MTCP or SFC</td> <td>Lead agencies and capacity building</td> </tr> <tr> <td>Gunung Lesong Community-Based Ecotourism Committee</td> <td>Community partner. Management of accommodation and provision of services.</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Promotion</td> </tr> <tr> <td>Tour Operators</td> <td>Sales and marketing</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	MTCP or SFC	Lead agencies and capacity building	Gunung Lesong Community-Based Ecotourism Committee	Community partner. Management of accommodation and provision of services.	Sarawak Tourism Board	Promotion	Tour Operators	Sales and marketing
	Agencies	Roles & Responsibilities									
	MTCP or SFC	Lead agencies and capacity building									
	Gunung Lesong Community-Based Ecotourism Committee	Community partner. Management of accommodation and provision of services.									
	Sarawak Tourism Board	Promotion									
Tour Operators	Sales and marketing										

2.4.2.2 Develop a Community Managed Campsite at Kpg Menuang Gunung Lesong

Strategic Focus Area: S2: Community-Based Tourism	
Action/Project No:	S2-2 Develop a Community Managed Campsite at Kpg Menuang Gunung Lesong
Project Description:	Pioneer a community-managed 'homestay' camping site at the northern borders of Gunung Lesong (Kpg Menuang)
Project Site:	Kampung Menuang, near the stream at the start of the Menuang-Langgir trail.
Link Projects:	<ul style="list-style-type: none"> S1-1, developing Gunung Lesong-Lingga Ecotourism Cluster S1-2, an initiative to develop a portfolio of camp sites in Sri Aman division S1-3, develop sites for domestic tourists
Target Market:	Domestic and international tourists

Strategic Focus Area: S2: Community-Based Tourism											
Project Rational:	<ul style="list-style-type: none"> Provides income for local communities Quick win project, easy to implement Opens up opportunities for ecotourism activities in northern area of Gunung Lesong (Banded langurs and orangutans are seen near Menuang) There are already good jungle trails near Menuang Taps into growing domestic tourism demand 										
Impacts/Outcomes:	<ul style="list-style-type: none"> New accommodation option at Gunung Lesong Provides a base for exploring the northern area of the park Creates employment and income opportunities for local community. New type of CBT project 										
Estimated Budget:	RM 300,000										
Activities/Components:	<ul style="list-style-type: none"> Development of camp site 										
Investors:	Public Sector: 100%										
Business Model:	CBT project. This project could also be managed by the GLCBEC as per S2-1 above. Alternatively, the community at Menuang could manage the site themselves. The village could set up a Tourism Committee to manage tourism activities and allocate work. Revenue from user fees (camping fees, car park fees, etc.) could be shared amongst the villagers whilst individuals would be paid for work such as guiding, maintenance activities, cooking, etc.										
Project Time Frame:	Short to Medium-Term										
Key Success Factors:	<ul style="list-style-type: none"> Community buy-in and support for the project Government support (e.g. capacity building) in start-up phase. Strong partnerships with private sector operators to market the tours. Effective promotion to local domestic market. 										
Possible Barriers & Threats	<ul style="list-style-type: none"> Obtaining a suitable site or getting a long lease (most land is NCR) Managing community expectations (CBT projects often take time to bear fruit). Slow recovery of tourism industry could limit demand (and revenue) in initial years of project. 										
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>MTCP</td> <td>Lead agency and capacity building</td> </tr> <tr> <td>SFC</td> <td>Support</td> </tr> <tr> <td>Gunung Lesong Community-Based Ecotourism Committee (or Kpg Menuang only)</td> <td>Management of campsite and provision of services</td> </tr> <tr> <td>Tour operators</td> <td>Sales and marketing</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	MTCP	Lead agency and capacity building	SFC	Support	Gunung Lesong Community-Based Ecotourism Committee (or Kpg Menuang only)	Management of campsite and provision of services	Tour operators	Sales and marketing
Agencies	Roles & Responsibilities										
MTCP	Lead agency and capacity building										
SFC	Support										
Gunung Lesong Community-Based Ecotourism Committee (or Kpg Menuang only)	Management of campsite and provision of services										
Tour operators	Sales and marketing										

2.4.2.3 Campsite and Associated Facilities at Wong Ajong, Engkilili

Strategic Focus Area: S2: Community-Based Tourism	
Action/Project No:	S2-3 Campsite and Associated Facilities at Wong Ajong, Engkilili
Project Description:	Develop a community-based tourism project, campsite and associated facilities at Wong Ajong
Project Site:	Wong Ajong
Link Projects:	<ul style="list-style-type: none"> S1-2, an initiative to develop a portfolio of camp sites in Sri Aman division S1-3, develop sites for domestic tourists.
Target Market:	Domestic tourists

Strategic Focus Area:		S2: Community-Based Tourism	
Project Rational:	<ul style="list-style-type: none"> • Provides income for local communities • Existing facilities are run-down and in need of repair • Harnesses tourism potential of Wong Ajong • Provides recreational facilities for residents of nearby towns • Encourages domestic tourism 		
Impacts/Outcomes:	<ul style="list-style-type: none"> • New attraction close to Simanggang and Engkilili • Creates employment and income opportunities for local community • New CBT project 		
Estimated Budget:	RM 1.5 million		
Activities/Components:	<ul style="list-style-type: none"> • Campsite, complete with toilets and showers, dining hut, fire pits and sufficient space to pitch 10 tents. • Repair the trail/walkway from the entry point to the existing picnic area. • New steps to the river • Signage • Clear all rubbish from the site and community/council to implement regular refuse collection (esp. at weekends) • Capacity building and training for the community (e.g. setting a user fee system (fees for entry, car park, camping, etc.), maintenance of facilities, guiding, etc.) 		
Investors:	Public Sector: 100%		
Business Model:	<ul style="list-style-type: none"> • CBT project managed by a Tourism Committee from the nearby longhouse. Government funding to build the recreational facilities which are then managed by the local community. • A CBT project would be embedded in the project from the start. A carefully designed user fee system would form the 'heart' of the CBT. This system would set fees for car parking, entry (adult and child rates), overnight camping fee, BBQ Use., etc. Additional income could be derived from supply of firewood to campers, guiding services, F&B services, etc. • The 'user fee' focused CBT model for Wong Ajong could be a demonstration project. If successful, MTCP could roll out at other river / waterfall sites in Sarawak. This could form part of a portfolio of new 'non-homestay' CBT projects. 		
Project Time Frame:	Short to Medium-Term		
Key Success Factors:	<ul style="list-style-type: none"> • Community buy-in and support for the project • Government support (e.g., capacity building) in start-up phase • Effective promotion to local domestic market • Continued maintenance of facilities • Refuse collection system (especially at weekends) 		
Possible Barriers & Threats	<ul style="list-style-type: none"> • Managing community expectations (CBT projects often take time to bear fruit). • Slow recovery of tourism industry could limit demand (and revenue) in initial years of project. 		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	MTCP		Lead agency and capacity building
	Local Community		Manage the project and provide tourism services
	Local Council		Ensure proper refuse collection system in place and facilities are maintained
	Sarawak Tourism Board		Promotion to domestic tourists

Kampung Stay with Stand Alone Accommodation at Banting

Strategic Focus Area:		S2: Community-Based Tourism											
Action/Project No:	S2-4 Kampung Stay with Stand Alone Accommodation at Banting												
Project Description:	Develop a 'kampung stay' project with 'stand-alone' accommodation at Banting when the village is accessible by road.												
Project Site:	Banting												
Link Projects:	<ul style="list-style-type: none"> • S1-1, developing Gunung Lesong-Lingga Ecotourism Cluster • S1-2, an initiative to develop a portfolio of camp sites in Sri Aman division • S1-3, develop sites for domestic tourist 												
Target Market:	Domestic and international tourists												
Project Rational:	<ul style="list-style-type: none"> • Provides income for local communities • Project is in line with MOTAC's policy of upscaling Malaysia's homestay experience by developing community managed 'stand-alone' accommodation • Strengthens product offerings in Gunung Lesong-Lingga Ecotourism Cluster and adds option of overnight stay in Banting • Premier 'kampung stays' likely to appeal to Singaporeans and other Asian Markets more than a traditional homestay product 												
Impacts/Outcomes:	<ul style="list-style-type: none"> • New tourist accommodation • Creation of a new CBT project • Job and business opportunities for local communities 												
Estimated Budget:	RM 750,000												
Activities/Components:	<ul style="list-style-type: none"> • 2 blocks of mini-longhouses, each having 5 rooms with ensuite bathrooms and individual verandahs • Kitchen and dining area • Landscaped garden 												
Investors:	Public Sector: 100%												
Business Model:	CBT project managed by cooperative / community association. Initial funding from government. Similar to Action S2-1 above												
Project Time Frame:	Medium-Term												
Key Success Factors:	<ul style="list-style-type: none"> • Suitable site location • Appropriately designed accommodation and facilities that put the guest experience first and offer a 'sense of place' • Community buy-in and strong local organisation to manage project • Government support (e.g. capacity building) in start-up phase 												
Possible Barriers & Threats	<ul style="list-style-type: none"> • Managing community expectations (CBT projects often take time to bear fruit). 												
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Agencies	Roles & Responsibilities												
MTCP	Lead agency and capacity building												
Local Community	Manage the project and provide tourism services												
Local Council	Ensure proper refuse collection system in place and facilities are maintained												
Sarawak Tourism Board	Promotion												

2.4.2.4 Continue to Promote Private Sector Led Ecotourism Operations at Batang Ai

Strategic Focus Area: S2: Community-Based Tourism									
Action/Project No:	S2-5 Continue to Promote Private Sector Led Ecotourism Operations at Batang Ai								
Project Description:	Continue to promote private sector led, community focused ecotourism operations at Batang Ai.								
Project Site:	Batang Ai								
Target Market:	Domestic and international tourists								
Project Rational:	<ul style="list-style-type: none"> Existing tours and activities provide significant income for local communities Partnerships with private sector are essential for the success of community-based tourism Existing tourism activities (e.g. longhouse tourism, trekking) at Batang Ai feature heavily in Sarawak's destination imagery. Batang Ai is one of very few sites in Sarawak that attracts high yield ecotourism activities. 								
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Local Tour operators</td> <td>Sales & marketing, tour operations</td> </tr> <tr> <td>Local Community</td> <td>Provision of tourism services</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Promotion</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Local Tour operators	Sales & marketing, tour operations	Local Community	Provision of tourism services	Sarawak Tourism Board	Promotion
	Agencies	Roles & Responsibilities							
	Local Tour operators	Sales & marketing, tour operations							
	Local Community	Provision of tourism services							
Sarawak Tourism Board	Promotion								
Note:	Planned road developments on the Engkari side of Batang Ai may impact arrivals to key longhouse tourism destinations. The evolution of tourism on the Skrang and Lemanak shows that roads can result in a decline in longhouse tourism if the tourism appeal is degraded. It is too early to say whether this will occur when roads improve access to some longhouses. It is estimated that around 4,000 arrivals per year visit longhouses on the Engkari side of the lake. If arrivals decline, some communities may lose income from tourism. This income might be replaced by income from other economic activities. Tourism activities may need to evolve in order to maintain the appeal of longhouses that are accessible by road. For example, the addition of more lake based activities (fishing, sunset cruises, houseboat cruises, etc.). The situation will need to be monitored over the medium term to ensure that communities can still derive income from tourism.								

2.4.2.5 Develop a Cultural Heritage Centre at Gunung Lesong

Strategic Focus Area: S2: Community-Based Tourism	
Action/Project No:	S2-6 Develop a Cultural Heritage Centre at Gunung Lesong
Project Description:	A cultural heritage centre to show case the culture and traditions of the local people. To include galleries and exhibits, restaurant, gift shop and office space for the Gunung Lesong Community-Based Ecotourism Committee.
Project Site:	Close to S2-1 (Kampung / stay near Kpg Munggu Sawa), near the existing summit trail.
Link Projects:	<ul style="list-style-type: none"> S1-1, developing Gunung Lesong as a tourism destination S1-3, developing sites / attractions for domestic tourists S2-1, stand-alone accommodation / kampung stay at Gunung Lesong
Target Market:	Domestic and international tourists
Project Rational:	<ul style="list-style-type: none"> Provides a centre to showcase the cultural heritage of the Gunung Lesong area Provides a base for the Gunung Lesong Community-Based Ecotourism Committee.

Strategic Focus Area: S2: Community-Based Tourism											
	<ul style="list-style-type: none"> Provides a retail outlet to promote local handicrafts 										
Impacts/Outcomes:	<ul style="list-style-type: none"> New cultural attraction Job and business opportunities for local communities HQ / office for the local CBT organization 										
Estimated Budget:	RM 2 million										
Activities/Components:	<ul style="list-style-type: none"> Exhibitions and displays F&B outlet Gift shop to sell local handicrafts 										
Investors:	Public Sector: 100%										
Business Model:	CBT project managed by cooperative/ community association. Initial funding from the government.										
Project Time Frame:	Short to Medium-Term										
Key Success Factors:	<ul style="list-style-type: none"> Suitable site location close to the park and attractions Appropriately designed facility that has a 'sense of place' Community buy-in and strong local organisation to manage project Government support (e.g. capacity building) in start-up phase Budget allocation for long term maintenance 										
Possible Barriers & Threats	<ul style="list-style-type: none"> Obtaining a suitable site or getting a long lease (most land is NCR) Lack of agreement/cohesion amongst the multiple communities in the Gunung Lesong Community-Based Ecotourism Committee Managing community expectations (CBT projects often take time to bear fruit) Slow recovery of the tourism industry could limit demand (and revenue) in the initial years of the project 										
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	Agencies	Roles & Responsibilities									
	MTCP or SFC	Lead agencies									
	Gunung Lesong Community-Based Ecotourism Committee	Community partner. Management of facility and provision of services									
	Sarawak Tourism Board	Promotion									
Tour Operators	Sales and marketing										

2.4.2.6 CBT Capacity Building

Strategic Focus Area: S2: Community-Based Tourism	
Action/Project No:	S2-7
Project Description:	Conduct capacity building and training to prepare communities for the new community-based tourism projects included in the plan.
Project Site:	<ul style="list-style-type: none"> Gunung Lesong (focus on project sites at Kampung Munggu Sawa and Kampung Menuang. Capacity building may also involve communities from other areas in Gunung Lesong.) Longhouse near Wong Ajong
Link Projects:	<ul style="list-style-type: none"> S1-1, develop the Gunung Lesong-Lingga Ecotourism Cluster S2-1, community-managed stand-alone accommodation and campsite at base of G. Lesong summit trail near Munggu Sawa S2-2, campsite at Kpg Menuang S2-3, community-based tourism project, campsite and facilities at Wong Ajong, Engkilili
Project Rationale:	<ul style="list-style-type: none"> Capacity building is essential for the tourism projects being developed in new areas Community-based tourism must be developed in a systematic way

	<ul style="list-style-type: none"> • Provides support and training for local communities • Ensures communities are ready when tourism project launches • Improves product and service quality
Impacts/Outcomes:	<ul style="list-style-type: none"> • New community organisation to manage tourism • New skills for members of the community • Market readiness • Setting user fees (e.g., entry, guiding fee, parking fee, etc.) to provide a source of income to communities • Community buy-in • Increased household income
Estimated Budget:	<ul style="list-style-type: none"> • RM 300,000 allocated to Gunung Lesong under S1-1 • RM 300,000 for Wong Ajong
Activities/Components:	<p>Capacity Building for CBT can take many forms and involves many steps to develop and sustain a tourism project. It is recommended that CBT capacity building focus on two geographical areas / products - Gunung Lesong-Lingga Ecotourism Cluster and Wong Ajong - as these are new destinations. Capacity building should focus on Project S2-1 (stand-alone accommodation / kampung stay and camp site near Munggu Sawa, S2-2 (campsite at Kpg Menuang) and S2-3 (Wong Ajong Project). Capacity building will need to begin before construction activities commence.</p> <p>Capacity Building for CBT can take many forms and involves many steps to develop and sustain a tourism project. It is recommended that CBT capacity building focus on two geographical areas / products - Gunung Lesong-Lingga Ecotourism Cluster and Wong Ajong - as these are new destinations. Capacity building should focus on Project S2-1 (stand-alone accommodation / kampung stay and camp site near Munggu Sawa, S2-2 (campsite at Kpg Menuang) and S2-3 (Wong Ajong Project). Capacity building will need to begin before construction activities commence.</p> <p>Some valuable capacity building work has already been done by Sarawak Forestry at Gunung Lesong. Importantly, SFC has assisted with the formation of an organisation (Gunung Lesong Community-Based Ecotourism Committee) to manage tourism activities. This is a critical step in the process of developing and managing CBT.</p> <p>There are many handbooks and guides on developing CBT. Rather than reinventing the wheel, capacity building efforts could utilise one of these handbooks to guide the training and development needs of the communities. It is recommended that the APEC Handbook - 'Community Based Tourism – How to Prepare and Sustain CBT' is used to guide the capacity building. This excellent resource was co-authored by Malaysia's leading expert on CBT, Prof. Amran Hamzah. Download at:</p> <p>https://www.apec.org/Publications/2009/12/Handbook-on-Community-Based-Tourism-How-to-Develop-and-Sustain-CBT-December-2009</p> <p>Many aspects of the product development will form part of the SAMP CBT projects. Initial capacity building should therefore focus on preparing the community for tourism and putting everything in place so ensure the success and sustainability of the new projects. The APEC handbook outlines a 9-Step approach to CBT and contains simple worksheets to assist with village training sessions and workshops.</p> <p>Ideally, capacity building and workshops should be conducted by MTCP at the respective villages or longhouses and where necessary at training sessions in Simanggang. Field trips to successful CBT projects and attractions in Sarawak should form part of the capacity building.</p> <p>Capacity building for Wong Ajong should initially focus on the first 4 steps of the handbook's approach. Gunung Lesong has already completed the first 4 steps and can therefore focus on Steps 5-9. Suggested modules for capacity training are outlining below.</p> <p>Step 1: Assessing Community Readiness for Tourism</p> <ul style="list-style-type: none"> • Introduction – outline of SAMP CBT Project planned for their community / location.

<ul style="list-style-type: none"> • Why should the community be involved in tourism? • Determine the role of tourism (e.g., alternative source of income, conservation, etc.). • Situational analysis (community expectations, concerns, aspirations, labour force needs, etc.). <p>Step 2: Educating and Preparing the Community for Tourism</p> <ul style="list-style-type: none"> • Preliminary workshops (brainstorming on activities to be developed). • Identifying and developing linkages to nearby attractions. • Identifying different roles (guiding, F&B, maintenance, etc.). • Training needs assessment. • Study trips to successful CBT projects in Sarawak. <p>(A user fee system will be important for the Wong Ajong project, as such study visits to villages near Kuching that have implemented a fee structure should be included. There are numerous villages near Kuching that charge fees for entry to jungle trails, visits to waterfalls, local guiding, car parking, etc.)</p> <p>Step 3: Identifying Leaders / Local Champions</p> <ul style="list-style-type: none"> • Community to select leaders for various roles <p>Step 4: Establishing a Community Organisation</p> <ul style="list-style-type: none"> • Community to decide what is best set-up. For example, a longhouse tourism committee with headman, women, youth, etc. • Community to formulate a vision and confirm roles • Set up a community tourism fund. <p>Step 5: Further Develop Partnerships</p> <ul style="list-style-type: none"> • Government agencies • Private sector tour operators • NGOs and associations • Research institutes / universities <p>Step 6: Adopt Integrated Approach</p> <ul style="list-style-type: none"> • Integrate with conservation or sustainable development, and / or • Integrate with other economic activities in area (e.g., farming, handicrafts, forest rehabilitation / tree planting) <p>Step 7: Plan and Design Quality Products</p> <ul style="list-style-type: none"> • Set user fee system (entry fee, car parking fee, guiding fee, BBQ fee, F&B services, etc) • Marketing and promotion (STB to assist with websites, brochures, signage, etc) • Interpretation and communication • Service quality • Training <p>(As facilities (e.g. accommodation, camping grounds, toilets, trails to waterfall, picnic areas will be constructed through the SAMP projects, Step 7 product development activities will focus more on destination management, setting up a user fee system, marketing, maintenance plans, etc.)</p> <p>Step 8: Identify Market Demand and Marketing Strategy</p> <ul style="list-style-type: none"> • Matching product to potential market segments (e.g., domestic, backpackers, groups, etc.) • Understanding channels of distribution (direct, online, B2B, etc) • Embracing digital marketing • Linking up with tour operators and ground handlers <p>Step 9: Implementation and Monitoring</p> <ul style="list-style-type: none"> • Construction of tourism facilities – involve the local community

	<ul style="list-style-type: none"> Monitoring of performance (e.g., income generated, employment, tourist satisfaction etc) <p>(Note: where possible local communities should be involved in the construction of the tourism facilities. Appointed contractors can engage members of the local community to assist with construction. This approach not only channels income to local communities it can also result in residents acquiring new skills. This approach was successfully implemented with the re-design of the new Nanga Sumpa Lodge at Batang Ai. Approx. 35% of the budget was paid to local residents for work and services provided. This injected hundreds of thousands of Ringgit into the local community.)</p>												
Investors:	Public Sector: 100%												
Business Model:	See individual project components (e.g., S2-1, etc.)												
Project Time Frame:	Short to medium term												
Key Success Factors:	<ul style="list-style-type: none"> Community buy-in and support for tourism initiatives Setting up community organisation to manage tourism Formulating a common vision Strong local leadership Developing strong links / partnerships with the tourism industry and government agencies Empowering women and youths Patience – CBT takes a long time to bear fruit 												
Possible Barriers & Threats	<ul style="list-style-type: none"> Community division / factionalism Lack of local leaders Lack of awareness or interest in tourism (esp. if it is only seen as a side income) 												
Benchmark	<p>MESCOT Initiative, Kinabatangan River. An example of an NGO initiated CBT supported by the State Ministry of Tourism and Forestry Department.</p> <p>The Ulu Ai Project, Batang Ai, Sarawak. An example of an industry-initiated CBT, a partnership between a tour operator and longhouse community.</p> <p>Both of these projects are long established and started with village-level discussions. These projects also established community organisations from the very beginning. These organisations (a cooperative and a longhouse tourism committee) manage tourism and ensure equitable division of roles and income.</p>												
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>MTCP Sarawak</td> <td>Lead agency for capacity building</td> </tr> <tr> <td>SFC</td> <td>Supporting agency at Gunung Lesong</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Provide training and assistance in promotion and digital marketing</td> </tr> <tr> <td>Association of Inbound Agencies (ASIA)</td> <td>Private sector support from tour operators (e.g. site visits and fam trips, business partnerships, marketing support)</td> </tr> <tr> <td>Gunung Lesong Community-Based Ecotourism Committee</td> <td>Community partner</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	MTCP Sarawak	Lead agency for capacity building	SFC	Supporting agency at Gunung Lesong	Sarawak Tourism Board	Provide training and assistance in promotion and digital marketing	Association of Inbound Agencies (ASIA)	Private sector support from tour operators (e.g. site visits and fam trips, business partnerships, marketing support)	Gunung Lesong Community-Based Ecotourism Committee	Community partner
Agencies	Roles & Responsibilities												
MTCP Sarawak	Lead agency for capacity building												
SFC	Supporting agency at Gunung Lesong												
Sarawak Tourism Board	Provide training and assistance in promotion and digital marketing												
Association of Inbound Agencies (ASIA)	Private sector support from tour operators (e.g. site visits and fam trips, business partnerships, marketing support)												
Gunung Lesong Community-Based Ecotourism Committee	Community partner												

2.4.2.7 Summary of Community Based Tourism Projects

The Community Based Tourism projects are summarised in the following table.

Table 2.5: Summary of Community Based Tourism Projects and Costs

No.	Action	Est Budget	Timing
S2-1	Pioneer a CBT kampung stay with 'stand-alone' accommodation at the base of the current summit trek at Gunung Lesong (Kpg Munggu Sawa)	RM1,250,000	S-M
S2-2	Pioneer a community-managed 'homestay' camping site at the northern borders of G. Lesong (Kpg Menuang)	RM300,000	S-M
S2-3	Develop a community-based tourism project, camp site and associated facilities at Wong Ajong, Engkilili.	RM1,500,000	S-M
S2-4	Develop a 'kampung stay' project with 'stand-alone' accommodation at Banting when the village is accessible by road.	RM750,000	M
S2-5	Continue to promote private sector led, community focused ecotourism operations at Batang Ai.	RM2,000,000	S-M
S2-6	Develop a Cultural Heritage Centre at Gunung Lesong	RM2,000,000	S-M
S2-7	Capacity Building	RM 600,000	S-M
TOTAL		RM 8,400,000	

2.4.3 Conserving Natural Tourism Assets

Protect natural assets and utilize these sites for high value-added ecotourism activities.

There are five actions under conserving natural tourism assets.

Table 2.6: Summary of Conserving Natural Tourism Assets Recommendations

No.	Action
S3-1	Gazette Ulu Sungai Menyang landscape as a national park (or other form of protected forest) to protect the orangutan population.
S3-2	Establish a wildlife corridor between Gunung Lesong and Sebuyau National Parks.
S3-3	Conduct wildlife surveys to estimate the population of Bornean Banded Langur (or Sarawak langur) at Gunung Lesong and surroundings.
S3-4	Gazette the proposed extensions to Batang Ai National Park
S3-5	Avoid building roads through irreplaceable orangutan habitat at Batang Ai. Instead of roads in these fragile areas, improve river and lake transport for communities (new jetties, lake ferry service, etc.).

Further details of each action are outlined below.

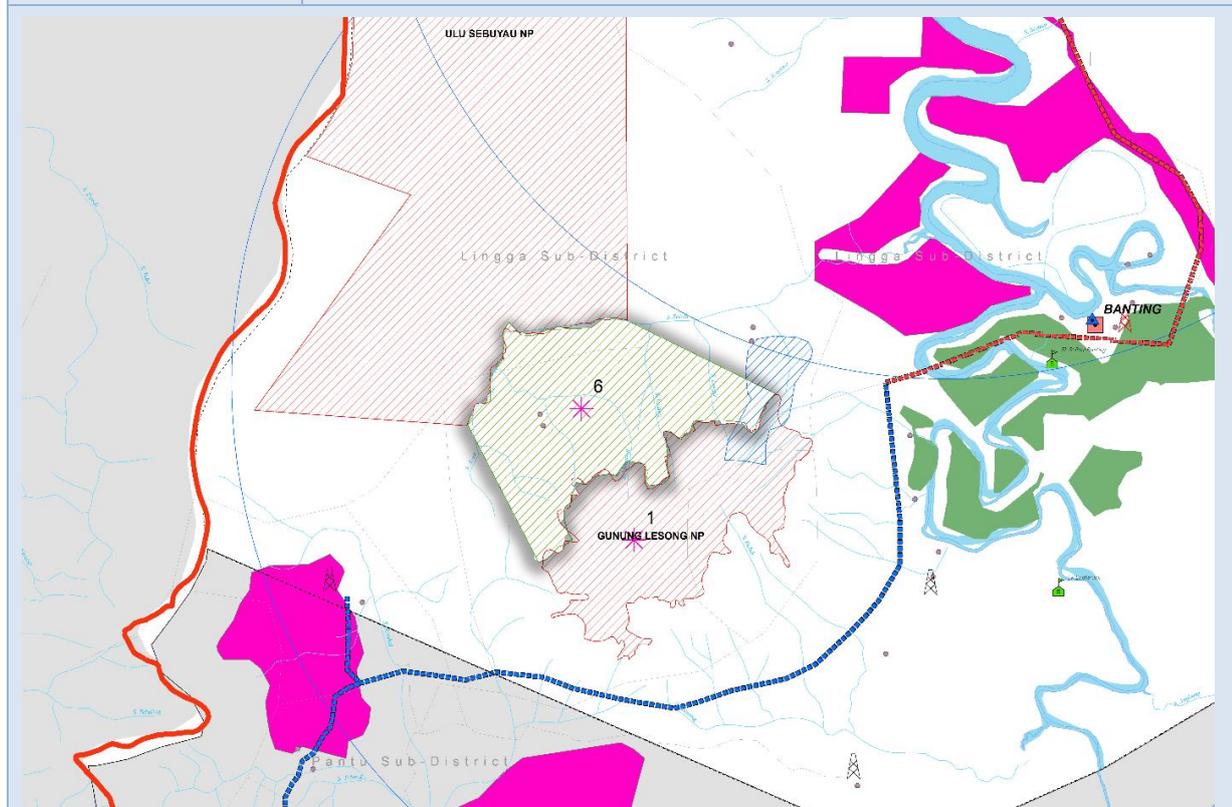
2.4.3.1 Gazette the Ulu Sungai Menyang Landscape as A Protected Area

Strategic Focus Area: S3: Conserving Natural Tourism Assets	
Action/Project No:	S3-1 Gazette the Ulu Sungai Menyang Landscape As A Protected Area
Project Description:	Gazette the Ulu Sungai Menyang landscape as a national park (or other form of protected forest) to protect the orangutan population.
Project Site:	Ulu Sungai Menyang, Batang Ai
Link Projects:	<ul style="list-style-type: none"> S1-4 and 5 S2-5 S3-4 S3-5
Target Market:	International tourists
Project Rational:	<ul style="list-style-type: none"> Protects an orangutan population estimated at 200 individuals Safeguards high value forest for future ecotourism activities Will create economic opportunities for local communities Creates positive global publicity for Sarawak Contributes to the Heart of Borneo initiative
Impacts/Outcomes:	<ul style="list-style-type: none"> Preservation of high value forest that can be used for future tourism activities Good for the Sarawak Brand Protects orangutans, an iconic species that is used extensively in Sarawak's tourism promotion. Spin off economic opportunities from high value ecotourism
Estimated Budget:	N/A
Activities/Components:	<ul style="list-style-type: none"> Creation of a new Ulu Sungai Menyang National Park
Investors:	Public Sector: 100%
Project Time Frame:	Medium-Term

Strategic Focus Area: S3: Conserving Natural Tourism Assets					
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sarawak Forestry</td> <td>Lead agency and State body responsible for gazetted protected areas.</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Sarawak Forestry	Lead agency and State body responsible for gazetted protected areas.
Agencies	Roles & Responsibilities				
Sarawak Forestry	Lead agency and State body responsible for gazetted protected areas.				

2.4.3.2 Sebuyau – Gunung Lesong Wildlife Corridor and Reforestation Project

Strategic Focus Area: S3: Conserving Natural Tourism Assets	
Action/Project No:	S3-2 Sebuyau – Gunung Lesong Wildlife Corridor and Reforestation Project
Project Description:	Establish a wildlife corridor between Gunung Lesong and Sebuyau National Parks.
Project Site:	Between Gunung Lesong and Sebuyau National Parks.



Source: UNIMAS Holdings

Link Projects:	<ul style="list-style-type: none"> S1-1, developing Gunung Lesong-Lingga Ecotourism Cluster.
Target Market:	Primarily for conservation and income creation for local communities. Some scope for international volunteer tourism
Project Rational:	<ul style="list-style-type: none"> Provides a wildlife corridor for orangutans and other wildlife to move between two protected areas Creates opportunities for volunteer tourism (e.g., tree planting) Creates income opportunities / employment for local communities (e.g., tree planting, maintaining, pruning, etc.) Creates positive global publicity for Sarawak Potential international funding via international NGOs (e.g., for CSR, carbon offsets, etc) Can be implemented on NCR or state land
Impacts/Outcomes:	<ul style="list-style-type: none"> Creation of Wildlife Corridor Enhances tourism opportunities Income for local communities

Strategic Focus Area:	S3: Conserving Natural Tourism Assets											
	<ul style="list-style-type: none"> Positive publicity 											
Estimated Budget:	It varies depending on land size. Approximately RM 15,000 per hectare. (Rough estimate 1,500 Ha = RM22.5 mill)											
Activities/Components:	<ul style="list-style-type: none"> Sebuyau - Gunung Lesong Wildlife Corridor and Reforestation Project. 											
Investors:	Public Sector: 50% Donors: 50%											
Project Time Frame:	Medium to Long-Term											
Key Success Factors:	<ul style="list-style-type: none"> Community buy-in Partnerships with NGOs and researchers Securing funding from donors 											
Possible Barriers & Threats	<ul style="list-style-type: none"> Donor / NGO funding is not as readily available in post-Covid period. 											
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sarawak Forestry</td> <td>Lead agency</td> </tr> <tr> <td>Local Community</td> <td>Partners</td> </tr> <tr> <td>Local Research Institutes</td> <td>Research</td> </tr> <tr> <td>International NGOs</td> <td>External funding</td> </tr> </tbody> </table>		Agencies	Roles & Responsibilities	Sarawak Forestry	Lead agency	Local Community	Partners	Local Research Institutes	Research	International NGOs	External funding
Agencies	Roles & Responsibilities											
Sarawak Forestry	Lead agency											
Local Community	Partners											
Local Research Institutes	Research											
International NGOs	External funding											

2.4.3.3 Wildlife Surveys Around Gunung Lesong National Park

Strategic Focus Area:	S3: Conserving Natural Tourism Assets	
Action/Project No:	S3-3 Wildlife Surveys Around Gunung Lesong National Park	
Project Description:	Conduct wildlife surveys to estimate the population of Bornean Banded Langur (Bijit) around the borders of Gunung Lesong National Park	
Project Site:	Gunung Lesong National Park and the forest outside the park	
Link Projects:	<ul style="list-style-type: none"> S1-1, developing Gunung Lesong-Lingga Ecotourism Cluster 	
Target Market:	-	
Project Rational:	<ul style="list-style-type: none"> According to local villagers the Bornean Banded Langur is found in the forest bordering Gunung Lesong National Park This is one of the rarest monkeys in the world and could be an icon for Gunung Lesong Potential for high value ecotourism / wildlife watching tours Conservation of a rare species 	
Impacts/Outcomes:	<ul style="list-style-type: none"> Data on population of the Banded Langurs Maps / details of locations where they are commonly found Information that can assist with planning wildlife watching tours (if viable) Valuable data for conservation of this rare species and potential icon for Gunung Lesong and Sarawak. 	
Estimated Budget:	RM 100,000	
Activities/Components:	<ul style="list-style-type: none"> Wildlife Survey of Areas Outside of Gunung Lesong National Park 	

Strategic Focus Area: S3: Conserving Natural Tourism Assets		
Investors:	Public Sector: 50% NGOs: 50%	
Project Time Frame:	Short-Term	
Roles & Responsibilities:	Agencies	
	Roles & Responsibilities	
	Sarawak Forestry	Lead agency
	Local Community	Assist with survey work
	NGOs	Funding and assistance with wildlife surveys

2.4.3.4 Gazette Proposed Extensions to Batang Ai National Park

Strategic Focus Area: S3: Conserving Natural Tourism Assets		
Action/Project No:	S3-4 Gazette Proposed Extensions to Batang Ai National Park	
Project Description:	Gazette the proposed extensions to Batang Ai National Park	
Project Site:	Proposed extensions to Batang Ai National Park	
Link Projects:	<ul style="list-style-type: none"> S1-4, Batang Ai field studies centre S2-5, promoting ecotourism in upriver areas of Batang Ai S3-1, gazettement Ulu Sungai Menyang as a national park 	
Project Rational:	<ul style="list-style-type: none"> Safeguards an area of forest that is already used for high value ecotourism activities Safeguards long term economic opportunities for local communities Creates positive global publicity for Sarawak Contributes to the Heart of Borneo initiative 	
Impacts/Outcomes:	<ul style="list-style-type: none"> Conservation of high-value forest Opportunities to expand tourism activities. 	
Activities/Components:	<ul style="list-style-type: none"> Extension of Batang Ai National Park 	
Project Time Frame:	Medium-Term	
Roles & Responsibilities:	Agencies	
	Roles & Responsibilities	
	Sarawak Forestry	Lead agency and State body responsible for gazettement protected areas.

2.4.3.5 Avoid Building Roads Through Irreplaceable Orangutan Habitat at Batang Ai

Strategic Focus Area: S3: Conserving Natural Tourism Assets	
Action/Project No:	S3-5 Avoid Building Roads Through Irreplaceable Orangutan Habitat at Batang Ai
Project Description:	Avoid building roads through irreplaceable orangutan habitat. Instead of roads in these fragile areas, improve river and lake transport for communities (new jetties, lake ferry service, etc.).
Project Site:	Batang Ai Area
Project Rational:	<ul style="list-style-type: none"> Cost-effective

Strategic Focus Area: S3: Conserving Natural Tourism Assets					
	<ul style="list-style-type: none"> • Benefits local communities • Improves tourist transport and boat safety • Conserves high-value forest and orangutan habitat 				
Activities/Components:	<ul style="list-style-type: none"> • See Action S5-3 under Accessibility 				
Project Time Frame:	Short to Long-Term				
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sarawak EPU</td> <td></td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Sarawak EPU	
	Agencies	Roles & Responsibilities			
Sarawak EPU					

2.4.3.6 Summary of Conserving Natural Tourism Assets Projects

The Conserving Natural Tourism Assets projects are summarised in the table below.

Table 2.7: Summary of Conserving Natural Tourism Assets Projects and Costs

No.	Action	Est Budget	Timing
S3-1	Gazette Ulu Sungai Menyang landscape as a national park (or other form of protected forest) to protect the orangutan population.		
S3-2	Establish a wildlife corridor between Gunung Lesong and Sebuyau National Parks.	RM22,500,000	M-L
S3-3	Conduct wildlife surveys to estimate the population of Bornean Banded Langur (or Sarawak langur) at Gunung Lesong and surroundings.	RM100,000	S
S3-4	Gazette the proposed extensions to Batang Ai National Park		
S3-5	Avoid building roads through irreplaceable orangutan habitat at Batang Ai. Instead of roads in these fragile areas, improve river and lake transport for communities (new jetties, lake ferry service, etc.).		
TOTAL		RM22,600,000	

2.4.4 Branding

Allocate more marketing resources to promoting attractions and experiences in Sri Aman Division and develop new adventure and sport events.

There are nine actions under Branding, including marketing and promotion activities and events.

Table 2.8: Summary of Branding Recommendations

No.	Action
S4-1	Set up a dedicated website for the tidal bore (e.g., borneotidal bore.com). This site should include general information about the tidal bore; daily 'wave' times at key sites along the Lupar River (e.g. times at Seduku, Sri Aman, etc.); and webcam feeds of the tidal bore.
S4-2	Set up a photo library of high-quality images of attractions and experiences in Sri Aman Division to be used for marketing and promotion.
S4-3	Ensure key attractions and recreation sites have correct locations in Google Maps.
S4-4	Develop interpretation materials and collaterals (trail maps, guides, etc.) and digital content (videos, photos, blog content, etc.) for the Gunung Lesong-Lingga Ecotourism Cluster
S4-5	Consider setting up a visitor information desk at Fort Alice, the Resident's Office or somewhere on the new waterfront development.
S4-6	Produce a destination video featuring the key attractions in Sri Aman Division and a series of video blogs on different attractions and experiences.
S4-7	Promote an adventure race in Sri Aman Division (e.g., the Sarawak Adventure Challenge). Potential locations include Gunung Lesong and Batang Ai.
S4-8	Promote a Road Cycling Race in Sri Aman when the Borneo Highway is completed. A potential route is Lingga--Simanggang-Engkilili.
S4-9	Develop a water-based event or festival at Batang Ai Lake (e.g. jet ski regatta, kayaking races, longboat races, etc.).

Further details of each action are outlined in following sections.

2.4.4.1 Website on the Tidal Bore

<i>Strategic Focus Area:</i> S4: Branding	
<i>Action/Project No:</i>	S4-1 Website on the Tidal Bore
<i>Project Description:</i>	Set up a dedicated website for the tidal bore (e.g. borneotidal bore.com). This site should include general information about the tidal bore; daily 'wave' times at key sites along the Lupar River (e.g. times at Seduku, Sri Aman, etc.); images and video; and webcam feeds of the tidal bore.
<i>Target Market:</i>	Domestic and international tourists
<i>Project Rational:</i>	<ul style="list-style-type: none"> • Fills the current information gap about tidal times, etc • Promotes a key feature of Sri Aman Division • Makes it easy for tourists to plan a trip and see the tidal bore
<i>Estimated Budget:</i>	RM 35,000
<i>Activities/Components:</i>	Tidal Bore Website
<i>Investors:</i>	Public Sector: 100%

Strategic Focus Area: S4: Branding							
Project Time Frame:	Short-Term						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sarawak Tourism Board</td> <td>Lead agency</td> </tr> <tr> <td>Resident's Office</td> <td>Supporting role.</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Sarawak Tourism Board	Lead agency	Resident's Office	Supporting role.
	Agencies	Roles & Responsibilities					
	Sarawak Tourism Board	Lead agency					
Resident's Office	Supporting role.						

2.4.4.2 Increased Promotion of Sri Aman Division's Attractions

Strategic Focus Area: S4: Branding							
Action/Project No:	S4-2, 3, 4, and 6						
Project Description:	<p>Set up a photo library of high quality images of attractions and experiences in the Sri Aman Division to be used for marketing and promotion.</p> <p>Ensure key attractions and recreation sites have correct locations in Google Maps.</p> <p>Develop interpretation materials and collaterals (trail maps, guides, etc.) and digital content (videos, photos, blog content, etc.) for the Gunung Lesong-Lingga Ecotourism Cluster</p> <p>Produce a destination video featuring the key attractions in Sri Aman Division and a series of video blogs on different attractions and experiences.</p>						
Target Market:	Domestic and international tourists						
Project Rational:	<ul style="list-style-type: none"> Improves promotion of Sri Aman's attractions Fills travel information gaps Kick starts promotion of Gunung Lesong-Lingga Ecotourism Cluster 						
Estimated Budget:	RM 200,000						
Activities/Components:	<ul style="list-style-type: none"> Photo library Interpretation materials and collaterals for Gunung Lesong-Lingga Ecotourism Cluster Destination videos and Vlogs 						
Investors:	Public Sector: 100%						
Project Time Frame:	Short-Term						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sarawak Tourism Board</td> <td>Lead agency</td> </tr> <tr> <td>Resident's Office</td> <td>Supporting role</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Sarawak Tourism Board	Lead agency	Resident's Office	Supporting role
	Agencies	Roles & Responsibilities					
	Sarawak Tourism Board	Lead agency					
Resident's Office	Supporting role						

2.4.4.3 Visitor Information Desk in Simanggang Town

Strategic Focus Area: S4: Branding	
Action/Project No:	S4-5 Visitor Information Desk in Simanggang Town
Project Description:	Consider setting up a visitor information desk at Fort Alice, the Resident's Office or somewhere on the new waterfront development.
Target Market:	Domestic and international tourists

Strategic Focus Area: S4: Branding							
Project Rational:	<ul style="list-style-type: none"> • Currently there is nowhere in the Division where tourists can get visitor information • Easy to set up, either at Resident's office, local council office or at Fort Alice. • Low cost 						
Estimated Budget:	NA, using existing resources						
Activities/Components:	<ul style="list-style-type: none"> • Visitor information desk 						
Investors:	Public Sector: 100%						
Project Time Frame:	Short-Term						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Resident's Office or Local Council</td> <td>Coordinate and manage</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Supporting role and provision of marketing collaterals</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Resident's Office or Local Council	Coordinate and manage	Sarawak Tourism Board	Supporting role and provision of marketing collaterals
	Agencies	Roles & Responsibilities					
	Resident's Office or Local Council	Coordinate and manage					
Sarawak Tourism Board	Supporting role and provision of marketing collaterals						

2.4.4.4 Develop An Adventure Race in Sri Aman Division

Strategic Focus Area: S4: Branding											
Action/Project No:	S4-7 Develop An Adventure Race in the Sri Aman Division										
Project Description:	Promote an annual or biennial adventure race in Sri Aman Division. Potential locations include Gunung Lesong and Batang Ai.										
Target Market:	Domestic and international tourists										
Project Rational:	<ul style="list-style-type: none"> • Promotes the Sri Aman Division • Helps to promote new or emerging tourism areas in the Division • Spin off economic benefits for local communities 										
Estimated Budget:	RM 250,000 government sponsorship										
Activities/Components:	<ul style="list-style-type: none"> • Sri Aman Adventure Race 										
Investors:	Public Sector (Sponsorship) and Private Sector (sponsorship, fees, etc).										
Project Time Frame:	Short-Term, could be launched in 2022.										
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>MTCP, and Ministry of Youth & Sports</td> <td>Sponsorship</td> </tr> <tr> <td>Local Councils and Resident's Office</td> <td>Supporting role</td> </tr> <tr> <td>Private Sector</td> <td>Organiser, funding, sponsorship, sales, and marketing, etc.</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Promotion</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	MTCP, and Ministry of Youth & Sports	Sponsorship	Local Councils and Resident's Office	Supporting role	Private Sector	Organiser, funding, sponsorship, sales, and marketing, etc.	Sarawak Tourism Board	Promotion
	Agencies	Roles & Responsibilities									
	MTCP, and Ministry of Youth & Sports	Sponsorship									
	Local Councils and Resident's Office	Supporting role									
Private Sector	Organiser, funding, sponsorship, sales, and marketing, etc.										
Sarawak Tourism Board	Promotion										
Benchmark:	The Sarawak Adventure Challenge. This annual cycling and running event take places near Kuching. It currently attracts around 200 participants from across Malaysia but has the potential to grow.										

2.4.4.5 Develop A Road Cycling Race in Sri Aman Division

Strategic Focus Area:	S4: Branding											
Action/Project No:	S4-8	Develop A Road Cycling Race in the Sri Aman Division										
Project Description:	Promote an annual or biennial Road Cycling Race in the Sri Aman Division. A potential route is Lingga–Simanggang-Engkilili.											
Target Market:	Domestic and international tourists											
Project Rational:	<ul style="list-style-type: none"> • Promotes the Sri Aman Division • Helps to promote new or emerging tourism areas in the Division • Spin off economic benefits for local communities • Taps into growing local interest in cycling 											
Estimated Budget:	RM 250,000 government sponsorship											
Activities/Components:	<ul style="list-style-type: none"> • Sri Aman Road Race 											
Investors:	Public Sector (Sponsorship) and Private Sector (sponsorship, fees, etc).											
Project Time Frame:	Medium term, can only be done when the Pan Borneo Highway and other roads are completed.											
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>MTCP and Ministry of Youth & Sports</td> <td>Sponsorship</td> </tr> <tr> <td>Local Councils and Resident's Office</td> <td>Supporting role</td> </tr> <tr> <td>Private Sector</td> <td>Organiser, funding, sponsorship, sales and marketing, etc.</td> </tr> <tr> <td>Sarawak Tourism Board</td> <td>Promotion</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	MTCP and Ministry of Youth & Sports	Sponsorship	Local Councils and Resident's Office	Supporting role	Private Sector	Organiser, funding, sponsorship, sales and marketing, etc.	Sarawak Tourism Board	Promotion	
Agencies	Roles & Responsibilities											
MTCP and Ministry of Youth & Sports	Sponsorship											
Local Councils and Resident's Office	Supporting role											
Private Sector	Organiser, funding, sponsorship, sales and marketing, etc.											
Sarawak Tourism Board	Promotion											

2.4.4.6 Develop a Water Based Event or Festival at Batang Ai

Strategic Focus Area:	S4: Branding	
Action/Project No:	S4-9	Develop a Water Based Event or Festival at Batang Ai
Project Description:	Develop a water-based event or festival at Batang Ai Lake (e.g. jet ski regatta, kayaking races, longboat races, recreational fishing, etc.).	
Target Market:	Domestic and international tourists	
Project Rational:	<ul style="list-style-type: none"> • Promotes Batang Ai and Sri Aman Division • Spin off economic benefits for local communities • Community event for Lubok Antu District • Makes use of an underutilized tourism asset (the lake) 	
Estimated Budget:	RM 250,000 government sponsorship	
Activities/Components:	<ul style="list-style-type: none"> • Batang Ai Festival 	
Investors:	Public Sector (Sponsorship) and Private Sector (sponsorship, fees, etc).	

Strategic Focus Area: S4: Branding		
Project Time Frame:	Short to Medium-term	
Roles & Responsibilities:	Agencies	Roles & Responsibilities
	MTCP and Ministry of Youth & Sports	Sponsorship
	Local Council and Resident's Office	Supporting role
	Private Sector	Organiser, funding, sponsorship, sales and marketing, etc.
	Sarawak Tourism Board	Promotion

2.4.4.7 Summary of Branding Projects

The Branding projects are summarised in the table below.

Table 2.9: Summary of Branding Projects and Costs

No.	Action	Est Budget	Timing
S4-1	Set up a dedicated website for the tidal bore (e.g., borneotidal bore.com). This site should include general information about the tidal bore; daily 'wave' times at key sites along the Lupar River (e.g., times at Seduku, Sri Aman, etc.); and webcam feeds of the tidal bore.	RM35,000	S
S4-2	Set up a photo library of high-quality images of attractions and experiences in Sri Aman Division to be used for marketing and promotion.	RM200,000	S
S4-3	Ensure key attractions and recreation sites have correct locations in Google Maps.	Incl in S4-2	S
S4-4	Develop interpretation materials and collaterals (trail maps, guides, etc.) and digital content (videos, photos, blog content, etc.) for the Gunung Lesong-Lingga Ecotourism Cluster	Incl in S4-2	S
S4-5	Consider setting up a visitor information desk at Fort Alice, the Resident's Office or somewhere on the new waterfront development.		
S4-6	Produce a destination video featuring the key attractions in Sri Aman Division and a series of video blogs on different attractions and experiences.	Incl in S4-2	S
S4-7	Promote an adventure race in Sri Aman Division (e.g., the Sarawak Adventure Challenge). Potential locations include Gunung Lesong and Batang Ai.	RM250,000	S
S4-8	Promote a Road Cycling Race in Sri Aman when the Borneo Highway is completed. A potential route is Lingga--Simanggang-Engkilili.	RM250,000	M
S4-9	Develop a water-based event or festival at Batang Ai Lake (e.g., jet ski regatta, kayaking races, longboat races, etc.).	RM250,000	S-M
TOTAL		RM985,000	

2.4.5 Accessibility

Continue to improve access to high priority tourism attractions but be mindful that road access can degrade high value ecotourism sites and lead to reduced income for local communities.

There are seven actions under accessibility.

Table 2.10: Summary of Accessibility Recommendations

No.	Action
S5-1	Build a road from Pantu to Gunung Lesong to unlock the potential of the Gunung Lesong-Lingga Ecotourism Cluster.
S5-2	Clear the piles of logs and fallen trees (log jams) on the Ai and Delok Rivers. This should be done each year. This will create faster and safer river travel for both communities and tourists.
S5-3	Improve river transport for upriver communities at Batang Ai. Study the merits of introducing river / lake taxis, building better jetties and boat ramps, having a fuel depot near lake, etc.
S5.4	Build boat jetties at Banting and an appropriate site near G. Lesong to connect the tourism cluster and facilitate boat cruises along the Sungai Seterap.
S5.5	Allocate funds to maintain the tourist jetty and reception area / toilet block at the Batang Ai. With the resort closed this building is going into disrepair. Even without a resort, this facility is needed and should be maintained by the local council, Sarawak Energy or relevant agency.
S5.6	SEB to continue to maintain the water level of the reservoir so that upriver areas remain safe and navigable and rapids do not appear (e.g., Wong Taong).
S5.7	Examine the feasibility of float plane service to Batang Ai.

Further details of each action are outlined in the following sections.

2.4.5.1 Pantu to Gunung Lesong Road

Strategic Focus Area: S5: Accessibility	
Action/Project No:	S5-1 Pantu to Gunung Lesong Road
Project Description:	Build a road from Pantu to Gunung Lesong.
Project Site:	Pantu to Gunung Lesong.
Link Projects:	<ul style="list-style-type: none"> RO-8, RO-9 S1-1, developing Gunung Lesong-Lingga Ecotourism Cluster.
Target Market:	Domestic and international tourists
Project Rational:	<ul style="list-style-type: none"> Creates access to Gunung Lesong National Park Unlocks potential of Gunung Lesong-Lingga Ecotourism Cluster Benefits local communities
Estimated Budget:	As budgeted under roads infrastructure.
Activities/Components:	<ul style="list-style-type: none"> Road from Pantu to Gunung Lesong, part of wider Gunung Lesong-Lingga Ecotourism Cluster
Investors:	Public Sector: 100%
Project Time Frame:	Short to Medium-term

Strategic Focus Area: S5: Accessibility	
Roles & Responsibilities:	Agencies
	Ministry of Infrastructure

2.4.5.2 Clear Logs & Floating Debris at Batang Ai & Tributaries of the Sungai Seterap

Strategic Focus Area: S5: Accessibility	
Action/Project No:	S5-2 Clear Logs & Floating Debris at Batang Ai & Tributaries of the Sungai Seterap
Project Description:	Remove the piles of logs and fallen trees (log jams) on the Ai, Engkari and Delok Rivers at Batang Ai. This should be done each year. Clear logs and debris from tributaries of the Sungai Seterap that have potential for river cruises / tourism activities.
Project Site:	Batang Ai – Ai, Engkari and Delok Rivers Seterap River
Target Market:	International tourists
Project Rational:	<ul style="list-style-type: none"> Enhances safety of boat transport for communities and tourists Reduces boat journey times (incl. medical evacuation times) Reduces risk Removes an eyesore that some tourists mistakenly view as environmental damage Helps to avoid possible negative press, PR or social media coverage
Estimated Budget:	RM 100,000 per year (Batang Ai) RM 100,000 Seterap River.
Activities/Components:	<ul style="list-style-type: none"> River Debris Removal
Investors:	Public Sector: 100%
Project Time Frame:	Short to Long-term
Roles & Responsibilities:	Agencies
	Sarawak Energy
	Local Council
	Sarawak Rivers Board

2.4.5.3 Improve River and Lake Transport at Batang Ai

Strategic Focus Area: S5: Accessibility											
Action/Project No:	S5-3 Improve River and Lake Transport at Batang Ai See also Project TR-3 under Transportation										
Project Description:	Improve river transport for upriver communities at Batang Ai. Study the merits of introducing river / lake taxis, building better jetties and boat ramps, having a fuel depot near lake, etc.										
Project Site:	Batang Ai										
Project Rational:	<ul style="list-style-type: none"> • Cost effective • Benefits local communities • Improves tourist transport and boat safety 										
Estimated Budget:	<ul style="list-style-type: none"> • Fuel Depot. Cost depends on size and scale of facility. To be determined. • Feasibility Study. RM 200,000. (Included in transportation budget TR-3) 										
Activities/Components:	<ul style="list-style-type: none"> • Fuel depot at lake for local boat owners / community to use • Feasibility study on introducing lake taxis (e.g. from main jetty to Nanga Delok and other longhouses) and improving jetties) 										
Investors:	Public Sector: 100%										
Project Time Frame:	Short-term										
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Resident's Office</td> <td>Supervise feasibility study on river / lake taxis</td> </tr> <tr> <td>Sarawak Energy</td> <td>Support</td> </tr> <tr> <td>Local Council</td> <td>As local communities need for fuel depot</td> </tr> <tr> <td>Sarawak Rivers Board</td> <td>Support</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Resident's Office	Supervise feasibility study on river / lake taxis	Sarawak Energy	Support	Local Council	As local communities need for fuel depot	Sarawak Rivers Board	Support
Agencies	Roles & Responsibilities										
Resident's Office	Supervise feasibility study on river / lake taxis										
Sarawak Energy	Support										
Local Council	As local communities need for fuel depot										
Sarawak Rivers Board	Support										

2.4.5.4 Boat Jetties at Banting and Near Gunung Lesong

Strategic Focus Area: S5: Accessibility	
Action/Project No:	S5-4 Boat Jetties at Banting and Near Gunung Lesong
Project Description:	Build boat jetties at Banting and an appropriate site near G. Lesong.
Project Site:	Banting and Gunung Lesong.
Link Projects:	<ul style="list-style-type: none"> • S1-1, developing Gunung Lesong-Lingga Ecotourism Cluster.
Target Market:	Domestic and international tourists
Project Rational:	<ul style="list-style-type: none"> • Connects locations in the Gunung Lesong-Lingga Ecotourism Cluster • Facilitates the creation of tourism circuits • Facilitates development of boat cruises along the Sungai Seterap • Improves tourist transport and boat safety • Benefits local communities
Impacts/Outcomes:	<ul style="list-style-type: none"> • Improved river connections • Community benefits • Opens up opportunities for tourism circuits and boat based tours
Estimated Budget:	As budgeted under existing plans.
Activities/Components:	<ul style="list-style-type: none"> • Boat Jetties

Strategic Focus Area: S5: Accessibility							
Investors:	Public Sector: 100%						
Project Time Frame:	Medium-term						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Ministry of Infrastructure</td> <td>Lead agency</td> </tr> <tr> <td>Sarawak Rivers Board</td> <td>Support</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Ministry of Infrastructure	Lead agency	Sarawak Rivers Board	Support
	Agencies	Roles & Responsibilities					
	Ministry of Infrastructure	Lead agency					
Sarawak Rivers Board	Support						

2.4.5.5 Maintenance of Tourist Jetty at Batang Ai Lake

Strategic Focus Area: S5: Accessibility							
Action/Project No:	S5-5 Maintenance of Tourist Jetty at Batang Ai Lake						
Project Description:	Allocate funds to maintain the tourist jetty and reception area / toilet block at the Batang Ai reservoir. With the resort closed this building and the jetty is going into disrepair. Even without a resort, this facility is needed and should be maintained by the local council, Sarawak Energy or relevant agency.						
Project Site:	Batang Ai						
Target Market:	Domestic and international tourists						
Project Rational:	<ul style="list-style-type: none"> Essential maintenance of an established tourist facility The current run-down building and toilets creates negative publicity Jetty maintenance is essential for tourist safety 						
Estimated Budget:	RM 50,000 per year						
Activities/Components:	<ul style="list-style-type: none"> Maintenance of Batang Ai Jetty and Tourist Reception Area 						
Investors:	Public Sector: 100% (if longhouse resort remains closed) Or Private Sector: 100% (if longhouse resort reopens)						
Project Time Frame:	Short to Medium-term						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Local Council (or Longhouse Resort)</td> <td>Periodic maintenance</td> </tr> <tr> <td>Sarawak Energy</td> <td>Catchment Management Authority</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Local Council (or Longhouse Resort)	Periodic maintenance	Sarawak Energy	Catchment Management Authority
	Agencies	Roles & Responsibilities					
	Local Council (or Longhouse Resort)	Periodic maintenance					
Sarawak Energy	Catchment Management Authority						

2.4.5.6 Maintain Water Level At Batang Ai Reservoir and Upriver Areas

Strategic Focus Area: S5: Accessibility	
Action/Project No:	S5-6 Maintain Water Level At Batang Ai Reservoir and Upriver Areas
Project Description:	Sarawak Energy to continue to maintain the water level of the reservoir so that upriver areas remain safe and navigable and rapids do not appear (e.g. Wong Taong).
Project Site:	Batang Ai

Strategic Focus Area: S5: Accessibility					
Target Market:	Domestic and international tourists				
Project Rational:	<ul style="list-style-type: none"> Ensures water levels in upriver areas of Batang Ai (e.g. Delok River) are sufficiently high for safe river transport and medical evacuation (if needed) Benefits local communities Reduces risk and improves tourist safety 				
Impacts/Outcomes:	<ul style="list-style-type: none"> Safer river travel Improves travel times 				
Estimated Budget:	NA, part of ongoing Sarawak Energy catchment management plans				
Activities/Components:	N/A, part of on-going Sarawak Energy catchment management activities				
Project Time Frame:	Short to Long-term				
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sarawak Energy</td> <td>Catchment Management Authority</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Sarawak Energy	Catchment Management Authority
	Agencies	Roles & Responsibilities			
Sarawak Energy	Catchment Management Authority				

2.4.5.7 Feasibility Study on Float Plane Service at Batang Ai Lake

Strategic Focus Area: S5: Accessibility							
Action/Project No:	S5-7 Feasibility Study on Float Plane Service At Batang Ai Lake						
Project Description:	Examine the feasibility of floatplane service to Batang Ai						
Project Site:	Batang Ai						
Target Market:	Domestic and international tourists						
Project Rational:	<ul style="list-style-type: none"> Idea has been suggested by senior government officials Full feasibility is required to ascertain the viability of offering such a service Significantly cuts travel time and adds a new travel experience Could attract new demand segments and potentially lead to increased arrivals 						
Estimated Budget:	RM 300,000						
Activities/Components:	<ul style="list-style-type: none"> Float Plane Feasibility Study 						
Investors:	Public Sector: 100%						
Project Time Frame:	Short-term						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Economic Planning Unit</td> <td>Study Coordinator</td> </tr> <tr> <td>Hornbill Skyways</td> <td>Support</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Economic Planning Unit	Study Coordinator	Hornbill Skyways	Support
	Agencies	Roles & Responsibilities					
	Economic Planning Unit	Study Coordinator					
Hornbill Skyways	Support						

2.4.5.8 Summary of Accessibility Projects

The Accessibility projects are summarised in the table below.

Table 2.11: Summary of Accessibility Projects and Costs

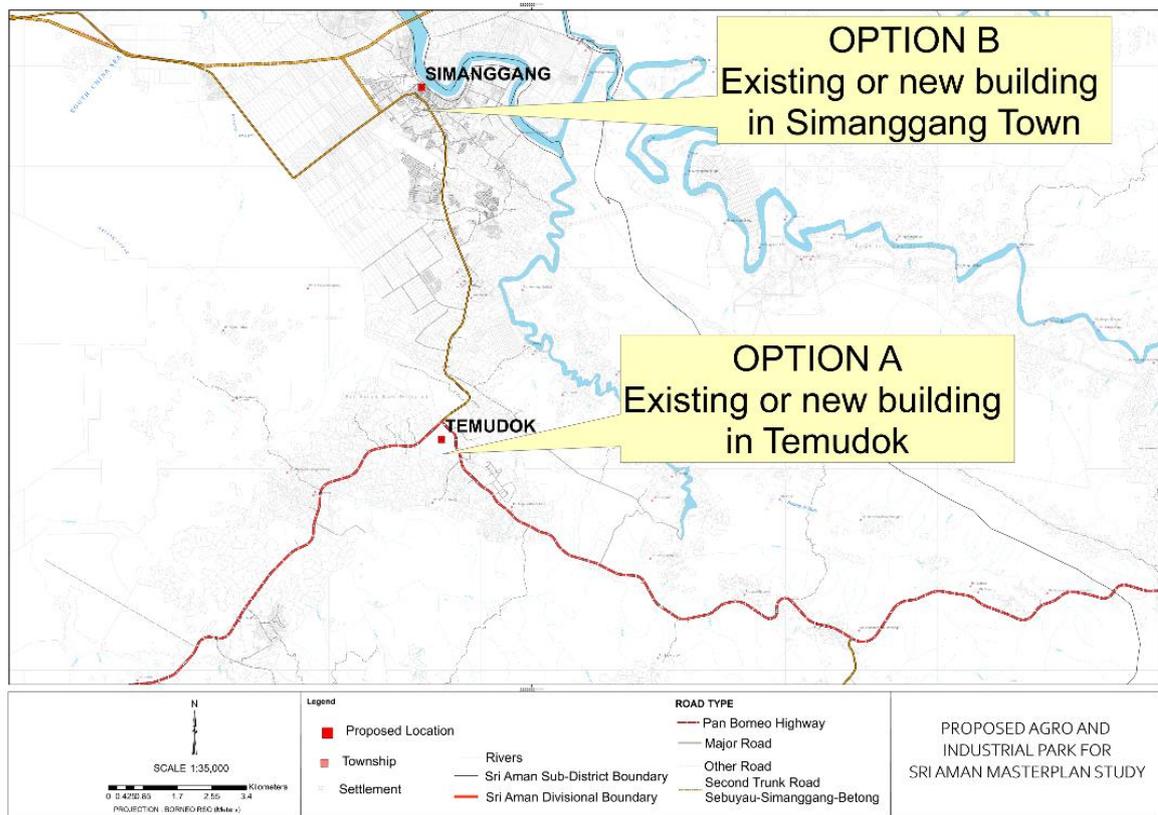
No.	Action	Est Budget	Timing
S5-1	Build a road from Pantu to Gunung Lesong to unlock the potential of the Gunung Lesong-Lingga Ecotourism Cluster.		
S5-2	Clear the piles of logs and fallen trees (log jams) on the Ai and Delok Rivers. This should be done each year. This will create faster and safer river travel for both communities and tourists.	RM1,100,000	S-L
S5-3	Improve river transport for upriver communities at Batang Ai. Study the merits of introducing river / lake taxis, building better jetties and boat ramps, having a fuel depot near lake, etc.	Incl in Transportation	S
S5.4	Build boat jetties at Banting and an appropriate site near G. Lesong to connect the tourism cluster and facilitate boat cruises along the Sungai Seterap.		
S5.5	Allocate funds to maintain the tourist jetty and reception area / toilet block at the Batang Ai. With the resort closed this building is going into disrepair. Even without a resort, this facility is needed and should be maintained by the local council, Sarawak Energy or relevant agency.	RM500,000	S-L
S5.6	SEB to continue to maintain the water level of the reservoir so that upriver areas remain safe and navigable and rapids do not appear (e.g. Wong Taong).		
S5.7	Examine the feasibility of float plane service to Batang Ai.	RM300,000	S
TOTAL		RM1,900,000	

SECTION 2.5 SOFT INFRASTRUCTURE PROJECTS

2.5.1 Development of Business Incubation Centre

Action/ Project No:	ES 1: Development of Business Incubation Centre
<p>Project Description:</p>	<ul style="list-style-type: none"> ● The incubation centre aims to foster entrepreneurship activities and equip new businesses with the knowledge to develop and operate a successful business. ● The services provided will be orientated towards developing technology-enabled businesses in agriculture, aquaculture, food processing, digital technology, and trade. ● The incubation centre will be developed on a site covering about 1 hectare near Simanggang (city centre). ● The development will be done in a phased manner similar to the Technology Park Malaysia Incubation Centre, which adopted a landlord model and later included an advisory model. <ul style="list-style-type: none"> – Under Phase 1 (between 2021-2025), the incubation centre to adopt a landlord model, which is providing office space and shared facilities such as video conferencing facilities, access to high-speed internet. – In phase 2 (beyond 2026), the incubation centre can include an additional advisory model to the landlord model, providing additional services such as business advisory services, mentoring and coaching, and facilitating access to funding. ● SDEC has already planned to enhance the development of local start-up ecosystem through innovation, entrepreneurship education through “Digital Innovation Hubs and Digital Village” in the Sri Aman Division ● SEDC is also planning an incubator centre that will be focusing on Bumiputera. ● To avoid duplication of efforts, it is proposed to integrate the efforts undertaken by SEDC and SDEC and extend the services to all eligible residents of the Sri Aman Division. ● The incubation centre will assist new start-ups, both SMEs and entrepreneurs, become successful in their venture at a reasonable fee. ● The incubation centre is being proposed to be built and operated as a public-private partnership to ensure that the centre does not fully rely on Government funding. ● The incubation centre will house companies that develop, adapt, and showcase advanced smart technologies and techniques which have the potential to uplift Sri Aman’s economy. ● The incubation centre will have strategic partnerships with industry associations, governmental bodies, universities and research centres located in and around Sri Aman. ● The incubation centre will serve to connect local entrepreneurs with leading foreign food technology and research institutions.
<p>Project Site:</p>	<p>The site location recommendation is to have a single building housing five projects that include (1) Incubation centre; (2) E-commerce market access point; (3) Training and development centre; (4) Outsourcing services delivery centre; and (5) Business matchmaking and networking offices.</p> <p>Having the various projects named above housed under one roof will foster an environment of interaction across the business community, ensure greater ease of access to business services and support more efficient utilisation of common facilities, e.g., meeting spaces, office space.</p> <p>The site would ideally be located in Temudok in proximity to the proposed Agro Park and Industrial Park. However, pre-existing office buildings may be used for this purpose in the city centre if a suitable building is available with a collective gross floor area of 66,642 square feet (0.62 ha).</p>

Action/ ES 1: Development of Business Incubation Centre
Project No:



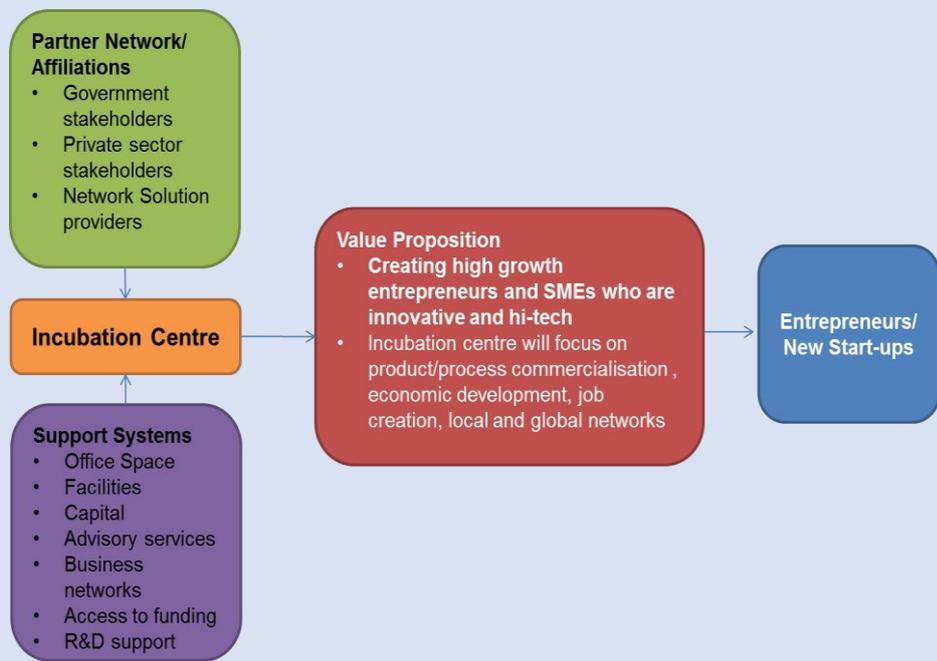
Source: UNIMAS Holdings

Link Projects:	<ul style="list-style-type: none"> ● Agro Park ● Industrial Park ● E-Commerce Market Access 												
Project Rational:	<ul style="list-style-type: none"> ● Similar to the journey of other incubation centres in Malaysia, the proposed incubation centre plays a key role in the development of business start-ups, technology development, R&D, as well as resulting commercialisation of R&D outcome, job creation, and training, among others ● To promote the development and growth of high potential businesses and improve their competitiveness in their processes, products, and services ● To resolve the lack of a favourable environment for start-ups ● To facilitate business network both within Sri Aman Division and outside 												
Impacts/Outcomes:	<ul style="list-style-type: none"> ● Development of locally owned businesses to promote economic areas such as food processing, smart farming, and aquaculture ● Creating products that are ready for exports to the international market ● Establish a working relationship between local entrepreneurs and research and development institutions ● Establish business networks with industries within Malaysia and abroad 												
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Setting up an integrated incubation centre ● Development of infrastructure in the incubation centre includes office space, access to utilities, high-speed infrastructure, basic machinery and tools, video conferencing facilities 												
Estimated Budget:	<table border="1"> <thead> <tr> <th>Incubation centre</th> <th>2021-2026</th> <th>2027-2030</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Area ha</td> <td>0.06</td> <td>0.06</td> <td>0.129</td> </tr> <tr> <td>Area sq. ft</td> <td>6,953</td> <td>6,953</td> <td>13,906</td> </tr> </tbody> </table>	Incubation centre	2021-2026	2027-2030	Total	Area ha	0.06	0.06	0.129	Area sq. ft	6,953	6,953	13,906
Incubation centre	2021-2026	2027-2030	Total										
Area ha	0.06	0.06	0.129										
Area sq. ft	6,953	6,953	13,906										

Action/ Project No: ES 1: Development of Business Incubation Centre

- Activities/ Components:**
- Determine a suitable area for setting up the incubation centre
 - Current state: There are multiple stakeholders in incubation and entrepreneurship activities: (1) SEDC currently operates incubation facilities in the Sri Aman division focused on providing premises and training. (2) SDEC are in the early planning stages to establish a digital innovation hub focused on various incubation services for digital businesses; (3) SMA have plans to establish digital community centres. To enhance accessibility and coordination for the Sri Aman division, it is recommended for SADA to develop a centralised incubation centre to house initiatives from various stakeholders to create an integrated incubation environment and introduce additional incubation services focused on the promoted economic activities.
 - Form a technical committee under SADA to plan the development of the incubation centre
 - Establish one working group to overlook the incubation centre functioning
 - Provide the incubation centre with office space and necessary infrastructure such as roads, utilities, internet video conferencing facilities, R&D facilities at a subsidised rate
 - Promote the incubation centre to potential entrepreneurs, institutes of higher learning, early start-ups
 - Provide mentoring and handholding
 - Training and development in business management
 - Facilitate the development of successful business models in food processing, agriculture, livestock, aquaculture, and tourism to be used as examples to encourage greater local participation

Business Model: The business model canvas for the incubation centre is shown below:



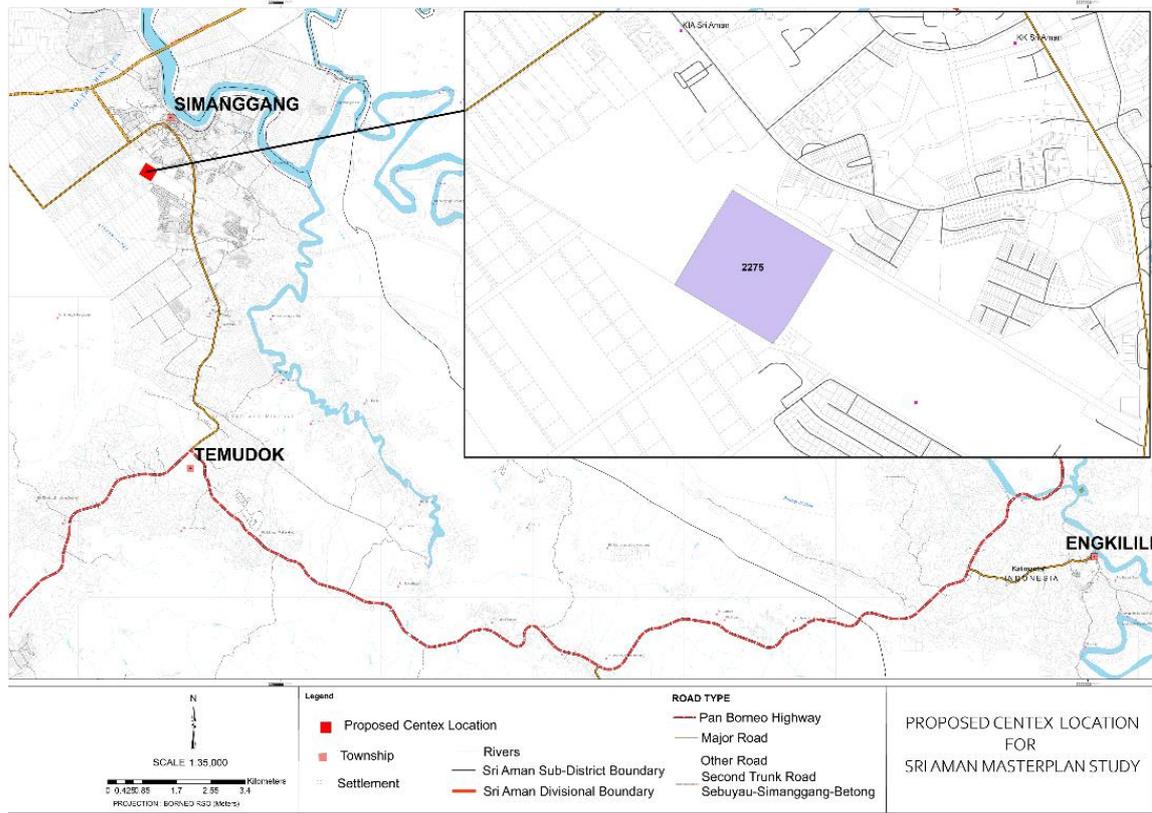
Action/ Project No: ES 1: Development of Business Incubation Centre

Project Time Frame:	2021	2022	2023	2024	2025	2026	2026-2030
	Short Term		Mid Term			Long Term	
	Phase 1			Phase 2			
	<ul style="list-style-type: none"> • Designate location for the incubation centre • Develop infrastructure • Construction of building (incubation centre) 			<ul style="list-style-type: none"> • Promote and attract potential incubators • Screen and select participants • Operation of incubation centre 		<ul style="list-style-type: none"> • Further develop the incubation centre • Identify partners for providing additional services such as advisory service, funding assistance • Full deployment of all the facilities and services 	
Key Success Factors:	<ul style="list-style-type: none"> • The physical location of the incubation centre is very important as this would determine the types and nature of companies/entrepreneurs to attract • Stringent selection criteria to select quality entrepreneurs with high growth potential. • Incentives such as low rentals and long-term lease arrangements • The incubation centre should be well equipped with the necessary infrastructure utilities, internet connectivity, basic R&D facilities for developing local products. • Availability and access to a strong business network • A reliable team that will be involved in the management and act as intermediaries between new ventures and external parties. • Experienced advisory panel 						
Possible Barriers & Threats:	<ul style="list-style-type: none"> • Limited or lower support from the financing community to fund the new ventures. • Slow process of approvals and land matters • Failure to shape the ecosystem, namely business networks, accessible markets, availability of human capital, support system, training, and link up with IHLs for the incubation centre. • Failure for stakeholders to unify their effort to develop one incubator centre 						

2.5.2 Development of Training Centre

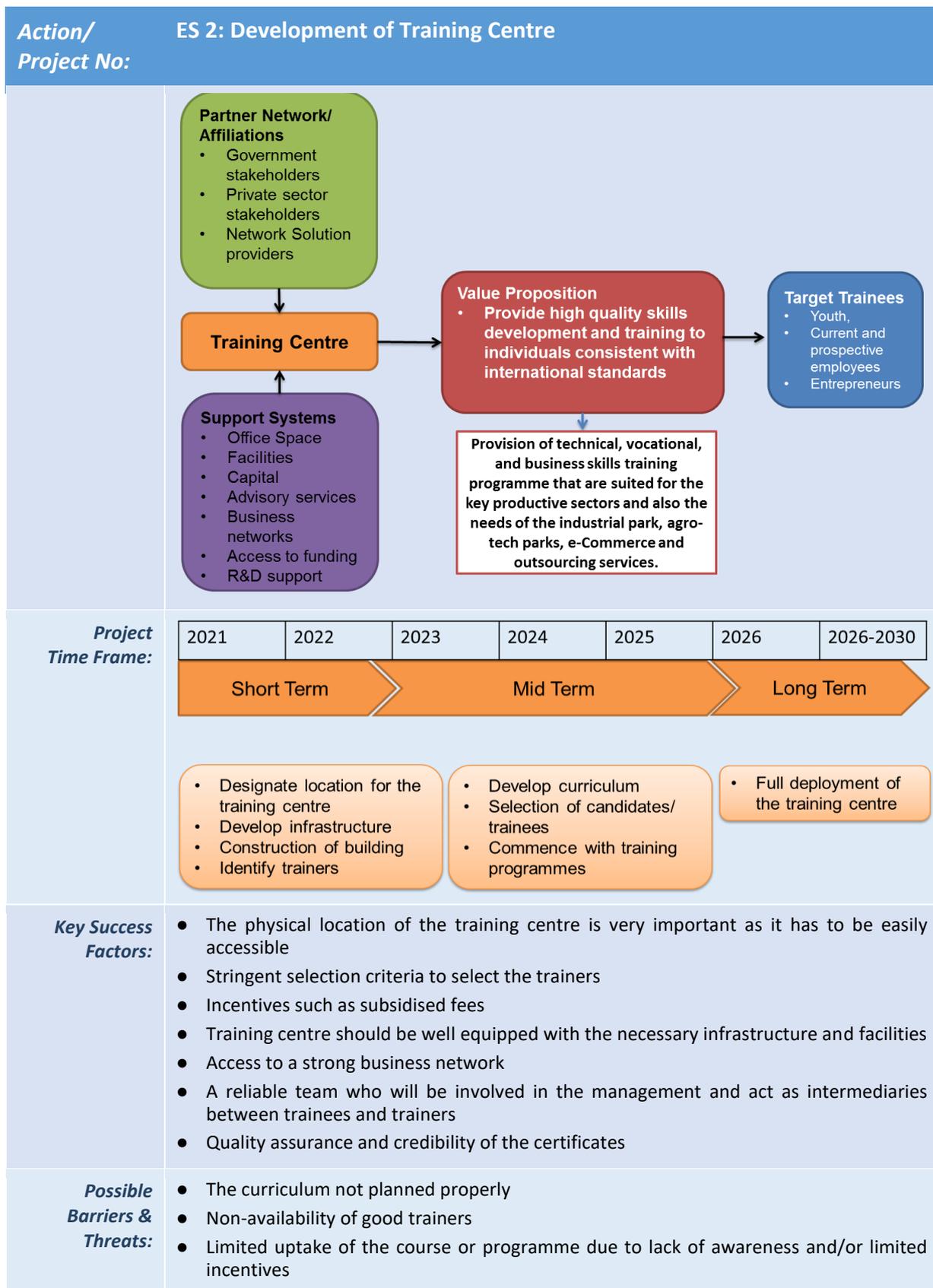
<i>Action/ Project No:</i>	ES 2: Development of Training Centre
Project Description:	<ul style="list-style-type: none"> ● The proposed training centre will facilitate the development of skills required for the productive sectors of the Sri Aman division to move into downstream higher-value activities. This proposed facility focuses on short courses for the existing workforce. ● The training centre will be developed near the incubation centre, about 0.5 to 1 hectare. ● The training centre will cater to the needs of the incubation centre, industrial park, agri-food technology park, e-Commerce, and other productive sectors, namely agriculture, livestock, aquaculture, tourism. ● The training centre will provide technical, vocational, and business skills training programmes. ● The training centre has the following facilities: <ul style="list-style-type: none"> – Classrooms: designed for lecture-style instruction and training. The room to be equipped for audio/visual and online-based instructions. – Conference rooms: designed to encourage roundtable discussions. The room to be equipped for audio/visual and online-based instructions. – Computer training rooms: The room to be equipped with computers and internet access. – Mini labs: designed to provide simulation experiments. – Other supporting facilities include the library, a cafeteria, workstations, WiFi for use outside classroom/ training. ● The training centre will invite participants at a reasonable fee or free of cost depending upon the course. ● The training centre also aims to provide continuous skills development for those already working and new skills development through continuous dialogue with industry players.
Link Projects:	<ul style="list-style-type: none"> ● Incubation Centre ● Agrifood Technology Park ● Industrial Park ● E-Commerce Service Delivery ● GBS Rural Delivery Centre
Project Rational:	<ul style="list-style-type: none"> ● Capacity development through training, skills development, and education make the current and prospective workforce well-trained and more productive ● To resolve the skill gap faced by industry players ● To facilitate sharing of experience and expertise from renowned industry participants
Project Site:	<p>The site location recommendation is to have a single building housing five projects that include (1) Incubation centre; (2) E-commerce market access point; (3) Training and development centre; (4) Outsourcing services delivery centre; and (5) Business matchmaking and networking offices.</p> <p>Having the various projects named above housed under one roof will foster an environment of interaction across the business community, ensure greater ease of access to business services and support more efficient utilisation of common facilities, e.g., meeting spaces, office space.</p> <p>The site would ideally be located in Temudok in proximity to the proposed Agro Park and Industrial Park. However, pre-existing office buildings may be used for this purpose in the city centre if a suitable building is available with a collective gross floor area of 66,642 square feet (0.62 ha).</p> <p>Refer to Section 2.5.1 for Project Location.</p>
Proposed Centex Location	

Action/ Project No: ES 2: Development of Training Centre



Source: UNIMAS Holdings

Impacts/ Outcomes:	<ul style="list-style-type: none"> • Train annually 100 people across various sectors 						
Outputs of Project & KPIs:	<ul style="list-style-type: none"> • Establishment of a training centre • The training centre will offer basic, intermediate, advanced, and professional levels of skills 						
Estimated Budget:	<table border="1"> <thead> <tr> <th>Training centre</th> <th>2021-2023</th> </tr> </thead> <tbody> <tr> <td>Area ha</td> <td>0.077</td> </tr> <tr> <td>Area sq ft</td> <td>8,300</td> </tr> </tbody> </table>	Training centre	2021-2023	Area ha	0.077	Area sq ft	8,300
Training centre	2021-2023						
Area ha	0.077						
Area sq ft	8,300						
Activities/ Components:	<ul style="list-style-type: none"> • Determine suitable areas for the development of the training centre, ideally near the incubation centre • Form a technical committee under SADA to plan the development of the training centre • Establish the training centre with the necessary infrastructure such as classrooms, conferencing rooms, utilities, internet and drainage, R&D facility, mini labs, IT infrastructure, to name a few • Proper planning of courses and curriculum to ensure it is relevant and effective • Promote the training centres among industry associations, entrepreneurs, IHLs • Provision of technical, vocational, and business skills training programme that is suited for the key productive sectors of Sri Aman • A continuous dialogue with members of the industry representing all productive and economic sectors 						
Business Model:	<p>The business model canvas for the training centre is shown below:</p>						



2.5.3 Small Traders E-Commerce Market Access Point (Public-Private Partnership)

<i>Action/ Project No:</i>	ES 4: Small traders e-Commerce market access point (Public-Private Partnership)
<i>Project Description:</i>	<ul style="list-style-type: none"> ● Establish a one-stop physical centre for the delivery of e-Commerce related services. The platform will act as a one-stop location for the purchase and sale of products ● The location will serve as the distribution hub for the Sri Aman Division, a centre for e-Commerce fulfilment and support services to assist local traders in establishing the online store platform ● The e-Commerce market access point will predominantly cater to the tenants of the industrial park and local entrepreneurs. The aim of the market access point is to assist local businesses in getting more direct access to end consumers and therefore increasing their income levels ● Physical facility to be established in the proposed incubation centre ● The registration fees, transaction fees, and subscription fees will be subsidised to make it attractive for the MSMEs to use the platform ● The e-Commerce access points will have the following facilities: <ul style="list-style-type: none"> – e-commerce service network – Access to a bonded warehouse – Access to last-mile logistics
<i>Project Site:</i>	<p>The site location recommendation is to have a single building housing five projects that include (1) Incubation centre; (2) E-commerce market access point; (3) Training and development centre; (4) Outsourcing services delivery centre; and (5) Business matchmaking and networking offices.</p> <p>Having the various projects named above housed under one roof will foster an environment of interaction across the business community, ensure greater ease of access to business services and support more efficient utilisation of common facilities, e.g., meeting spaces, office space.</p> <p>The site would ideally be located in Temudok in proximity to the proposed Agro Park and Industrial Park. However, pre-existing office buildings may be used for this purpose in the city centre if a suitable building is available with a collective gross floor area of 66,642 square feet (0.62 ha).</p> <p>Refer to Section 2.5.1 for Project Location.</p>
<i>Link Projects:</i>	<ul style="list-style-type: none"> ● Incubation Centre ● Agri Technology Park ● Industrial Park
<i>Project Rational:</i>	<ul style="list-style-type: none"> ● Open up opportunities for businesses to extend their market reach beyond Sri Aman and become more competitive ● Increase MSMEs opportunities for growth and scaling their capacities and potentially their capabilities ● Increase the exports of some high-value agriculture products
<i>Impacts/ Outcomes:</i>	<ul style="list-style-type: none"> ● Percentage of business revenue through e-Commerce 3% in 2023 and increase to 5% by 2026
<i>Outputs of Project & KPIs:</i>	<ul style="list-style-type: none"> ● Development of e-Commerce market access point in the proposed incubator centre building ● Total area of 0.045 ha ● Increase adoption in the MSME segment by increasing coverage and introducing a competitive price package ● Development of all the infrastructure required such as internet, digital infrastructure

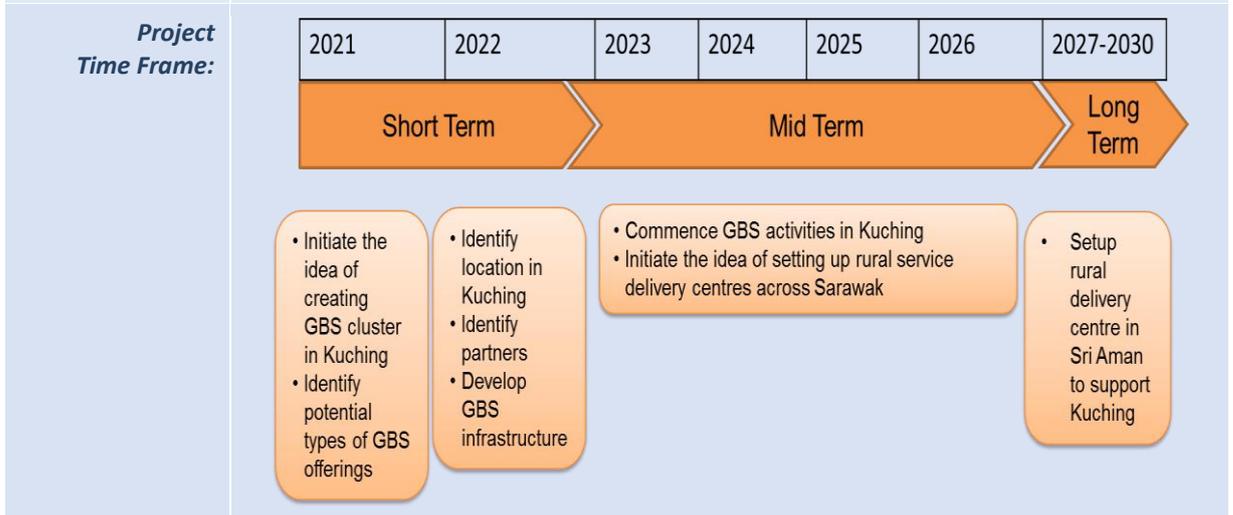
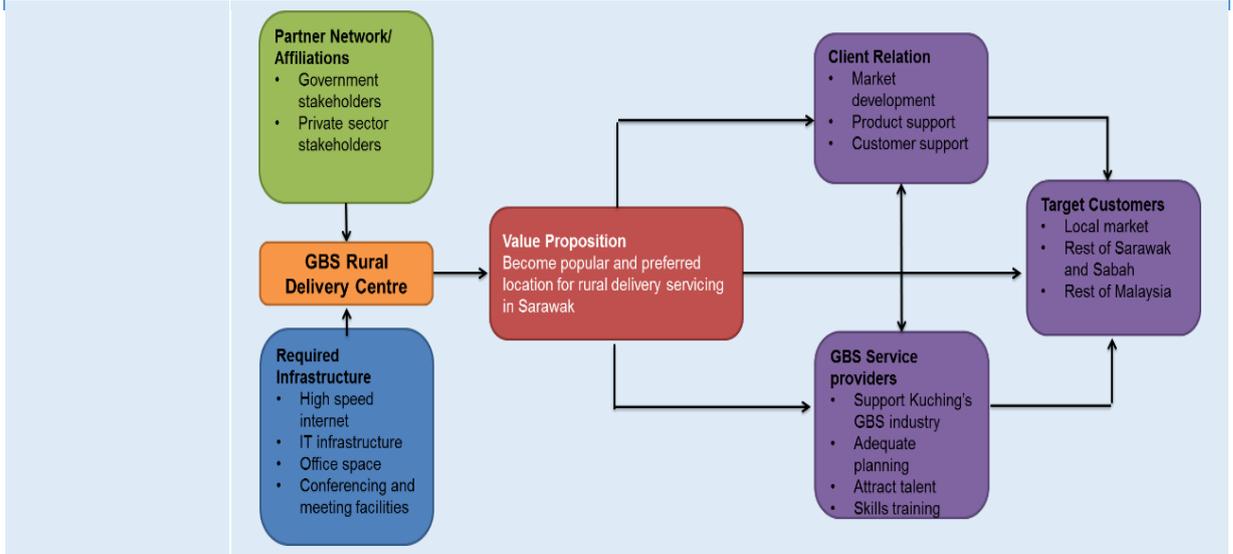
Action/ Project No:		ES 4: Small traders e-Commerce market access point (Public-Private Partnership)																						
Estimated Budget:	Ecommerce		2021-2023																					
	Area ha		0.046																					
	Area sq ft		5,000																					
Activities/ Components:	<ul style="list-style-type: none"> Form a technical committee under SADA as key stakeholders to plan the roll-out of e-Commerce market access point Learning from Alibaba’s rural Taobao programme, which aimed to increase e-Commerce adoption in China’s rural areas, the development of e-Commerce in Sri Aman would require a public-private partnership The e-Commerce market access point to be housed in the same building as the incubator centre while the warehouse and cold storage facilities necessary infrastructure will be set up in the industrial park at Temudok Establishing logistics infrastructure (proposed to be set up within the industrial park) can ensure fast and reliable delivery. Close coordination with Pos Laju is required, who can play a vital role in the last-mile delivery of products Setup digital infrastructure and improve high-speed internet connection Educate the MSMEs regarding the importance of e-Commerce to their business and provide e-Commerce related skills training to enable them to use the internet, buy-sell online, and use online payment through SDEC’s initiatives Appoint community leaders that would link rural production centres to the e-Commerce market access points 																							
Business Model:	<p>The business model canvas for the e-Commerce market access point is shown below:</p>																							
Project Time Frame:	<table border="1"> <thead> <tr> <th>2021</th> <th>2022</th> <th>2023</th> <th>2024</th> <th>2025</th> <th>2026</th> <th>2026-2030</th> </tr> </thead> <tbody> <tr> <td colspan="2">Short Term</td> <td colspan="3">Mid Term</td> <td colspan="2">Long Term</td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> Designate location for the e-Commerce market access point Identify private sector lead Develop infrastructure Construction of building, warehouse and cold storage Devise aggressive sales plan with effective incentive and sales training Identify trainers </td> <td colspan="3"> <ul style="list-style-type: none"> Commence operations Formulate effective marketing programs in television, newspaper, online portal, SMSs to reach customers </td> <td colspan="2"> <ul style="list-style-type: none"> Continue developing e-commerce and rich content leveraging local content and activities International scalability </td> </tr> </tbody> </table>			2021	2022	2023	2024	2025	2026	2026-2030	Short Term		Mid Term			Long Term		<ul style="list-style-type: none"> Designate location for the e-Commerce market access point Identify private sector lead Develop infrastructure Construction of building, warehouse and cold storage Devise aggressive sales plan with effective incentive and sales training Identify trainers 		<ul style="list-style-type: none"> Commence operations Formulate effective marketing programs in television, newspaper, online portal, SMSs to reach customers 			<ul style="list-style-type: none"> Continue developing e-commerce and rich content leveraging local content and activities International scalability 	
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Action/ Project No:	ES 4: Small traders e-Commerce market access point (Public-Private Partnership)											
Key Success Factors:	<ul style="list-style-type: none"> ● The e-Commerce market access point should be user-friendly and easily accessible even via lower speed internet ● Technology should be interoperable and be able to scale up in the future ● The platform should be properly integrated with a secure online payment system ● Customer service should be made available 24/7 all year round so that no customer query is left unattended, customer satisfaction being an ultimate priority 											
Possible Barriers & Threats:	<ul style="list-style-type: none"> ● Not receiving timely support from all the stakeholders could derail the uptake of the e-Commerce market access point due to its isolated approach ● More than expected time is taken to educate and prepare the MSMEs to use e-Commerce to sell their products 											
Roles & Responsibilities:	<ul style="list-style-type: none"> ● The e-Commerce market access point will be under the jurisdiction of the project promoter, i.e., SADA. To ensure the smooth implementation of the e-Commerce market access point, e-Commerce service provider, solution providers, infrastructure providers, industry associations and other stakeholders will work closely together <table border="1"> <thead> <tr> <th>Agencies</th> <th>Role & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>SADA</td> <td> <ul style="list-style-type: none"> ● Planning, design, and approval of plans for development ● Identify private sector companies </td> </tr> <tr> <td>SDEC</td> <td> <ul style="list-style-type: none"> ● Training and supporting MSMEs under Digital Innovation Hub programme </td> </tr> <tr> <td>Private sector stakeholders</td> <td> <ul style="list-style-type: none"> ● e-Commerce service provider ● Solution Providers for technical implementation and security ● Logistics service provider ● High-speed internet service provider ● e-Commerce training ● Financial service providers </td> </tr> <tr> <td>IHL/ Universities</td> <td> <ul style="list-style-type: none"> ● Advisory services and training provider </td> </tr> </tbody> </table>		Agencies	Role & Responsibilities	SADA	<ul style="list-style-type: none"> ● Planning, design, and approval of plans for development ● Identify private sector companies 	SDEC	<ul style="list-style-type: none"> ● Training and supporting MSMEs under Digital Innovation Hub programme 	Private sector stakeholders	<ul style="list-style-type: none"> ● e-Commerce service provider ● Solution Providers for technical implementation and security ● Logistics service provider ● High-speed internet service provider ● e-Commerce training ● Financial service providers 	IHL/ Universities	<ul style="list-style-type: none"> ● Advisory services and training provider
Agencies	Role & Responsibilities											
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IHL/ Universities	<ul style="list-style-type: none"> ● Advisory services and training provider 											

2.5.4 Establish An Outsourced Business Services Sector In Sarawak With First Rural Delivery Centre In Sri Aman

Action/ Project No:	ES 5: Establish an Outsourced Business Services Sector in Sarawak With First Rural Delivery Centre In Sri Aman			
Project Description:	<ul style="list-style-type: none"> Establish a Global Business Services cluster in Kuching where the longer-term plan includes creating rural delivery centres in Sarawak's divisions Leveraging on the currently available multilingual working-age population, Sri Aman to be positioned as the first rural services delivery centre Sri Aman division's focus will be on catering to less critical services for Sarawak and as a supporting centre to the main outsource business services cluster in Kuching 			
Project Site:	<p>The site location recommendation is to have a single building housing five projects that include (1) Incubation centre; (2) E-commerce market access point; (3) Training and development centre; (4) Outsourcing services delivery centre; and (5) Business matchmaking and networking offices.</p> <p>Having the various projects named above housed under one roof will foster an environment of interaction across the business community, ensure greater ease of access to business services and support more efficient utilisation of common facilities, e.g., meeting spaces, office space.</p> <p>The site would ideally be located in Temudok in proximity to the proposed Agro Park and Industrial Park. However, pre-existing office buildings may be used for this purpose in the city centre if a suitable building is available with a collective gross floor area of 66,642 square feet (0.62 ha).</p> <p>Refer to Section 2.5.1 for Project Location.</p>			
Link Projects:	<ul style="list-style-type: none"> Incubation Centre Training Centre 			
Project Rational:	<ul style="list-style-type: none"> Create employment opportunities and contribute to economic growth Potential to bring direct investments Create opportunities for businesses to extend their market reach beyond Sri Aman and become more competitive 			
Impacts/ Outcomes:	<ul style="list-style-type: none"> Employment generation: 531 direct jobs by 2030 			
Outputs of Project & KPIs:	<ul style="list-style-type: none"> Development of rural delivery centre to support GBS business in Kuching Dedicate and develop one floor in the incubation centre for GBS rural delivery centre Development of all the infrastructure required such as internet, digital infrastructure Provide training to youth who are desire to join the GBS industry 			
Estimated Budget:	Outsourcing	2024-2026	2027-2030	Total
	Area ha	0.07	0.27	0.34
	Area sq. ft	7,696	28,740	36,436
Activities/ Components:	<ul style="list-style-type: none"> Form a technical committee under SADA as key stakeholders to plan the roll out GBS rural service delivery centre Set up the GBS rural delivery centre under the same building as the proposed incubator centre with office space and necessary infrastructure Setup digital infrastructure and improve high-speed internet connection Educate the youth and those who are currently not working about the potential employment benefits 			
Business Model:	The business model for the Outsourcing Business Services is shown below:			

Action/ Project No: ES 5: Establish an Outsourced Business Services Sector in Sarawak With First Rural Delivery Centre In Sri Aman



Key Success Factors:

- IT infrastructure development and availability and access to high-speed internet is crucial for the GBS industry
- Site location is important, which considers the availability of the skill base
- Participation of qualified and full-time investors
- Qualified sales and marketing team to attract outsourcing business clients

Possible Barriers & Threats:

- Delay in establishing the GBS facilities in Kuching
- Slow process of approvals
- Lack of attractive incentives to invite potential business operators

Roles & Responsibilities:

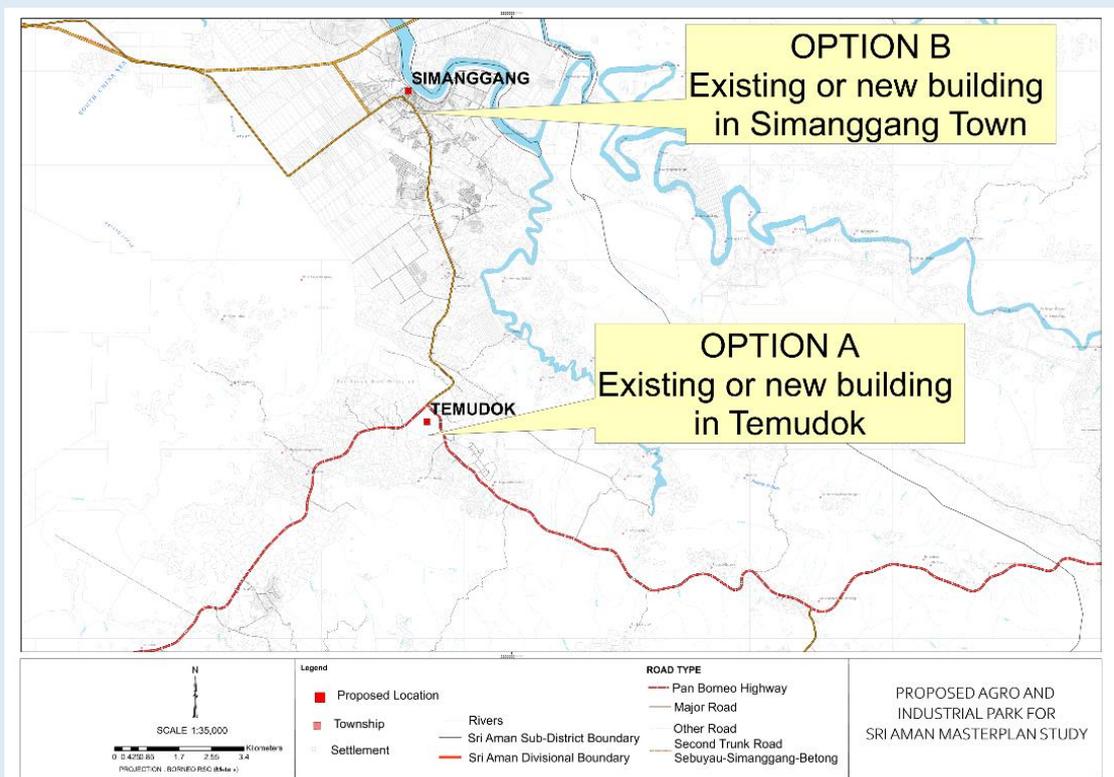
- The GBS rural delivery centre will be under the jurisdiction of the project promoter, i.e., SADA. To ensure the smooth implementation of the centre, solution providers, infrastructure providers, industry associations, and other stakeholders will work closely together

Agencies	Role & Responsibilities
SADA	<ul style="list-style-type: none"> Planning, design and approval of plans for development Identify private sector companies
Government stakeholders like MDEC, SDEC	<ul style="list-style-type: none"> Planning, promotion, and assist to identify companies

Action/ Project No:	ES 5: Establish an Outsourced Business Services Sector in Sarawak With First Rural Delivery Centre In Sri Aman	
	Private sector stakeholders	<ul style="list-style-type: none"> ● Solution Providers for technical implementation and security ● High-speed internet service provider ● Training providers ● Financial service providers
	IHL/ Universities	<ul style="list-style-type: none"> ● Advisory services and training provider

2.5.5 Facilitate Business Matchmaking and Promotion Of Opportunities In Sri Aman

Action/ Project No:	ES 6: Facilitate Business Matchmaking and Promotion of Opportunities in Sri Aman
Project Description:	<ul style="list-style-type: none"> • Hosting of business forums and promotion of the Sri Aman Division's business opportunities to prospective investors within Malaysia as well outside Malaysia to create greater awareness and enhance the Sri Aman Division's brand name • Utilise overseas assets such as STATOS and other promotional platforms available through federal agencies • Promote commercially viable projects with community participation • Encourage companies from Sri Aman to participate in trade shows and events organised at the National level by offering incentives • Encourage companies to become members of associations/chambers of commerce to better reach out to businesses in their efforts to help the industry grow in trade and investment • Facilitate business matchmaking through dedicated events by inviting large companies to Sri Aman to identify suitable business partners from Sri Aman
Project Site:	<p>The site location recommendation is to have a single building housing five projects that include (1) Incubation centre; (2) E-commerce market access point; (3) Training and development centre; (4) Outsourcing services delivery centre; and (5) Business matchmaking and networking offices.</p> <p>Having the various projects named above housed under one roof will foster an environment of interaction across the business community, ensure greater ease of access to business services and support more efficient utilisation of common facilities, e.g., meeting spaces, office space.</p> <p>The site would ideally be located in Temudok in proximity to the proposed Agro Park and Industrial Park. However, pre-existing office buildings may be used for this purpose in the city centre if a suitable building is available with a collective gross floor area of 66,642 square feet (0.62 ha).</p>



Source: UNIMAS Holdings

Action/ Project No: ES 6: Facilitate Business Matchmaking and Promotion of Opportunities in Sri Aman										
Link Projects:	<ul style="list-style-type: none"> All the projects 									
Project Rational:	<ul style="list-style-type: none"> To attract investments into the Sri Aman Division to drive commercially viable developments. To create business opportunities outside of the Sri Aman Division for local companies 									
Impacts/ Outcomes:	<ul style="list-style-type: none"> Attract large 5 investors into Sri Aman 									
Outputs of Project & KPIs:	<ul style="list-style-type: none"> Establish business network outside of the Sri Aman Division Attract potential investors 									
Estimated Budget:	<table border="1"> <thead> <tr> <th colspan="2">Business networking</th> <th>2021-2023</th> </tr> </thead> <tbody> <tr> <td>Area ha</td> <td></td> <td>0.028</td> </tr> <tr> <td>Area sq. ft</td> <td></td> <td>3,000</td> </tr> </tbody> </table>	Business networking		2021-2023	Area ha		0.028	Area sq. ft		3,000
Business networking		2021-2023								
Area ha		0.028								
Area sq. ft		3,000								
Activities/ Components:	<ul style="list-style-type: none"> Establish a working relationship with key business associations located in Sarawak to jointly promote and attract investments into the Sri Aman Division To utilise overseas assets such as STATOS and other promotional platforms available through federal agencies Promote commercially viable projects with community participation 									
Business Model:	<p>The business model for the business promotion and matchmaking is shown below:</p> <pre> graph TD A[Partner Network/Affiliations • Government stakeholders • Private sector stakeholders] --> B[Business opportunities Promotion] C[Required Infrastructure • High speed internet • IT infrastructure • Office space • Conferencing and meeting facilities] --> B B --> D[Value Proposition To make Sri Aman an attractive destination for investments within Sarawak] D --> E[Client Relation • Market development • Product support • Customer support] D --> F[Target Investors • Rest of Sarawak and Sabah • Rest of Malaysia • Foreign investors] E --> F </pre>									

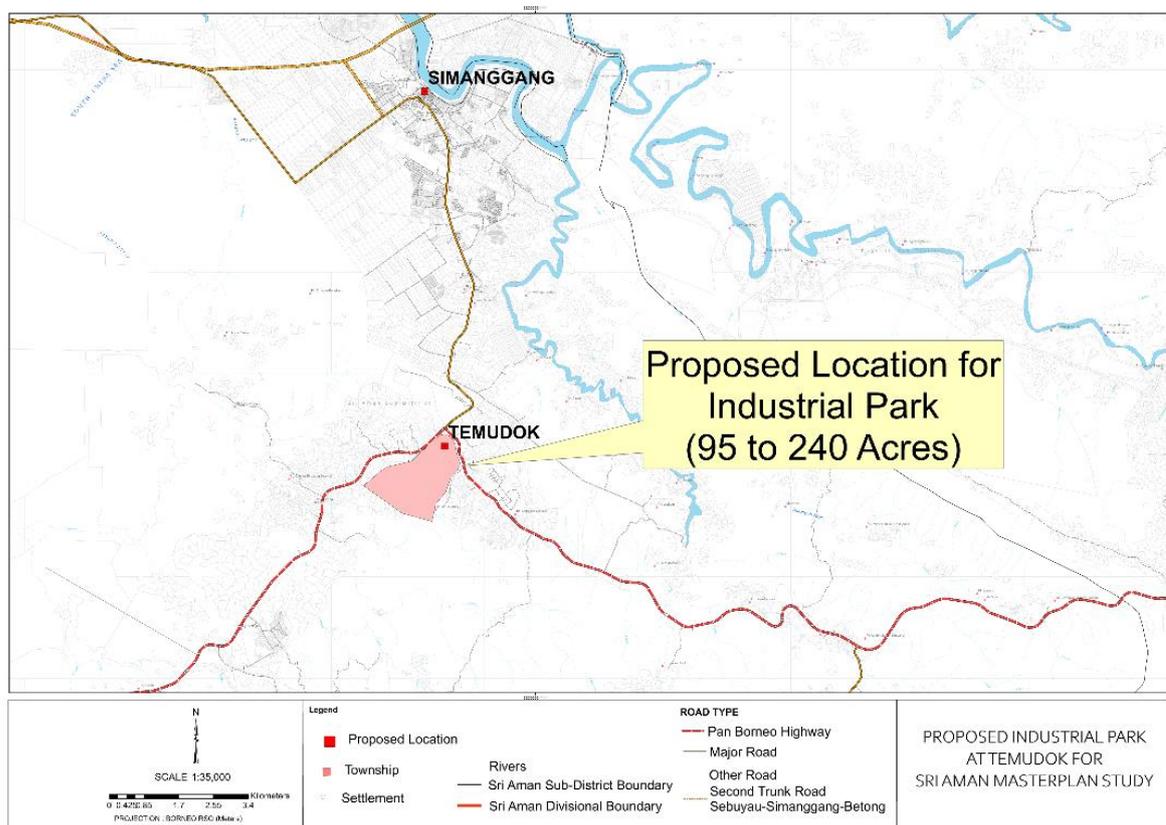
Action/ Project No:		ES 6: Facilitate Business Matchmaking and Promotion of Opportunities in Sri Aman														
Project Time Frame:		2021	2022	2023	2024	2025	2026	2027-2030								
		Short Term		Mid Term			Long Term									
		<ul style="list-style-type: none"> Set up office in Sri Aman Invite stakeholders to plan business promotion events Establish business network with support from stakeholders 		<ul style="list-style-type: none"> Organise events to showcase Sri Aman's business opportunities 		<ul style="list-style-type: none"> Attract investments Facilitate business match making between local companies and large companies outside Sri Aman 		<ul style="list-style-type: none"> Strengthen the ongoing activities 								
Key Success Factors:		<ul style="list-style-type: none"> Access to a strong business network Reliable team with knowledge of trade and investment, foreign language, management principles, proper business language, and a host of other soft skills Incentives to attract companies to visit Sri Aman and also local companies to showcases their products outside Sri Aman 														
Possible Barriers & Threats		<ul style="list-style-type: none"> Delay in finalising and implementation of projects planned in Sri Aman Lack of attractive incentives 														
Roles & Responsibilities:		<ul style="list-style-type: none"> The facilitation, promotion and business matching will be under the jurisdiction of the project promoter, i.e., SADA. To ensure the smooth implementation of the facilitation, promotion, and business matching, all the government agencies, industry associations, and chambers of commerce will work closely together. <table border="1"> <thead> <tr> <th>Agencies</th> <th>Role & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>SADA</td> <td> <ul style="list-style-type: none"> Enhance visibility of Sri Aman's business opportunities. Organise trade shows, business matching events in Sri Aman. Incentivise companies to attend trade shows outside Sri Aman. </td> </tr> <tr> <td>Government stakeholders</td> <td> <ul style="list-style-type: none"> Advisory services </td> </tr> <tr> <td>Private sector stakeholders</td> <td> <ul style="list-style-type: none"> Advisory services and support SADA to enhance the visibility of Sri Aman's business opportunities. Assist in building a business network </td> </tr> </tbody> </table>							Agencies	Role & Responsibilities	SADA	<ul style="list-style-type: none"> Enhance visibility of Sri Aman's business opportunities. Organise trade shows, business matching events in Sri Aman. Incentivise companies to attend trade shows outside Sri Aman. 	Government stakeholders	<ul style="list-style-type: none"> Advisory services 	Private sector stakeholders	<ul style="list-style-type: none"> Advisory services and support SADA to enhance the visibility of Sri Aman's business opportunities. Assist in building a business network
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Private sector stakeholders	<ul style="list-style-type: none"> Advisory services and support SADA to enhance the visibility of Sri Aman's business opportunities. Assist in building a business network 															

SECTION 2.6 INDUSTRIAL PARK

2.6.1 Establishment of An Industrial Park for Micro, Small, Medium Business with A Primary Focus on Food Processing and Logistics

Action/ Project No:	ES 3: Establishment of An Industrial Park for Micro, Small, Medium Business with A Primary Focus on Food Processing and Logistics
<p><i>Project Description:</i></p>	<p>Industrial parks are critical for the development of small and medium-sized businesses in Sri Aman. In order to deliver employment and economic growth, governments, private developers, and industrial companies must establish long-term, profitable conditions for industrial development</p> <p>An industrial park covering approximately 200 hectares will be established in Temudok. The proposed park will primarily focus on food processing and packaging, providing and servicing agricultural machinery, and recycling of waste arising from the food processing. In the long run the park will focus on other light manufacturing activities.</p> <p>Potential industries that can be established in the Industrial Park include:</p> <ul style="list-style-type: none"> ▪ Oil Palm refinery – Under the SAMP projects approximately 16,700 Hectares of new or replaced planting of oil palm will be established. The production from these areas will require a new oil palm mill to be established. Since the land areas identified for the oil palm are smaller parcels scattered across the Engkilili and Lubok Antu subdistricts, it makes sense to provide a centralized location, and Temudok is well suited for this. ▪ SAMP is proposing about 10,000 hectares of coconut plantation development. Downstream processing of a range of coconut products can be undertaken at the Temudok Industrial Park. ▪ There is potential for the establishment of a fertilizer production factory to provide for the agricultural developments in the region. ▪ Nursery facilities can be established for coconut, banana, durian, coffee, rambutan, and various other crops being established in the Division ▪ Facilities for selling and servicing of agricultural machinery ▪ Facilities for selling and servicing of farm transport vehicles ▪ The industrial park aims to provide an avenue for MSMEs involved in food processing and light manufacturing to set up and scale up their businesses by focusing on ease of doing business. <ul style="list-style-type: none"> ● The Park will have zones dedicated to different types of industrial and non-industrial activities. For example, all units producing wet solid wastes will be zoned together so that waste treatment can be done in a single plant. Similarly, those which produce dry solid wastes will be zoned together so that the wastes can be pelletised or used for converting into fertiliser. ● The Park will invite private enterprises to establish processing and manufacturing units in demarcated plots at a reasonable fee. ● The Park is proposed to be built and operated on a competitive commercial basis. ● The Park will be provided with physical infrastructure consisting of basic flattened factory spaces for the private sector to establish their required facilities (warehouses and cold storage, quality control laboratories, packing and grading facilities). The sites will be provided with the required utilities such as electricity and water.

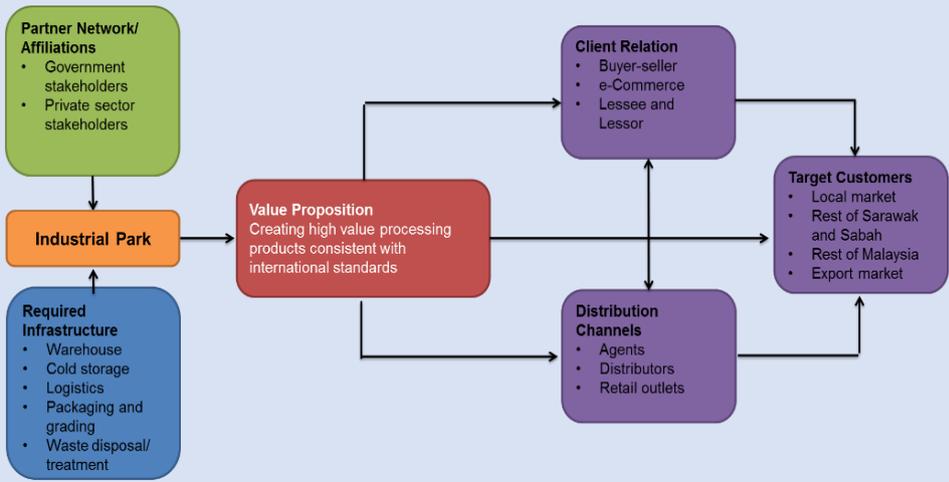
Action/ Project No:	ES 3: Establishment of An Industrial Park for Micro, Small, Medium Business with A Primary Focus on Food Processing and Logistics
	<ul style="list-style-type: none"> Park to potentially house privately driven initiatives in palm oil processing, downstream processing activities such as fertiliser production, coconut processing, and maintenance services.
Project Site:	<ul style="list-style-type: none"> It is proposed that 200 Hectares be earmarked for the industrial park development including a reserve for future industrial activities. The Park will be constructed in stages depending on demand. The remainder of the land will be developed depending upon the uptake of the plots



SMEs Industrial Park

Source: UNIMAS Holdings

Link Projects:	<ul style="list-style-type: none"> Incubation Centre Agrifood Technology Park E-Commerce Service Delivery Training Centre
Project Rationale:	<ul style="list-style-type: none"> Currently, there are inadequate facilities for handling, packing, processing and the preservation of fruits, vegetables, and other harvests that cause substantial losses to the producers. However, with agro-food processing, to a large extent, the shelf life of the product can be improved, the product can be made ready to be consumed, reduce unwanted weight, remove soil, unwanted fibre, among other advantages Substantial industries will be required to support the proposed expansion in agriculture in the Division Increase the exports of agriculture products through value add To generate additional employment and increase income
Impacts/ Outcomes:	<ul style="list-style-type: none"> Create at least 200 jobs Increase Sri Aman community participation in agriculture and aquaculture downstream economic activities
Outputs of Project & KPIs:	<ul style="list-style-type: none"> Development of industrial park. Total area of approximately 200 ha, including allowance for future development

Action/ Project No:		ES 3: Establishment of An Industrial Park for Micro, Small, Medium Business with A Primary Focus on Food Processing and Logistics																									
		<ul style="list-style-type: none"> To attract at least 50 tenants Development of infrastructure required in the parks 																									
Estimated Budget:	Industrial park	2021-2023	2024-2026	2027-2030	Total																						
	Area acres	10 acres	40 acres	45 acres	95 acres																						
	Area sq. ft	435,594	1,742,396	1,960,203	4,138,192																						
Activities/ Components:	<ul style="list-style-type: none"> Determine suitable areas for the Industrial Park, ideally near the proposed agro-tech area in Temudok Form a technical committee under SADA to plan the development of the park Design the Park with emphasis on sustainable development and an aesthetically pleasing environment Provide the Park with the necessary infrastructure such as storage, testing facilities, packaging and grading facilities, roads, water, electrical supply, internet, and drainage Divide the Park into various zones like industries zone, amenities zone, logistics zone, green zones Demarcate the Park into parcels of land Identify anchor companies Promote the Park to potential tenants Facilitate linkages with e-Commerce market access points 																										
Business Model:	<p>The business model canvas for the training centre is shown below:</p> 																										
Project Time Frame:	<table border="1"> <thead> <tr> <th>2021</th> <th>2022</th> <th>2023</th> <th>2024</th> <th>2025</th> <th>2026</th> <th>2026-2030</th> </tr> </thead> <tbody> <tr> <td colspan="3">Short Term</td> <td colspan="3">Mid Term</td> <td>Long Term</td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> Gazette the park Attract investors and anchor companies Selection of participants </td> <td colspan="2"> <ul style="list-style-type: none"> Develop infrastructure Construction of facilities Construction of building (office space, settlements) </td> <td colspan="2"> <ul style="list-style-type: none"> Commence operation of the industrial park Expand tenant base Further develop the park </td> <td> <ul style="list-style-type: none"> Focus on future sustainability and development of the park </td> </tr> </tbody> </table>						2021	2022	2023	2024	2025	2026	2026-2030	Short Term			Mid Term			Long Term	<ul style="list-style-type: none"> Gazette the park Attract investors and anchor companies Selection of participants 		<ul style="list-style-type: none"> Develop infrastructure Construction of facilities Construction of building (office space, settlements) 		<ul style="list-style-type: none"> Commence operation of the industrial park Expand tenant base Further develop the park 		<ul style="list-style-type: none"> Focus on future sustainability and development of the park
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Key Success Factors:	<ul style="list-style-type: none"> Park should be well equipped with necessary quality basic infrastructure utilities such as electricity, water, roads, and drainage Access to raw materials required for the processing companies Incentives such as low rentals and long-term lease arrangements 																										

Action/ Project No:	ES 3: Establishment of An Industrial Park for Micro, Small, Medium Business with A Primary Focus on Food Processing and Logistics											
	<ul style="list-style-type: none"> ● Access to favourable loans as most of the raw materials are seasonal and highly perishable requiring timely working capital ● Qualified Park management and operator who can not only maintain the park in proper order but also can attract tenants 											
Possible Barriers & Threats:	<ul style="list-style-type: none"> ● Insufficient volume of crop and/or crop varieties available for processing ● Procedural hindrances and delays ● Difficulties in attracting tenants due to lack of attractive incentives. ● Improper zoning planning ● Improper planning of storage facilities 											
Roles & Responsibilities:	<ul style="list-style-type: none"> ● The industrial park will be under the jurisdiction of the project promoter, i.e., SADA. To ensure the smooth implementation of the industry park, government stakeholders and private sector stakeholders will work closely together. <table border="1"> <thead> <tr> <th>Agencies</th> <th>Role & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>SADA</td> <td> <ul style="list-style-type: none"> ● Planning, design and approval of plans for development ● Identify potential park operators ● Provide funds for physical infrastructure consisting of buildings, storage, testing facility, packing, and grading facility, logistics infrastructure, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water ● Monitoring and evaluation of the project </td> </tr> <tr> <td>Government stakeholders (SEDC, DOA, FAMA, DVS, SME Corp)</td> <td>Advisory services and Certification program</td> </tr> <tr> <td>Private sector stakeholders</td> <td>Advisory services and participation in Park</td> </tr> <tr> <td>IHL/ Universities</td> <td>Advisory services and training</td> </tr> </tbody> </table>		Agencies	Role & Responsibilities	SADA	<ul style="list-style-type: none"> ● Planning, design and approval of plans for development ● Identify potential park operators ● Provide funds for physical infrastructure consisting of buildings, storage, testing facility, packing, and grading facility, logistics infrastructure, access roads, irrigation and drainage system, and the required utilities such as electricity, Internet, and water ● Monitoring and evaluation of the project 	Government stakeholders (SEDC, DOA, FAMA, DVS, SME Corp)	Advisory services and Certification program	Private sector stakeholders	Advisory services and participation in Park	IHL/ Universities	Advisory services and training
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SECTION 2.7 TRANSPORTATION

The key objective of the transportation strategy is to enhance the connectivity between communities, making access to services, facilities, and community infrastructure available to all.

The proposals are for new jetties, public bus services, and water taxi service.

It is also proposed to introduce commuter friendly transport alternatives to Simanggang town.

The proposed projects are:

- TR-1:** Proposed New Jetties on Batang Seterap, at Banting, Pantu and Engkeranji.
- TR-2 Public Transport Network (Bus)**
 - TR-2a** Simanggang – Lingga – Pantu – Lachau – Simanggang,
 - TR-2b** Engkilili – Lubok Antu – Batang Ai – Engkilili
 - TR-2c** Simanggang – Temudok – Engkilili – Temudok - Simanggang
- TR-3** Public Transport Water Taxi service at Batang Ai
- TR-4:** Proposed New Jetties at Batang Ai
- TR-5:** Proposed pedestrian network, cycle track and installation of smart centre to monitor the city using AI technology in Sri Aman.

2.7.1 TR-1: Proposed New Jetties on Batang Seterap, at Banting, Pantu & Engkeranji.

Strategic Focus Area:	Jetties
Action/Project No:	TR-1: Proposed New Jetties on Batang Seterap, at Banting, Pantu and Engkeranji.
Project Description:	Construct new jetties at 3 locations on Batang Seterap. Jetties will facilitate access for local communities, visitors and tourists. They will complement proposed tourism and agricultural projects proposed in the local area.
Link Projects:	<ul style="list-style-type: none"> RO-2, RO-3, RO-8, RO-9, S-1-1
Project Rational:	<ul style="list-style-type: none"> Improve connectivity and socio-economic activities of its surrounding area. Provide riverine access to tourism assets Enhance wellbeing of local communities
Impacts/Outcomes:	<ul style="list-style-type: none"> Increased tourism Enhanced wellbeing of local communities
Project Site:	



Source: Google Earth and Daya Rancang analysis

Strategic Focus Jetties

Area:



Source: Google Earth and Daya Rancang analysis



Location of the proposed Jetties on Batang Seterap

Source: Google Earth and Daya Rancang analysis

Estimated Budget:	Budget for New Jetties – RM 5 million each Total = RM15 million
Activities/Components:	<ul style="list-style-type: none"> • Immediate commissioning of a feasibility study and a design proposal • Implementation in conjunction with RO-10, Upgrade of Ulu Skrang Road
Investors:	Public Sector: 100 % RM 15 million

Strategic Focus Area:		Jetties	
Project Time Frame:	Medium and Long-term		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	JKR		Site Assessment Engage contractor for upgrading works Operation and maintenance
	SADA		Monitor procedure and management

2.7.2 TR-2: Proposed Public Transportation Systems

Public Transport Re-shaping

The findings of the survey carried out in year 2020 indicate low utilisation of land-based public transport.

The highest demands for land-based public transport were recorded in Sri Aman with 5.0% for Home-Based-Work trip and 11.6% for Home-Based-School trip. These figures are even lower in smaller towns. Based on the short trip length distribution of work and school trips, it can be safely concluded that re-shaping of public transport is desirable in order to achieve higher modal switch.

It is clear that public transport is not commonly utilized. It is perceived that the infrequent service and low reliability are major factors contributing to this. However, the level of service is also driven by the low patronage, creating a self-perpetuating system where public transport is unable to develop.

To break this cycle, we suggest that arrangements be made with schools to provide school bus services that are timely, efficient and low cost. Outside of school hours these buses can be used to provide commuter services between towns in line with a fixed timetable.

The initial objective is to promote the use of public transport to enhance connectivity for local communities. Initially this should aim at breaking even, rather than being profit-making. Once established, growing patronage will allow the service to turn a useful profit and become self-sustaining.

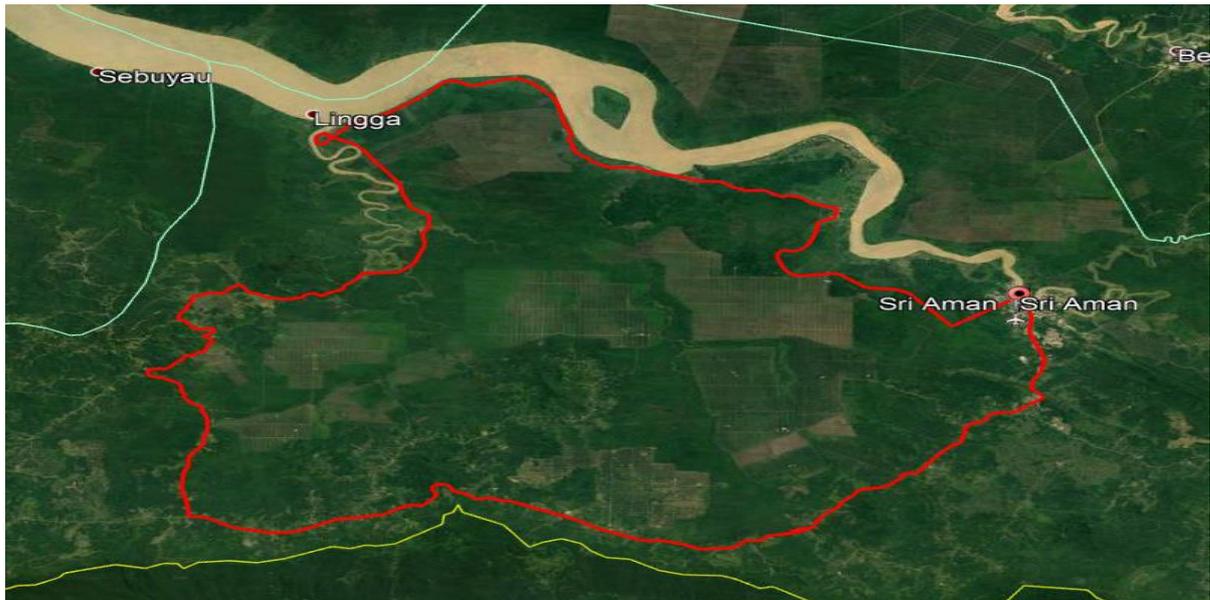
The completion of new roads and upgrading of existing roads under the SAMP provides opportunities to implement a more efficient inter-town bus service that will be a key component for connecting communities with services and with other communities.

The SAMP proposes the establishment of three key public transport inter-town routes:

- TR-2a The Simanggang – Lingga – Pantu – Lachau Route
- TR-2b The Engkilili – Lubok Antu – Batang Ai – Engkilili Route
- TR-2c The Simanggang – Temudok - Engkilili – Temudok – Simanggang Route

2.7.2.1 TR-2a: Simanggang – Lingga – Pantu – Lachau – Simanggang Public Bus Route

Action/ Project No:	TR-2a Simanggang – Lingga – Pantu – Lachau – Simanggang Public Bus Route
Project Description:	<p>The completion of the Pantu-Lingga road systems will allow a regular bus service to operate from Simanggang, taking in Stumbin, Bakong, Seduku, Lingga, Gunung Lesong, Banting, Engkeranji, Pantu, Lachau, Temudok, Mawang, Selepong, Panggil, Melugu, Entulang, Temudok and back to Simanggang.</p> <p>The project will use a number of buses (up to 12) operating this route in both directions on a fixed timetable. The total circuit is approximately 160 km and would require approximately five hours for each bus. The timetable would allow for an hourly service each way.</p> <p>Formal bus stations will be provided at Lingga, and Pantu, to complement the existing station at Simanggang. Simple bus stops/shelters will be provided at intermediate stops.</p> <p>A bus terminal / highway rest area will be established at Lachau to service intra-state and interstate bus services using the Pan Borneo Highway. This will provide rest areas, toilets, food and drink outlets, and car park areas. It will complement the existing Lachau market area which is already very popular.</p>
Link Projects:	<ul style="list-style-type: none"> • RO-2, RO-3, RO-8, RO-9

Action/ Project No: TR-2a Simanggang – Lingga – Pantu – Lachau – Simanggang Public Bus Route											
Project Rational:	<ul style="list-style-type: none"> The bus system will allow persons in all the settlements serviced to access government and community services in the relevant town centres at affordable cost. It will provide the level of reliability that is needed by individuals in the settlements It will reduce the reliance on individual motor vehicles, with benefits for the environment, reduced traffic congestion, etc 										
Impacts/ Outcomes:	<ul style="list-style-type: none"> Individuals will more easily be able to access medical, educational, sports, and community services People across communities will more easily be able to visit each other, enhancing communication and cohesiveness More people are able to participate in the life and activities across Sri Aman 										
Project Site:											
 <p style="text-align: center;">Proposed Bus Route</p>											
Source: Google Earth and Daya Rancang analysis											
Outputs of Project & KPIs:	<ul style="list-style-type: none"> Public transport usage increases Patronage of public services increases 										
Estimated Budget:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td>Buses – 12 @ RM 1 million</td> <td style="text-align: right;">= RM 12 million</td> </tr> <tr> <td>Bus stops at Lachau, Lingga and Pantu – 2 @ RM0.5 million</td> <td style="text-align: right;">= RM 1 million</td> </tr> <tr> <td>Bus terminal / Highway rest area at Lachau</td> <td style="text-align: right;">= RM 20 million</td> </tr> <tr> <td>Other bus stops – 20 @ RM0.15 million</td> <td style="text-align: right;">= RM 3 million</td> </tr> <tr> <td>TOTAL</td> <td style="text-align: right;">RM 36 million</td> </tr> </table> <p>Maintenance cost for buses – covered by fares.</p>	Buses – 12 @ RM 1 million	= RM 12 million	Bus stops at Lachau, Lingga and Pantu – 2 @ RM0.5 million	= RM 1 million	Bus terminal / Highway rest area at Lachau	= RM 20 million	Other bus stops – 20 @ RM0.15 million	= RM 3 million	TOTAL	RM 36 million
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Other bus stops – 20 @ RM0.15 million	= RM 3 million										
TOTAL	RM 36 million										
Activities/ Components:	<ul style="list-style-type: none"> Establish bus route and bus stop locations Procure bus fleet Establish bus stations at Lingga, Pantu and Lachau Establish service timetable Advertise timetable throughout the bus route. 										
Investors:	Public Sector: 100 % RM 36 million										
Project Time Frame:	Medium term as road projects needs to be completed first.										
Possible Barriers & Threats:	<ul style="list-style-type: none"> The main threat is that the service is unreliable or unaffordable. This can be due to <ul style="list-style-type: none"> Poor management Poor servicing Some level of subsidy may be required during the establishment period 										

Action/ Project No: TR-2a Simanggang – Lingga – Pantu – Lachau – Simanggang Public Bus Route	
Roles & Responsibilities:	Agencies
	Simanggang District Council
Roles & Responsibilities	

2.7.2.2 TR-2b: Engkilili – Lubok Antu – Batang Ai – Engkilili Public Bus Route

Action/ Project No: TR-2b Engkilili – Lubok Antu – Batang Ai – Engkilili Public Bus Route	
Project Description:	<p>The upgrade of the Engkilili – Lubok Antu Road (RO-14) will be important to this bus route as it shortens travel time between the two towns. Also, RO-12 will allow a loop back to Engkilili from Batang Ai.</p> <p>A number of intermediate stops at existing settlements can also be provided. The project will use a number of buses (up to 8) operating this route in both directions on a fixed timetable. The total circuit is approximately 90 km and would require approximately three hours for each bus. The timetable would allow for a two-hourly service each way.</p> <p>Formal bus stations will be provided at Lubok Antu, and Batang Ai.</p> <p>A bus interchange will be provided at Engkilili.</p> <p>Simple bus stops/shelters will be provided at intermediate stops.</p>
Link Projects:	<ul style="list-style-type: none"> • RO-12, RO-14, TR-4, TR-2c
Project Rational:	<ul style="list-style-type: none"> • The bus system will allow persons in all the settlements serviced to access government and community services in the relevant town centres at affordable cost. It will provide the level of reliability that is needed by individuals in the settlements • It will complement the water taxi service in Batang Ai and Sg Engkari, connecting persons from the remote settlements with towns and government services. • It will also reduce the reliance on individual motor vehicles, with benefits for the environment, reduced traffic congestion, etc.
Impacts/ Outcomes:	<ul style="list-style-type: none"> • Individuals will more easily be able to access medical, educational, sports, and community services • People across communities will more easily be able to visit each other, enhancing communication and cohesiveness • More people are able to participate in the life and activities across Sri Aman
Project Site:	

Action/ Project No: TR-2b Engkilili – Lubok Antu – Batang Ai – Engkilili Public Bus Route



Proposed Bus Route

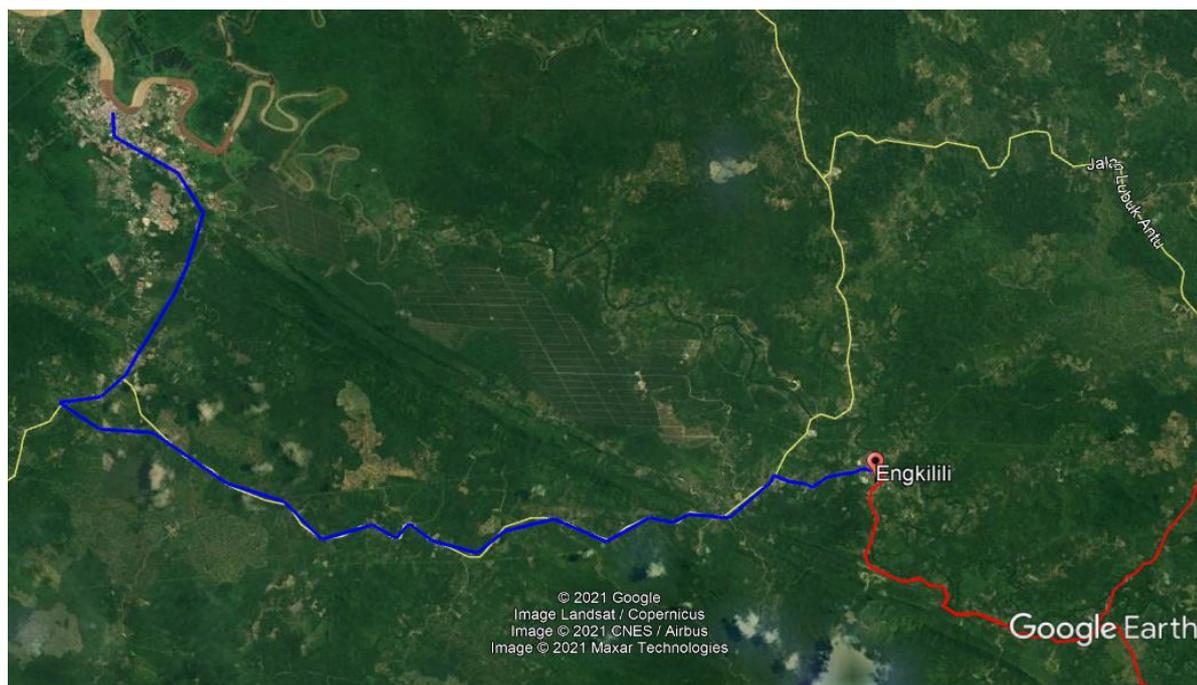
Source: Google Earth and Daya Rancang analysis

Outputs of Project & KPIs:	<ul style="list-style-type: none"> Public transport usage increases Patronage of public services increases 										
Estimated Budget:	<table border="0"> <tr> <td>Buses – 8 @ RM 1 million</td> <td>= RM 8 million</td> </tr> <tr> <td>Bus stops at Lubok Antu, Batang Ai, – 2 @ RM0.5 million</td> <td>= RM 1 million</td> </tr> <tr> <td>Bus Interchange at Engkilili</td> <td>= See TR-2c</td> </tr> <tr> <td>Other bus stops – 20 @ RM0.15 million</td> <td>= RM 3 million</td> </tr> <tr> <td>TOTAL</td> <td>RM 12 million</td> </tr> </table> <p>Maintenance cost for buses – covered by fares.</p>	Buses – 8 @ RM 1 million	= RM 8 million	Bus stops at Lubok Antu, Batang Ai, – 2 @ RM0.5 million	= RM 1 million	Bus Interchange at Engkilili	= See TR-2c	Other bus stops – 20 @ RM0.15 million	= RM 3 million	TOTAL	RM 12 million
Buses – 8 @ RM 1 million	= RM 8 million										
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Other bus stops – 20 @ RM0.15 million	= RM 3 million										
TOTAL	RM 12 million										
Activities/ Components:	<ul style="list-style-type: none"> Establish bus route and bus stop locations Procure bus fleet Establish bus stations at Lubok Antu and Batang Ai, and bus interchange at Engkilili Establish service timetable Advertise timetable throughout the bus route 										
Investors:	Public Sector: 100 % RM 12 million										
Project Time Frame:	Medium term as road projects need to be completed first										
Possible Barriers & Threats:	<ul style="list-style-type: none"> The main threat is that the service is unreliable or unaffordable. This can be due to <ul style="list-style-type: none"> Poor management Poor servicing Some level of subsidy may be required during the establishment period 										
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Lubok Antu District Council</td> <td></td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Lubok Antu District Council							
Agencies	Roles & Responsibilities										
Lubok Antu District Council											

2.7.2.3 TR-2c: Simanggang – Temudok – Engkilili – Temudok – Simanggang Public Bus Route

Action/ Project No:		TR-2c Simanggang – Temudok – Engkilili – Temudok – Simanggang Public Bus Route
Project Description:	<p>This route provides an express service between the major service towns of Simanggang, Temudok, and Engkilili. A small number of intermediate stops at existing settlements can also be provided.</p> <p>New industrial areas and agroparks and a CPPC are proposed for Temudok, as well as a new secondary school. Movement of workers and staff between Simanggang and Temudok is expected to increase dramatically.</p> <p>Engkilili is slated to have the new hospital established there as well as new schools. Providing a reliable, frequent transport connection between Simanggang and Engkilili will become increasingly important. Engkilili will also have a new bus exchange where commuters can change to the Lubok Antu and Batang Ai services.</p> <p>The project will use a number of buses (up to 8) operating this route in both directions on a fixed timetable. The total circuit is approximately 75 km and would require approximately two hours for each bus. The timetable would allow for a half-hourly service each way.</p> <p>A formal bus station will be provided at Temudok.</p> <p>A bus interchange will be provided at Engkilili.</p> <p>Simple bus stops/shelters will be provided at intermediate stops.</p>	
Link Projects:	<ul style="list-style-type: none"> RO-1, TR-2b 	
Project Rational:	<ul style="list-style-type: none"> The bus system will provide for efficient commuter transport between the main centres of Government services in Sri Aman It will allow people to travel to/from work at affordable cost, without limiting their employment prospects to the immediate vicinity of their place of residence. It will provide the level of reliability that is needed It will also reduce the reliance on individual motor vehicles, with benefits for the environment, reduced traffic congestion, etc. 	
Impacts/ Outcomes:	<ul style="list-style-type: none"> Individuals will more easily be able to access a wider range of employment opportunities, and community services More people are able to participate in the life and activities across Sri Aman 	

Project Site:



Proposed Bus Route

Source: Google Earth and Daya Rancang analysis

Action/ Project No:		TR-2c Simanggang – Temudok – Engkilili – Temudok – Simanggang Public Bus Route											
Outputs of Project & KPIs:	<ul style="list-style-type: none"> Public transport usage increases Patronage of public services increases 												
Estimated Budget:	<table> <tr> <td>Buses – 8 @ RM 1 million</td> <td>= RM 8 million</td> </tr> <tr> <td>Bus stops at Temudok, – 1 @ RM1.0 million</td> <td>= RM 1.0 million</td> </tr> <tr> <td>Bus Interchange at Engkilili</td> <td>= RM 4 Million</td> </tr> <tr> <td>Other bus stops – 10 @ RM0.15 million</td> <td>= RM 1.5 million</td> </tr> <tr> <td>TOTAL</td> <td>RM 14.5 million</td> </tr> </table> <p>Maintenance cost for buses – covered by fares.</p>			Buses – 8 @ RM 1 million	= RM 8 million	Bus stops at Temudok, – 1 @ RM1.0 million	= RM 1.0 million	Bus Interchange at Engkilili	= RM 4 Million	Other bus stops – 10 @ RM0.15 million	= RM 1.5 million	TOTAL	RM 14.5 million
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Other bus stops – 10 @ RM0.15 million	= RM 1.5 million												
TOTAL	RM 14.5 million												
Activities/ Components:	<ul style="list-style-type: none"> Establish bus route and bus stop locations Procure bus fleet Establish bus stations at Temudok, and bus interchange at Engkilili Establish service timetable Advertise timetable throughout the bus route 												
Investors:	Public Sector: 100 % RM 14.5 million												
Project Time Frame:	Short to Medium term												
Possible Barriers & Threats:	<ul style="list-style-type: none"> The main threat is that the service is unreliable or unaffordable. This can be due to <ul style="list-style-type: none"> Poor management Poor servicing Some level of subsidy may be required during the establishment period 												
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sri Aman District Council</td> <td></td> </tr> </tbody> </table>			Agencies	Roles & Responsibilities	Sri Aman District Council							
Agencies	Roles & Responsibilities												
Sri Aman District Council													

2.7.3 TR-3 Public Transport – Water Taxi at Batang Ai

For areas with limited road connections, rivers act as the primary means of transportation. While there are a number of areas that currently fall into this category, the SAMP is proposing road connections to many of these communities (e.g. Banting, Ulu Skrang). However, there are a number of settlements (27) upstream of the Batang Ai Dam, on the Sg Engkari and Batang Ai that are located in Totally Protected Areas. The SAMP recommends that these areas are not disturbed by road construction to conserve their important environmental assets.

2.7.3.1 The Issues

Apart from some settlements on the Sg. Engkari that are able to be accessed by logging roads, access to the longhouse communities on the Sg Engkari, the Batang Ai, Sg Delok and other tributary Rivers is currently achieved by the use of longboat (perahu). Typically, these long boats use a 15 hp outboard motor (Figure 2-1).



Figure 2-1: Longboat on Sungai Delok, Batang Ai

Navigation is limited by the depth of water in the River, and access can be difficult in dry/drought periods when the rivers are low. Hence the longboats are the most appropriate type of boat for these communities. Generally, each household will possess at least one long boat. The boats are skillfully constructed at the village using selected timber harvested in the vicinity.

Other limitations faced by the local communities in regard to transportation by boat are:

- Fuel for the boats is not readily available at Batang Ai. This means that it has to be obtained from Lubok Antu, 23 km by road from the Batang Ai Dam. When fuel can be obtained at the jetty area near the dam, it is much more expensive, attracting approximately 60% premium (RM15 per gallon)
- Log jams on the river systems are common and difficult to manage (Figure 2-2).
- The management of the Lake by SEB can affect the water level in the Rivers. It is recommended that the Lake be maintained at a level no lower than 108 m ASL to minimise this impact.

Implications on living conditions that result from these transport constraints are:

- While primary schools and medical clinics are available at strategic locations, accessing other government and commercial services requires travel to Lubok Antu, Engkilili and Simanggang, which is a costly and time-consuming exercise.
- Travel generally requires a two-stage process with long boat to Batang Ai Dam, and road vehicle to the nearby towns.

- Transporting produce to market is limited to what can be carried in a long boat. The cost of transport vs the value of the product is often excessive.
- While some pooling of resources is generally organized within the longhouse communities it is most common that each family travels independently in their own boat.
- Co-ordinating transport is currently not feasible as there is minimal access to mobile or internet signal in the catchment area.



Figure 2-2: Log jam on Sungai Delok (25 Oct 2021)

2.7.3.2 Project Objective

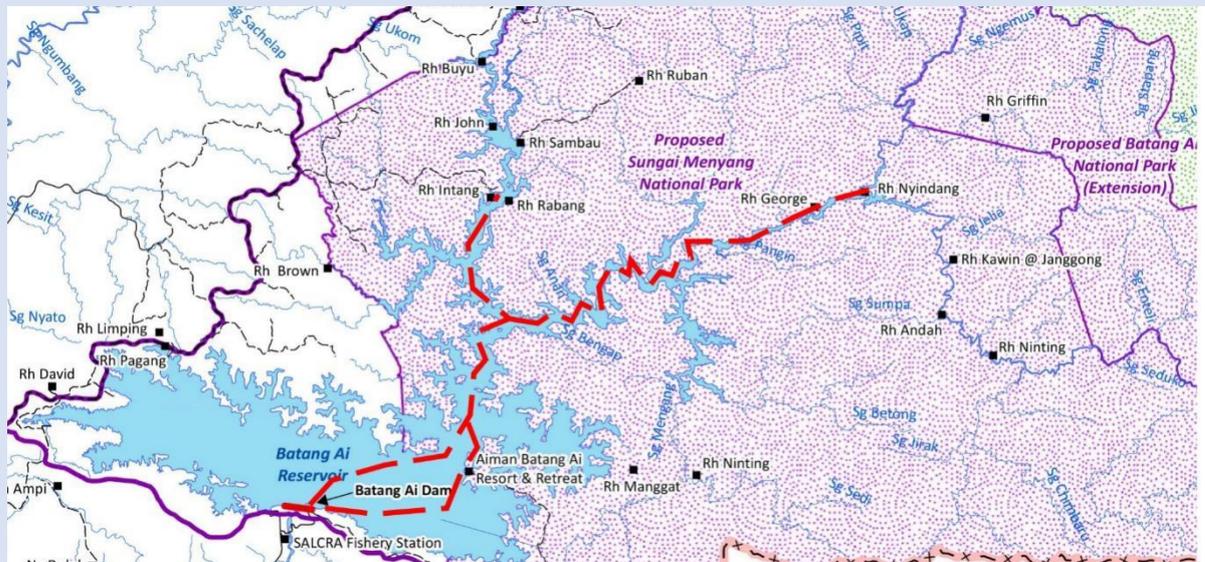
These communities need to be afforded a level of public transport that is commensurate to that being provided to other communities in Sri Aman. The rural water taxi will provide this service, connecting children to schools, people to clinics and allowing travel to other parts of the Division.

Associated riverine transport facilities and amenities are also to be upgraded. These include improvements of the jetties, refuelling facilities, and connections to public transport services at the Batang Ai public jetty.

Strategic Focus Area: Improve Riverine and Special Connectivity	
Project No:	TR 3: Feasibility study into introducing Water Transport Services at Batang Ai.
Project Description:	<p>Improve river transport services for upriver communities at Batang Ai. Undertake a feasibility and implementation study to determine the best way to achieve this, starting with the suggestions provided below.</p> <p>We propose that a Lake ferry service be introduced. This will consist of a larger boat that can transport 20 – 30 passengers in comfort (covered sitting area, etc) as well as transport goods and equipment that will be needed by upstream communities.</p> <p>The route of the vessel will be confined to the Lake vicinity as it will be too large to access the river systems.</p> <p>Main ports of call will be</p> <ul style="list-style-type: none"> • Start and finish at the public jetty at Batang Ai Dam • Rh Intang / Rh Rabang on the Engkari system • Ng Delok on the Batang Ai • Amphibious plane terminal at the Resort Hotel (Optional) <p>Passengers can pay for a one-way trip to any of these locations, where villagers can meet them to transport to their respective longhouses upstream. (Outgoing trips follow the same pattern). This will reduce dramatically the commuting trips required for each boat.</p> <p>Ng Delok and Intang/Rabang are to be encouraged to develop as trading depots for upstream communities. Goods can be brought into these settlements for on-trading to upstream communities. Basic goods such as gas-tanks, fuel supplies, flour, sugar, cooking oil, etc can thus be made readily available for the communities removing the need to travel to Lubok Antu for these.</p> <p>In turn, agricultural produce (pepper, rubber, fruits, fish, etc) can be collected at these depots and transported to the Batang Ai Dam jetty for more efficient transport to market.</p> <p>The route can also become a very attractive tourism circuit for visitors to Batang Ai, enhancing the appeal of a day trip from Simanggang.</p> <p>We estimate a round trip to occupy approximately 3 hours, including stops at the key depot points. Passengers can visit the settlements for refreshments and to appreciate local cultural features while goods are being off-loaded and onloaded.</p> <p>The feasibility study could assess an appropriate ticket price but we would envisage RM15 for a one-way ticket, and RM30 for a round trip. Costs for people from the upstream communities could be subsidised or discounted.</p> <p>The schedule can be tied into the public transport service proposed for Engkilili / Lubok Antu / Batang Ai.</p> <p>It is envisaged that a single ferry will be adopted initially but an additional ferry may be required once the transport system is established and demand increases.</p>

Strategic Focus Area: Improve Riverine and Special Connectivity

Project Site:



Potential Transport Service and Lake Cruise routes at Batang Ai

Source: Daya Rancang

Note: Base map from UNIMAS Holdings

Link Projects:	<ul style="list-style-type: none"> ● S5-3 ● TR=2b ● TR-4 						
Project Rational:	<p>Provision of water transport services to meet the needs of upriver communities is important. It will facilitate both reduced cost and reduced time required.</p> <p>By establishing trading depots the transport and provision of goods, as well as the transport of produce to market can be made more efficient and economical.</p> <p>The Lake ferry can become a significant tourism attraction for the Lake at the same time as providing the goods carriage service.</p>						
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Provide more efficient transport for remote communities ● Easier access to goods, markets, services ● An attraction for tourists to Batang Ai 						
Outputs of Project & KPIs:	<ul style="list-style-type: none"> ● Transport costs decrease for communities / households ● Access to staple goods improves ● Appreciation of the features of Batang Ai Lake are better appreciated by visitors. 						
Estimated Budget:	Feasibility Study - RM200,000 (Included in S5-3)						
Activities/ Components:	<ul style="list-style-type: none"> ● Feasibility study 						
Project Time Frame:	<p>Short term – Feasibility Study</p> <p>Medium Term – Establish Lake Ferry including jetty and passenger / goods service</p> <p>Long-term – Expand service in accordance with demand</p>						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>Sarawak Rivers Board</td> <td></td> </tr> <tr> <td>SEB</td> <td></td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Sarawak Rivers Board		SEB	
Agencies	Roles & Responsibilities						
Sarawak Rivers Board							
SEB							

2.7.4 TR-4 New Jetties at Batang Ai

In association with the expansion of aquaculture at Batang Ai it is proposed to establish a dedicated fish landing area. Three new jetties are proposed to service this area. This will allow multiple users at any one time. The jetties are used to:

- Load fish feed for transport to the aquaculture farms
- Unload harvested fish to be processed or carried to market
- Unload waste products from the aquaculture farms for hygienic disposal
- Transport workers to and from the aquaculture farms

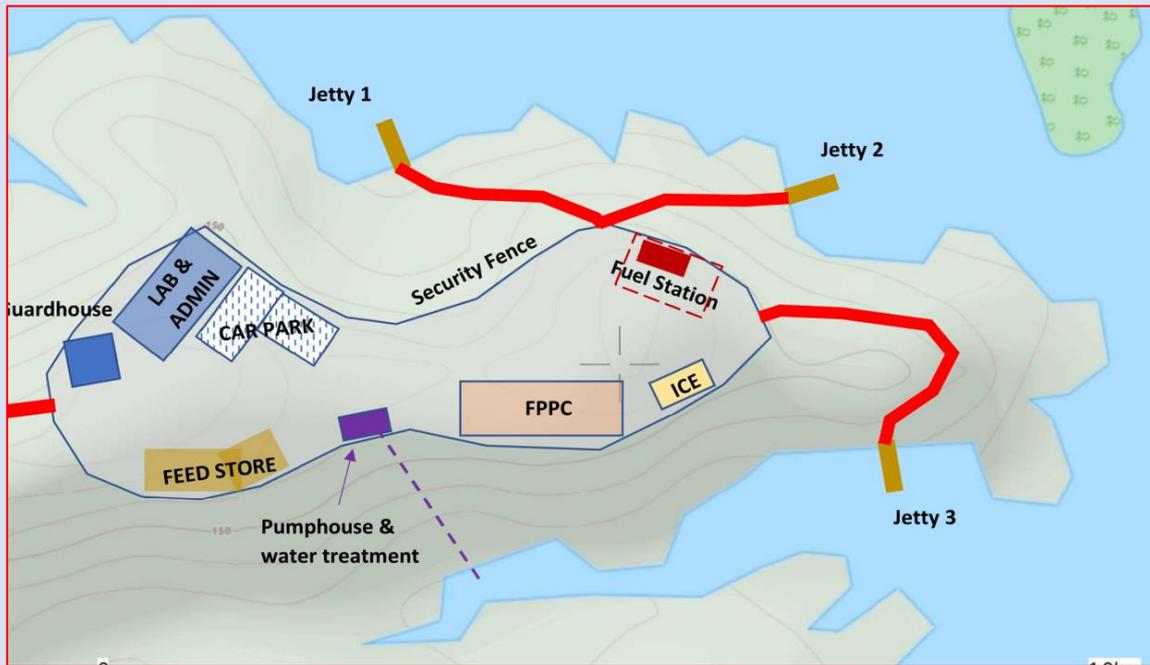
It is also proposed to install a new jetty at the public jetty area. This will cater for multiple boats that are currently landed on the bank of the Lake.



Boats landed on shoreline at public jetty area

Strategic Focus Area: Facilitate activities at Batang Ai	
Action/Project No:	TR 4: New jetties at Batang Ai.
Project Description:	<ul style="list-style-type: none"> • Facilitate separate access for aquaculture farm activities so that the public jetties are maintained for general public use. • Provide new jetty at Public jetty area for locals and recreational use • Provide refuelling facility for boats at public jetty

Project Site:



Location of new jetties for fish landing area at Batang Ai

Source: UNIMAS Holdings



Location of new jetty at public area

Source: Google Earth and UNIMAS Holdings analysis

Strategic Focus Area:		Facilitate activities at Batang Ai	
Link Projects:	<ul style="list-style-type: none"> • AQ-1 • RO-7 		
Project Rational:	<p>Jetties are required to support aquaculture expansion activities at the Lake, and prevent the mix of commercial and public activities at the existing public jetties.</p> <p>Three jetties allow for multiple users and facilitate limited use even in rough weather.</p> <p>At the public jetty it is important to improve facilities for local communities travelling to/from remote communities, as well as recreational boaters and fishermen.</p>		
Impacts/Outcomes:	<ul style="list-style-type: none"> • Efficient management of aquaculture resources and product • Enhanced aesthetics at public jetties 		
Outputs of Project & KPIs:	Enhanced productivity from aquaculture farms.		
Estimated Budget:	New Jetties at Fish Landing Area 3 @ RM 5 million	= RM 15 million	
	New jetty at Public Jetty Area	= RM5 million	
	Repair existing Jetties	= RM0.5 million	
	Provide refuelling facility at Public Jetty area	= RM0.8 million	
	TOTAL	= 21.3 million	
Activities/Components:	<ul style="list-style-type: none"> • Survey and investigation of sites • Design • Construction 		
Project Time Frame:	Short term – Survey and investigation of sites, Design Medium Term – Construction		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	SEB		
	SRB		

2.7.5 TR-5 Proposed Pedestrian Network, Cycle Track And Installation Of Smart Centre In Sri Aman

Strategic Focus Area: Sri Aman City Centre Roads and Facilities	
Action/Project No:	TR 6: Proposed efficient pedestrian network and cycle track in Sri Aman city centre. TR 6: Installation of smart centre to monitor the city using AI technology
Project Description:	<ul style="list-style-type: none"> Identify potential pedestrian network and cycle track that can be integrated with existing public transportation and its facilities. The smart transport management system to be developed in Simanggang city centre to enhance accessibility and connectivity.
Project Site:	-Simanggang
Project Rational:	<ul style="list-style-type: none"> Enhance mobility, connectivity and safety for pedestrian and cyclist. Recognise better city management and the initiative towards Green/ Smart City
Impacts/Outcomes:	<ul style="list-style-type: none"> Provide an easy means of roads network to the surrounding area. Smooth traffic flow Opening new areas for ecotourism
Outputs of Project & KPIs:	<ul style="list-style-type: none"> Increased wellbeing of local communities Economic growth
Estimated Budget:	-Nominal Budget = RM 5 million
Activities/Components:	<ul style="list-style-type: none"> Technological infrastructure Universal design Clear signage Vegetation and urban furniture Public transport stop/ stations
Business Model:	<p>Overall System and Tools of Smart Integrated Traffic Management System (ITMS) by Satna Smart City (Source: satnasmartcity.org)</p>
Time Frame:	Medium-term

2.7.6 Summary of Transportation Projects

The Transportation projects are summarised in the table below.

Table 2.12: Summary of Transportation Projects and Costs

No.	Description	Est Budget	Timing
TR-1:	Proposed New Jetties on Batang Seterap, at Banting, Pantu and Engkeranji.	RM15,000,000	M-L
TR-2	Public Transport Network (Bus)	RM62,500,000	S-M
TR-3	Water Transport service at Batang Ai	RM400,000	S
TR-4:	Proposed New Jetties at Batang Ai	RM21,300,000	S-M
TR-5:	Proposed pedestrian network, cycle track and installation of smart centre to monitor the city using AI technology in Sri Aman.	RM5,000,000	M
TOTAL		RM104,200,000	

SECTION 2.8 INFRASTRUCTURE (ROADS AND BRIDGES)

New and upgraded roads are one of the key strategies in achieving connected communities in Sri Aman. Each of the proposed roads projects either provides access to proposed agriculture, tourism, or other development projects, or connects communities that have historically been isolated. These communities have traditionally relied on riverine transport to access markets, services, and public facilities such as schools and health care.

Bridges

BR-1: Proposed New Bridge at Nanga Entalau Ulu Skrang

BR-2 Proposed New Bridge over Batang Lupar, Engkilili

The total length of 7 new roads proposed in Sri Aman is 39.4km and can be listed as follows:

- RO-1:** Simanggang Link Road (7km)
- RO-2:** Banting - Gunung Lesong - Engkeranji Road (6km)
- RO-3:** Lingga - Banting Road (10km)
- RO-4:** Batu Besai/ Po Ai Shortcut Road (4.4km)
- RO-5:** Jalan Merebong - Bukit Tungku Road (4km)
- RO-6:** Sebemban Gayau Road (5km)
- RO-7:** Access Road to New Aquaculture Site at Batang Ai (3km)

The total length of 7 road upgrading in Sri Aman is 163km and can be listed as follows:

- RO-8:** Upgrading of Menangkin to Engkeranji Road (11km)
- RO-9:** Upgrading of Pantu - Keranggas - Engkeranji Road (26km)
- RO-10:** Upgrading of Ulu Skrang Road (50km)
- RO-11:** Upgrading of Jalan Akses Sri Aman to dual carriageway (9km)
- RO-12:** Upgrading of Merindun Merio - Engkilili Road (13km)
- RO-13:** Upgrading of Batang Strap, Sapak, Isu to Simpang Ubah Road (24km)
- RO-14:** Upgrading of Engkilili – Lubok Antu Road (30 km)

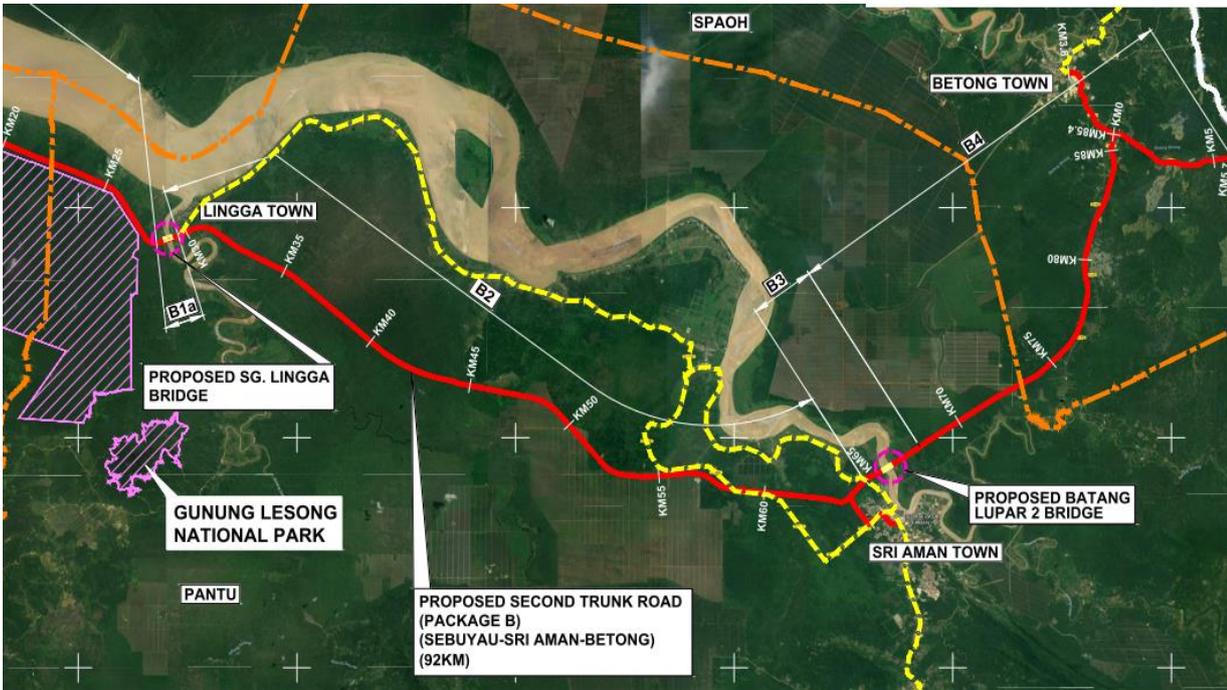
2.8.1 Second Trunk Road

JKR is currently constructing the Second Trunk Road (STR) for Sarawak. A portion of the STR passes through the Sri Aman Division. It will connect Lingga with Simanggang, and thence to Betong. This portion of the STR has not yet commenced.

The STR is expected to bring more visitors to Sri Aman.

The objectives of the Second Trunk Road Project are to:

1. Shorten the travelling distance from Kuching to Sibu and reduce travelling time;
2. Improve efficiency and safety;
3. Open new areas for development; and
4. Capitalise on Pan Borneo Highway and Coastal Road Network in order to increase the mobility in the State of Sarawak.



Source: JKR Coastal and Second Trunk Unit (CSTRU) and UNIMAS Holdings analysis

Importantly the STR includes bridges across Sungai Lingga at Lingga, and Batang Lupar at Simanggang. The bridge crossing at Simanggang will be the first link across the river in the capital of this Division. At present there is little development on the north side of the River at Simanggang, other than some plantations. However, the implementation of this bridge may be a catalyst to more development.

Development may be limited though, because much of the soil on the north side near Simanggang is peat soils



Concept for Bridge at Sg Lingga



Concept for Bridge at Btg Lupar at Simanggang

Source: JKR Coastal and Second Trunk Unit (CSTRU)

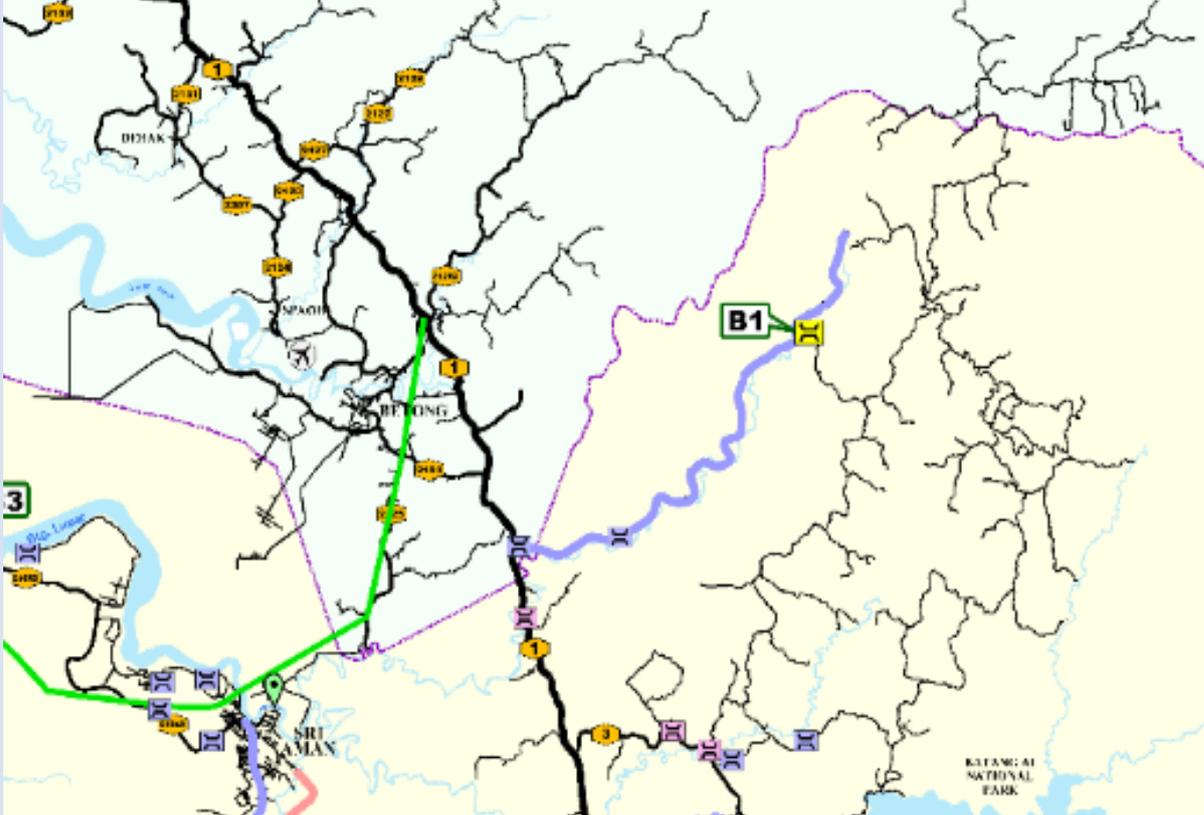
This project is budgeted and committed, thus has not been included under the budgets for SAMP.

Recommendation

We would recommend that provision for pedestrians and bicycles be built into the design of the bridge at Simanggang.

2.8.2 RN-I Proposed New Bridges

2.8.2.1 BR-1: Proposed New Bridge at Nanga Entalau Ulu Skrang

<i>Action/ Project No:</i>	BR-1: Proposed New Bridge at Nanga Entalau Ulu Skrang
<i>Project Description:</i>	Build new bridge at Nanga Entalau in Ulu Skrang. With the upgrade of the Ulu Skrang Road this bridge will provide access to road transport for a number of communities and will open up significant areas for agricultural development. The new bridge is estimated to be 60 metres in length.
<i>Link Projects:</i>	<ul style="list-style-type: none"> ● RO-10
<i>Project Rational:</i>	<ul style="list-style-type: none"> ● Improve connectivity and socio-economic activities of its surrounding area. ● Opening up areas for agricultural development ● Enhance wellbeing of local communities
<i>Impacts/ Outcomes:</i>	<ul style="list-style-type: none"> ● Develop more potential land for agricultural purposes which stimulate economic growth in the rural populace. ● Enhanced wellbeing of local communities
<i>Project Site:</i>	
	
<p style="text-align: center;">Location of the proposed new bridge at Ulu Skrang (B1)</p> <p><i>Source: UNIMAS Holdings</i></p>	

Action/ Project No:		BR-1: Proposed New Bridge at Nanga Entalau Ulu Skrang	
Estimated Budget:	Total budget for Reinforced Concrete (R.C.) Bridge – RM10.6 million		
Activities/Components:	<ul style="list-style-type: none"> • Immediate commissioning of a feasibility study and a design proposal • Implementation in conjunction with RO-10, Upgrade of Ulu Skrang Road. 		
Investors:	Public Sector: 100 % RM 10.6 million		
Project Time Frame:	Medium and Long-term		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	JKR		Site Assessment Engage contractor for upgrading works Operation and maintenance
	SADA		Monitor procedure and management

2.8.2.2 BR-2: Proposed New Bridge over Batang Lupar at Engkilili

Action/ Project No:		BR-2: Proposed New Bridge over Batang Lupar at Engkilili	
Project Description:	Build new bridge over Batang Lupar in Engkilili. There is currently no bridge across the River at Engkilili which is a significant restriction on growth in the town, and development of agricultural and other resources. The new bridge is estimated to be 100 metres in length.		
Project Rational:	<ul style="list-style-type: none"> • Improve connectivity and socio-economic activities of its surrounding area. • Opening up areas for agricultural development • Enhance wellbeing of local communities 		
Impacts/Outcomes:	<ul style="list-style-type: none"> • Develop more potential land for agricultural purposes which stimulate economic growth in the rural populace. • Enhanced wellbeing of local communities 		
Project Site:			

Action/ Project No: BR-2: Proposed New Bridge over Batang Lupar at Engkilili



Bridge to be located at a suitable point in the shaded area

Source: Google Earth and UNIMAS Holdings analysis

Estimated Budget:	Total budget for Reinforced Concrete (R.C.) Bridge – RM12 million Approach Roads – RM4 million Total – RM16 million	
Activities/ Components:	<ul style="list-style-type: none"> • Immediate commissioning of a feasibility study and a design proposal • Implementation in conjunction with RO-10, Upgrade of Ulu Skrang Road 	
Investors:	Public Sector: 100 % RM 16 million	
Project Time Frame:	Medium and Long-term	
Roles & Responsibilities:	Agencies	Roles & Responsibilities
	JKR	Site Assessment Engage contractor for upgrading works Operation and maintenance
	SADA	Monitor procedure and management

2.8.3 RN-2 New and Upgraded Roads to create Pantu – G Lesong – Lingga circuit

Strategic Focus Area: Connecting communities and projects

Action/ Project No:	RN-2 New and Upgraded Roads to create Pantu – G Lesong – Lingga circuit Comprises: RO-2, RO-3, RO-6, RO-8, RO-9, RO-13
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Strategic Focus Area: Connecting communities and projects	
<p>Project Description:</p>	<p>New road projects linking Pantu and Lingga will create a ‘tourism loop’ that will encourage multiple day visits to the area, covering Pantu town, Gunung Lesong, Banting historical precinct, Lingga Town, Batang Lupar riverside road with outlooks to Pulau Seduku, visits to rural villages, and eventually to Simanggang Town.</p> <p>Under SAMP there will be two new roads built to facilitate this</p> <ul style="list-style-type: none"> • RO-2 Lingga - Banting Road (10km) • RO-3 Banting - Gunung Lesong - Engkeranji Road (6km) <p>There will also be upgrades to roads from Pantu to Banting</p> <ul style="list-style-type: none"> • RO-8 Upgrading of Menangkin to Engkeranji Road (11km) • RO-9 Upgrading of Pantu - Keranggas - Engkeranji Road (26km) <p>There are a number of communities in this area that have been poorly connected to their service towns of Pantu and Lingga. The upgraded roads will vastly improve their access options, particularly once a public transport system is available.</p> <p>The roads will provide access to the Gunung Lesong National Park and make viable the proposed ecotourism projects proposed for there. It also provides access to Banting, previously relying on riverine access or difficult logging roads. Banting has some important historical and heritage features that will become available for the public to engage with.</p> <p>By completing this link, it will be possible to introduce a public transport system that can efficiently service the main settlements on the Simanggang-Lingga-Pantu-Simanggang loop.</p> <p>RO-6 and RO-13 provide access to proposed agricultural projects in the Pantu region</p> <ul style="list-style-type: none"> • RO-6: Sebemban Gayau Road (5km) • RO-13: Upgrading of Batang Strap, Sapak, Isu To Simpang Ubah Road (24km)
<p>Project Site:</p>	

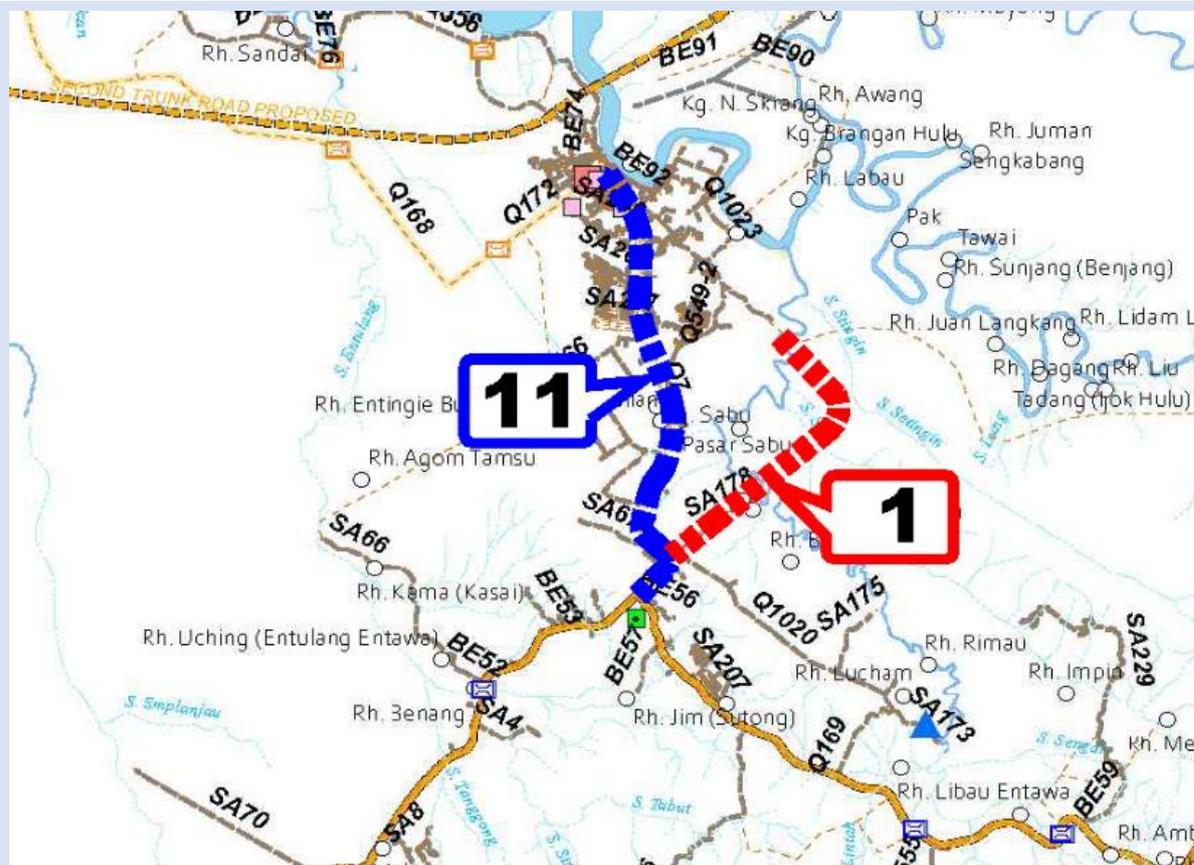
Strategic Focus Area: Connecting communities and projects							
Project Time Frame:	Short, Medium, and Long-term						
Key Success Factors:	<ul style="list-style-type: none"> ● Improvement in roads network to the surrounding area ● Smooth traffic flow to towns, villages, and settlements ● Increase new areas for ecotourism and open up more land for agriculture purpose 						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>JKR</td> <td> Site Assessment Engage contractor for construction works. Operation and maintenance </td> </tr> <tr> <td>SADA</td> <td>Monitor procedure and management</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	JKR	Site Assessment Engage contractor for construction works. Operation and maintenance	SADA	Monitor procedure and management
	Agencies	Roles & Responsibilities					
	JKR	Site Assessment Engage contractor for construction works. Operation and maintenance					
SADA	Monitor procedure and management						

2.8.4 RN-3 Improve access to Simanggang

Strategic Focus Area: Connecting key urban centres

Action/ Project No:	RN-3 Improve access to Simanggang Comprises: RO-1, RO-11
Project Description:	With the planned development activities in Sri Aman, Simanggang will become a very busy hub. The existing access to Sri Aman is a simple dual carriageway road with limited capacity. It is proposed to provide an alternative access road that avoids the developed areas, as well as upgrading the existing road. Under SAMP there will be two road projects built to facilitate this <ul style="list-style-type: none"> • RO-1 Simanggang Link Road (7 km) • RO-11 Upgrading of Jalan Akses to dual carriageway (9km)

Project Site:



Source: Daya Rancang

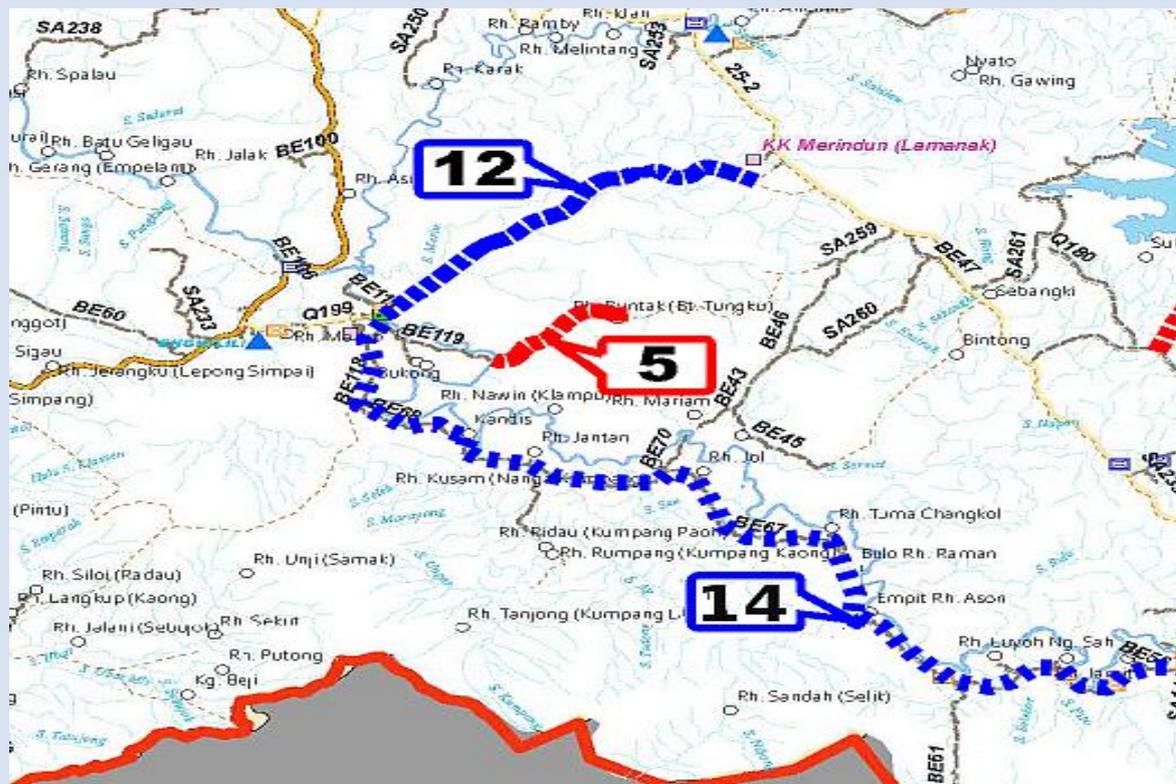
Project Rational:	<ul style="list-style-type: none"> • Relieve congestion on Simanggang access road • Provide for increased traffic • Facilitate linkage between Simanggang and Temudok and other towns
Impacts/ Outcomes:	<ul style="list-style-type: none"> • Improvement in roads connections to the surrounding area will provide balanced and sustainable growth • Enhance accessibility
Estimated Budget:	<ul style="list-style-type: none"> • RO-1: Simanggang Link Road (RM45.5 million)) • RO-11: Proposed upgrading of Jalan Akses Sri Aman to dual carriageway (RM82.5 million)

	The total overall budget– RM128 million	
Activities/ Components:	<ul style="list-style-type: none"> Review of road design and the process of land acquisition Traffic management and construction work Operation and maintenance 	
Investors:	Public Sector: 100% RM 128 million	
Project Time Frame:	Short, Medium, term	
Key Success Factors:	<ul style="list-style-type: none"> Improvement in roads connections to the surrounding area Improved traffic flow 	
Roles & Responsibilities:	Agencies	
	JKR	Roles & Responsibilities Site Assessment Engage contractor for construction works. Operation and maintenance
	SADA	Monitor procedure and management

2.8.5 RN-4 Improve access around Engkilili

Strategic Focus Area:	Connecting towns, communities and development areas	
Action/ Project No:	RN-4 Improve access around Engkilili Comprises RO-5, RO-12, RO-14	
Project Description:	With a number of agricultural projects planned for Engkilili sub-district, improving connectivity between areas and for access to/from project sites will be important. Under SAMP there will be two road projects built to facilitate this <ul style="list-style-type: none"> RO-5: Jalan Merebong - Bukit Tungku Road (4km) RO-12: Upgrading of Merindun Merio - Engkilili Road (13km) RO-5 is a short section of road that provides connectivity between two existing roads, thus opening up access for a substantial area RO-12 provides access into a proposed coconut plantation area. Additionally, it is proposed to upgrade the Engkilili – Lubok Antu Road. This is a narrow, winding sealed road that is considerably shorter than the main access road into Lubok Antu. Connections between Engkilili and Lubok Antu will be increasingly important as the District grows, and it is proposed that this road be straightened and widened to make it safer for travel for increasing levels of traffic. It will also increasingly be used by public and school buses. With a new hospital to be established in Engkilili, Lubok Antu residents will be looking for expedient access and this road will assist with that. <ul style="list-style-type: none"> RO-14: Upgrade Engkilili – Lubok Antu Road (30km) 	
Project Site:		

Strategic Connecting towns, communities and development areas
Focus Area:



Source: Daya Rancang

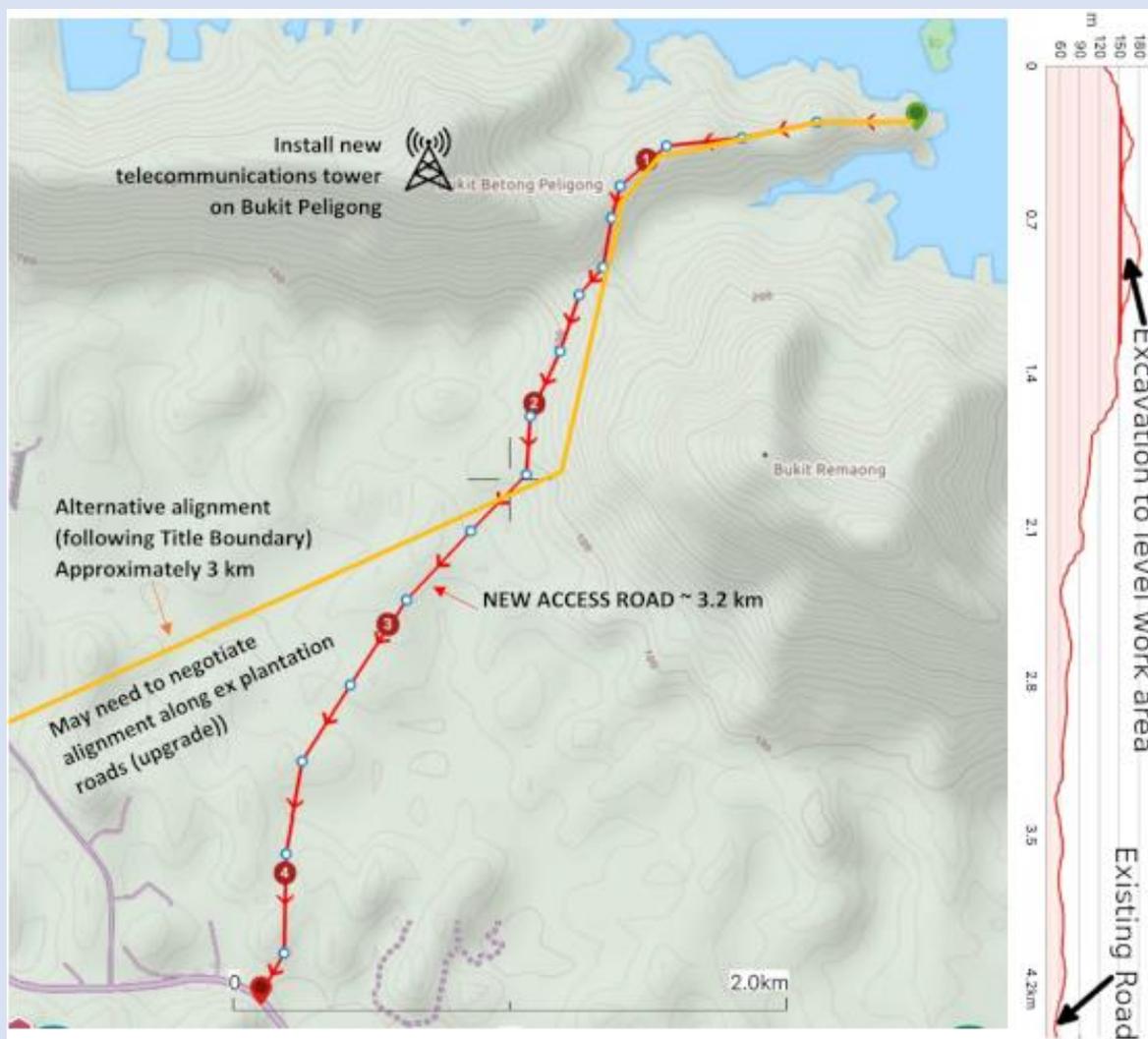
Link Projects	<ul style="list-style-type: none"> ● TR-3b ● AG-4 						
Project Rational:	<ul style="list-style-type: none"> ● Provide access to agriculture project areas ● Provide important transport linkage between Lubok Antu and Engkilili ● Open up isolated areas for community access and development 						
Impacts/ Outcomes:	<ul style="list-style-type: none"> ● Improvement in roads connections to the surrounding area will provide balanced and sustainable growth ● Enhance accessibility, especially for Lubok Antu 						
Estimated Budget:	<ul style="list-style-type: none"> ● RO-5: Jalan Merebong - Bukit Tungku Road (RM26 million) ● RO-12: Proposed upgrading of Merindun Merio - Engkilili Road (RM88.7 million) ● RO-14: Upgrade Engkilili – Lubok Antu Road (RM160 million) <p>The total overall budget– RM275 million</p>						
Activities/ Components:	<ul style="list-style-type: none"> ● Review of road design and the process of land acquisition ● Traffic management and construction work. ● Operation and maintenance 						
Investors:	Public Sector: 100% RM 275 million						
Project Time Frame:	Short Term – RO-14, Medium Term – RO-5, RO-12						
Key Success Factors:	<ul style="list-style-type: none"> ● Improvement in roads connections to the surrounding area ● Increased traffic flow 						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>JKR</td> <td>Site Assessment Engage contractor for construction works Operation and maintenance</td> </tr> <tr> <td>SADA</td> <td>Monitor procedure and management</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	JKR	Site Assessment Engage contractor for construction works Operation and maintenance	SADA	Monitor procedure and management
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2.8.6 RN-5 Access Road to Aquaculture landing area, Batang Ai

Strategic Focus Area: Access to development project

Action/ Project No:	RO-7: Access Road to New Aquaculture Site at Batang Ai
Project Description:	<p>A new aquaculture landing area is to be established at Batang Ai. The aquaculture activities will thereafter be able to be kept independent of the other activities being undertaken at the Lake (tourism, hydro, solar array, recreational fishing, public facilities).</p> <p>This is important so that biosecurity can be enforced and the integrity of the aquafarm production is not threatened.</p> <p>RO-7 is a new road that provides access into the proposed landing site.</p>

Project Site:

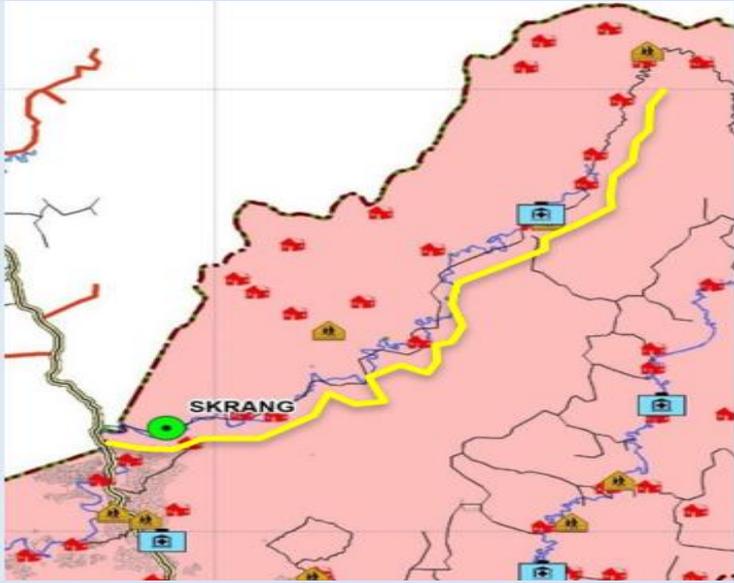


Source: Daya Rancang

Link Projects	<ul style="list-style-type: none"> ● TR-5 ● AQ-1
Project Rational:	<ul style="list-style-type: none"> ● Provide separate access to aquaculture landing and process areas ● Expedite transport of aquaculture product to market
Estimated Budget:	<ul style="list-style-type: none"> ● RO-7: Access Road to New Aquaculture Site at Batang Ai (RM18 million) <p>The total overall budget– RM18 million</p>

Strategic Focus Area:							
Activities/Components:	<ul style="list-style-type: none"> Review of road design and the process of land acquisition Traffic management and construction work Operation and maintenance 						
Investors:	Public Sector: 100% RM 18 million						
Project Time Frame:	Short Term – Investigation, Design, Land acquisition Medium Term - Construction						
Key Success Factors:	<ul style="list-style-type: none"> Streamlined aquaculture management Improved security at aquaculture areas 						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>JKR</td> <td>Site Assessment Engage contractor for construction works Operation and maintenance</td> </tr> <tr> <td>SADA</td> <td>Monitor procedure and management</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	JKR	Site Assessment Engage contractor for construction works Operation and maintenance	SADA	Monitor procedure and management
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SADA	Monitor procedure and management						

2.8.7 RN-6 Upgrade Road to Ulu Skrang

Strategic Focus Area:	
Action/Project No:	RO-10: Upgrading of Ulu Skrang Road
Project Description:	<p>The Skrang Valley is to be the site of several durian farm enterprises, as well as developing a beekeeping (apiculture) industry.</p> <p>To facilitate access to these developments, and transport of product to processing centres or market it is important that the existing access road be upgraded and sealed. The length of road to be upgraded is approximately 50 km.</p>
Project Site:	 <p>Source: Daya Rancang</p>

Strategic Focus Area: Access to development project areas							
Link Projects	<ul style="list-style-type: none"> AG-5, AG-9 						
Project Rational:	<p>Over the last 20 years Ulu Skrang has been heavily logged. There are now opportunities to reinstate the landscape with productive agriculture.</p> <p>Upgrade of Ulu Skrang Road will provide for establishment of agricultural development in Skrang area. At this stage durian farms and beekeeping are targeted in this area.</p> <p>The road also greatly improves access for communities that have been affected by the difficulties of riverine access and poor roads over a long period.</p>						
Estimated Budget:	<ul style="list-style-type: none"> RO-10: Proposed upgrading of Ulu Skrang Road (RM331 million) <p>The total overall budget– RM331 million</p>						
Activities/Components:	<ul style="list-style-type: none"> Review of road design and the process of land acquisition Traffic management and construction work Operation and maintenance 						
Investors:	Public Sector: 100% RM 331 million						
Project Time Frame:	Short Term – Investigation, Design, Land acquisition Medium Term - Construction						
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>JKR</td> <td> Site Assessment Engage contractor for construction works Operation and maintenance </td> </tr> <tr> <td>SADA</td> <td>Monitor procedure and management</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	JKR	Site Assessment Engage contractor for construction works Operation and maintenance	SADA	Monitor procedure and management
	Agencies	Roles & Responsibilities					
	JKR	Site Assessment Engage contractor for construction works Operation and maintenance					
SADA	Monitor procedure and management						

2.8.8 RN-7 New Connector Road near Melugu

Strategic Focus Area: Short cut to facilitate travel in remote area.	
Action/Project No:	RO-4: Batu Besai / Po Ai Shortcut Road (4.4km)
Project Description:	Construction of new road to enhance connection in area and provide shorter transport path. Total length = 4.4 km
Project Site:	



Source: Daya Rancang

<p>Project Rational:</p>	<p>The area between Melugu and Batu Lintang has few roads, other than logging roads. The proposed road will connect two of the main access roads in this area, allowing travel from one side to the other, while cutting off 20 – 30 km that would otherwise have to be travelled.</p> <p>This road also facilitates alternative egress routes for remote communities, should they be needed, for example, in case of forest fire.</p>							
<p>Estimated Budget:</p>	<p>RO-4: Batu Besai/ Po Ai Shortcut Road (RM29 million) The total overall budget– RM29 million</p>							
<p>Activities/ Components:</p>	<ul style="list-style-type: none"> • Review of road design and the process of land acquisition • Traffic management and construction work • Operation and maintenance 							
<p>Investors:</p>	<p>Public Sector: 100% RM 29 million</p>							
<p>Project Time Frame:</p>	<p>Short Term – Investigation, Design, Land acquisition Medium Term - Construction</p>							
<p>Roles & Responsibilities:</p>	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>JKR</td> <td> Site Assessment Engage contractor for construction works. Operation and maintenance </td> </tr> <tr> <td>SADA</td> <td>Monitor procedure and management</td> </tr> </tbody> </table>		Agencies	Roles & Responsibilities	JKR	Site Assessment Engage contractor for construction works. Operation and maintenance	SADA	Monitor procedure and management
Agencies	Roles & Responsibilities							
JKR	Site Assessment Engage contractor for construction works. Operation and maintenance							
SADA	Monitor procedure and management							

2.8.9 RN-8 Summary of Road and Bridge Projects

A summary of the road and bridge projects is shown in the Table below.

Project Title	Project Components	Estimated Costs	Agencies	Time Frame
RN-1 Proposed New Bridges	BR-1 Bridge at Ulu Skrang	RM10,600,000	JKR	M-L
	BR-2 Bridge at Engkilili	RM16,000,000	JKR	M-L
RN-2 New and Upgraded Roads to create Pantu – G Lesong – Lingga circuit	RO-2: Proposed Banting - Gunung Lesong - Engkeranji Road	RM54,000,000	JKR	S - M
	RO-3: Proposed Lingga - Banting Road	RM75,500,000	JKR	S - M
	RO-6: Sebemban Gayau Road	RM32,500,000	JKR	M-L
	RO-8: Proposed upgrading of Menangkin to Engkeranji Road	RM71,500,000	JKR	S-M
	RO-9: Proposed upgrading of Pantu - Keranggas - Engkeranji Road	RM169,000,000	JKR	S-M
	RO-13: Proposed upgrading of Batang Strap, Sapak, Isu to Simpang Ubah Road	RM168,000,000	JKR	L
RN-3 Improve access to Simanggang	RO-1: Simanggang Link Road	RM45,500,000	JKR	S-M
	RO-11: Proposed upgrading of Jalan Akses Sri Aman to dual carriageway	RM82,500,000	JKR	L
RN-4 Improve access around Engkilili	RO-5: Jalan Merebong - Bukit Tungku Road	RM26,000,000	JKR	L
	RO-12: Proposed upgrading of Merindun Merio - Engkilili Road	RM88,700,000	JKR	L
	RO-14: Upgrade Engkilili – Lubok Antu Road	RM160,000,000	JKR	S-M
RN-5 Access Road to New Aquaculture Site at Batang Ai	RO-7: Access Road to New Aquaculture Site at Batang Ai	RM18,000,000	JKR	S-M
RN-6 Upgrade Road to Ulu Skrang	RO-10: Proposed upgrading of Ulu Skrang Road	RM331,000,000	JKR	M
RN-7 New Connector Road near Melugu	RO-4: Batu Besai/ Po Ai Shortcut Road	RM29,000,000	DID	L
TOTAL		RM1377.8 million		

SECTION 2.9 INFRASTRUCTURE (DRAINAGE AND IRRIGATION)

This section covers projects to address:

- drainage issues,
- riverbank erosion and
- infrastructure required for irrigation projects.

2.9.1 Drainage Projects

There are a large number of drainage issues in the Sri Aman Division, covering serious flooding issues, minor flooding, local drainage problems, and road inundation affecting access.

The causes of these issues also vary but include:

- Drainage systems were designed for the population when constructed under capacity due to growing development in the catchment.
- The build-up of debris, vegetation, and rubbish in the drain system reduces its effective capacity.
- Buildings being constructed in flood-prone areas without appropriate design to manage inundation events (e.g., construction on stilts).
- Road culvert capacity is insufficient due to increased runoff and/or culvert blockages.
- Sedimentation in the downstream reaches of local river systems has reduced river capacity, leading to increased overbank flooding events.
- Coincidence of high flow events in the main rivers, with king tide events, limits the ability of rivers to discharge and increases the potential for flooding.

We have developed the following projects to address these drainage issues.

2.9.1.1 SW 1: Drainage Upgrades for High Priority Areas

Drainage issues vary from major to minor. It is clear from the socio-economic study that, for the most part, flooding contributes to personal and community inconvenience and nuisance, together with relatively minor financial impacts, rather than having a large financial impact. It may well be that the community has adapted to periodic flood events and can minimise its financial exposure. Nevertheless, there would be a very significant benefit in addressing these issues.

Accordingly, it is proposed to address only the higher priority drainage problems. This will require a review of the known drainage issue sites, including a site visit to each. From this, a priority list of drainage remediation projects is to be developed. They are then to be implemented in accordance with their position on the priority list. The number of projects to be completed will be limited to those covered by the proposed budget.

<i>Strategic Focus Area:</i>	Drainage and Flood Mitigation
<i>Action/ Project No:</i>	SW 1: Drainage Upgrades for High Priority Areas
<i>Project Description:</i>	Under this project, we propose to allocate funds to addressing drainage and flooding issues at high priority sites. The project includes a site assessment component that will supplement the drainage master plan for Sri Aman recently undertaken.

Strategic Focus Area: Drainage and Flood Mitigation									
	<p>The works are restricted to the capacity of the budget provided and, thus, only the higher priority sites will be addressed.</p> <p>Drainage issues associated with road culverts are not included in this project as they are addressed separately.</p>								
Project Site:	Various sites throughout the Division								
Link Projects:	<ul style="list-style-type: none"> SW-2 Road culvert upgrades SW-3 Drainage planning linked to urban development 								
Project Rational:	<ul style="list-style-type: none"> DID has identified 46 sites where flooding has occurred in the last 4 years. As yet, there is no assessment as to the severity and economic impact of flooding at these sites. However, based on the socio-economic survey, the impacts are likely economically minor but represent a major nuisance for social and community purposes It is important to identify the locations where the impacts are greatest and address these sites as a priority 								
Impacts/ Outcomes:	<ul style="list-style-type: none"> Mitigation of major flooding impacts in high priority areas in Sri Aman Improved amenity for the affected communities Increased confidence for investors and developers in these areas 								
Estimated Budget:	Fixed budget of RM 50 million covering site assessment and prioritisation study and subsequent construction works at priority sites								
Activities/ Components:	<ul style="list-style-type: none"> Site assessment and prioritisation of sites identified by DID Progressive construction and/or upgrading of drainage infrastructure at high priority sites 								
Investors:	<p>Public Sector: 100 % RM 50 million</p> <p>Note that greenfields developments are not to be covered by this scheme. Drainage for new residential and commercial developments are to be fully funded by the developers.</p>								
Project Time Frame:	<p>SHORT TERM - Site assessment and priority study</p> <p>MEDIUM AND LONG TERM – Progressive delivery of drainage works and upgrades in accordance with priority ranking.</p>								
Key Success Factors:	<ul style="list-style-type: none"> Reduced number of sites affected by flooding year-on-year 								
Possible Barriers & Threats	<ul style="list-style-type: none"> The entire budget could end up being used in one location. This is to be avoided. In the event that one high priority site requires a very large budget, this should be carved off as a separate program and separate funding sought Improvement in drainage in one area can lead to exacerbated flooding in a nearby area downstream. The design needs to cater for this with the provision of detention ponds or similar means Drainage needs holistic planning over an extended timeframe. Without this, future development can make the drainage system inadequate 								
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>DID</td> <td>Manage and Deliver project</td> </tr> <tr> <td>Council</td> <td>Liaise with affected residential and commercial entities</td> </tr> <tr> <td>SADA</td> <td>Monitor outcomes and community benefits</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	DID	Manage and Deliver project	Council	Liaise with affected residential and commercial entities	SADA	Monitor outcomes and community benefits
Agencies	Roles & Responsibilities								
DID	Manage and Deliver project								
Council	Liaise with affected residential and commercial entities								
SADA	Monitor outcomes and community benefits								

2.9.1.2 SW 2: Road Culvert Upgrades

Flooding of roads can have serious implications for access to services and medical evacuations, in addition to the isolation of communities. This project proposes to undertake a desktop assessment of road culverts in the division and develop a priority list for culvert upgrades. Higher priority sites will have culverts upgraded or replaced, with the number of culverts being in accordance with the capacity of the budget provided.

Strategic Focus Area:		Drainage and Flood Mitigation
Action/ Project No:	SW 2: Road Culvert Upgrades	
Project Description:	<p>Under this project, we propose to allocate funds to address drainage and flooding issues that result in road inundation at culvert crossing sites. The project includes a site assessment component that will largely be based on desktop data that is available. Desktop data will include:</p> <ul style="list-style-type: none"> • Topographic information (topo maps and LiDAR where available) to determine culvert catchment areas • Existing data on culvert locations and size • Rainfall data for the local area <p>Based on the above data, a recommended culvert size will be determined. This will include an allowance for 50% blockage from accumulated debris. The recommended size will be compared with the size provided. Where the former is significantly larger, a program of culvert upgrades is to be implemented.</p> <p>The works are restricted to the capacity of the budget provided and, thus, only the higher priority sites will be addressed.</p>	
Project Site:	Various sites throughout the Division	
Link Projects:	None. This project can be undertaken independently	
Project Rational:	<ul style="list-style-type: none"> • Flooding of access roads can have a number of important impacts, not least of which is the potential to hinder the access of emergency services • It is important to identify the locations where the impacts are greatest and address these sites as a priority 	
Impacts/ Outcomes:	<ul style="list-style-type: none"> • Improvement in access to towns, villages, and settlements in times of heavy rainfall and flood events • Improved amenity for the affected communities • Increased confidence for investors and developers in these areas 	
Estimated Budget:	Fixed budget of RM 50 million covering site assessment and prioritisation study and subsequent construction works at priority sites	
Activities/ Components:	<ul style="list-style-type: none"> • Site assessment and prioritisation of sites • Progressive construction and/or upgrading of culverts at high priority sites 	
Investors:	Public Sector: 100% RM 50 million	

Strategic Focus Area:		Drainage and Flood Mitigation	
Project Time Frame:	SHORT TERM - Site assessment and priority study MEDIUM AND LONG TERM – Progressive delivery of culvert upgrade works in accordance with priority ranking		
Key Success Factors:	<ul style="list-style-type: none"> Improvement in access to towns, villages, and settlements in times of heavy rainfall and flood events Improved amenity for the affected communities 		
Possible Barriers & Threats	<ul style="list-style-type: none"> Works to upgrade a culvert may result in the closure of the road for a period of time. This may, in some cases, be the only access that a settlement has. It will be important that suitable arrangements are made for communities so that they are not cut off during the period of construction 		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	JKR		Commission site assessment study Engage contractors for culvert upgrade works
	Council		Liaise with affected communities
	SADA		Monitor effectiveness

2.9.1.3 SW 3: Drainage Planning Linked to Urban Development

This project proposes to address the issues associated with expanding urban development and its increasing demands on the historical drainage system. Project SW-1 will help to address existing systems.

This project, SW-3, proposes the design and implementation of policy changes that will help to prevent these issues in the future. Additionally, it suggests a more sustainable way of funding drainage capital works rather than relying on State funds for these works.

Strategic Focus Area:		Drainage and Flood Mitigation	
Action/Project No:	SW 3: Drainage planning linked to urban development		
Project Description:	<p>Under this project, we propose that drainage design and funding be based on long term development plans for each drainage catchment area. Under this proposal, DID will design the long-term drainage system based on full development. The estimated cost for the overall drainage scheme will be determined and provided on a ‘per hectare’ basis. Developers will then pay the cost of drainage development based on the area developed. That is, all developers pay the same rate based on land area.</p> <p>In this way, the provision of much larger drainage pipes and channels at the downstream end of drainage systems is effectively subsidised by developers at the upstream areas where drainage size and costs are generally much smaller.</p> <p>From the charges levied on developers, DID can then engage the developers to construct the required drainage system in their development area. In this way, developers in downstream areas are compensated for constructing the larger systems required to accommodate the upstream drainage feeding into it.</p>		
Project Site:	Various sites throughout the Division		

Strategic Focus Area:		Drainage and Flood Mitigation							
Link Projects:	None. This project can be undertaken independently								
Project Rational:	<ul style="list-style-type: none"> • The planning of drainage schemes is hampered by the difficulty of making allowance for future upstream developments • Persuading developers to provide drainage systems much larger than that required for their proposed development (in order to cater for future upstream development) is a perennial difficulty that has yet to be overcome • Public funding of drainage schemes, and particularly upgrading existing schemes, is not sustainable. The developers should rightly bear drainage costs from urban and commercial development 								
Impacts/Outcomes:	<ul style="list-style-type: none"> • Improvement in drainage system planning and effectiveness • Equity in drainage implementation costs on developers • Increased confidence for investors and developers 								
Estimated Budget:	<p>While there will be costs for DID in setting up this policy approach, we consider these costs within DID normal operating budget.</p> <p>The net cost of implementation of this policy should be zero in the long term. However, DID will be effectively subsidising drainage works in the downstream parts of the catchment, which will normally be the first areas to be developed. The costs for this will only be compensated once the drainage catchment is fully developed, as the levy on upstream developers will exceed the construction costs.</p> <p>DID will thus have to manage the cash flow discrepancy in this approach.</p>								
Activities/Components:	<ul style="list-style-type: none"> • Develop drainage system design and implementation policy • Engage with developer representative bodies in details and implementation of the proposed policy • Implement policy in new development areas 								
Investors:	Public Sector: 100% No net cost, but cash flow will need to be funded								
Project Time Frame:	<p>SHORT TERM – Develop drainage system design and implementation policy</p> <p>MEDIUM AND LONG TERM – Implement policy in new development areas</p>								
Key Success Factors:	<ul style="list-style-type: none"> • Acceptance by developers of the need for equity in drainage costs across drainage catchment areas • The ability of planners to provide long-term land use information for developing drainage master plans 								
Possible Barriers & Threats	<ul style="list-style-type: none"> • Adopting a significantly different policy in an established bureaucratic agency will be challenging 								
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>DID</td> <td>Develop drainage system design and implementation policy. Engage with developer representative bodies. Implement policy in new development areas</td> </tr> <tr> <td>Council</td> <td>Work with DID to distinguish local drainage from DID drainage schemes.</td> </tr> </tbody> </table>			Agencies	Roles & Responsibilities	DID	Develop drainage system design and implementation policy. Engage with developer representative bodies. Implement policy in new development areas	Council	Work with DID to distinguish local drainage from DID drainage schemes.
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DID	Develop drainage system design and implementation policy. Engage with developer representative bodies. Implement policy in new development areas								
Council	Work with DID to distinguish local drainage from DID drainage schemes.								

2.9.2 Riverbank erosion

Riverbank erosion can have a devastating impact on floodplain farms, adjacent infrastructure, and residential and commercial buildings.

Riverbank erosion has a number of causes:

- Removal of vegetation along the riparian zone of the river. Without the actively developing root systems of these vegetation communities, riverbank soils are much more prone to erosive forces.
- Rapid changes in water level in rivers, during and following flood events, or tidal fluctuations, can lead to the collapse of saturated soils on the bank, resulting in large scale landslips.
- Increased wave action from riverine vessels or even from weather events can lead to bank erosion.

Changes to bank and bed conditions through dredging or sand harvesting can lead to bank slips where the toe of the bank is undermined.

To some degree, riverbank erosion is a natural process whereby sediment is supplied to the river system and carried downstream to the coast, where it replenishes beaches, feeds mangrove systems, etc. However, the erosion rate is exacerbated by the increasing development along riverbanks and the activities that take place on rivers (motorised vessels, dredging, etc.). Also, the location of infrastructure and assets near riverbanks means that the impact of riverbank erosion is now much greater.

Addressing and/or preventing riverbank erosion can be a very expensive exercise. It also requires a comprehensive understanding of the fluvial processes that underlie erosion. It is not uncommon for erosion problems to be addressed with expensive protection works at one location to occur anew at another location a short distance downstream.

The following projects are proposed for Sri Aman:

2.9.2.1 RB 1: Riverbank Protection Works for High Priority Areas

Riverbank erosion sites are to be inspected by a team including a geomorphologist and river engineer to determine the mechanisms behind the erosion and establish a list of high priority sites. Appropriate protection designs will be developed, and projects will be implemented in accordance with the priority ranking and up to the limit of the budget allowed.

Strategic Focus Area:	
Action/ Project No:	RB 1: Riverbank Protection Works for High Priority Areas
Project Description:	<p>Riverbank erosion has been identified at a number of locations in Sri Aman Division. Riverbank protection works are being considered for sites along Batang Skrang, Batang Seterap, Batang Klauh, Batang Lupar, as well as sites near Lingga, Banting, and Pasir Panas.</p> <p>Under this project, we propose to allocate funds to addressing riverbank erosion issues at high priority sites. The project includes a geomorphological site assessment component that will allow for a priority listing of sites to be developed. The study will provide implementation plans and cost estimates for projects that can be delivered within the overall budget.</p> <p>The works are restricted to the capacity of the budget provided and, thus, only the higher priority sites will be addressed.</p>

Strategic Focus Area:		Infrastructure – Riverbank Erosion									
Project Site:	Various sites throughout the Division										
Link Projects:	None										
Project Rational:	<ul style="list-style-type: none"> • DID has identified 9 areas where riverbank erosion has occurred in the last 4 years. As yet, there is no assessment as to the severity and economic impact of flooding at these sites • It will be necessary to assess the erosion areas and identify the fluvial dynamics that are the basis for the erosion in order to develop appropriate strategies to mitigate the erosion • It is important to identify the locations where the impacts are greatest and address these sites as a priority 										
Impacts/Outcomes:	<ul style="list-style-type: none"> • Mitigation of riverbank erosion in high priority areas in Sri Aman • Protection of valuable productive land and/or infrastructure assets and buildings. • Improved amenity for the affected communities • Enhancement of the riverine environment if this work is done well 										
Estimated Budget:	Fixed budget of RM 100 million covering site assessment and prioritisation study as well as subsequent construction works at priority sites.										
Activities/Components:	<ul style="list-style-type: none"> • Geomorphological site assessment and prioritisation of sites by DID • Plans and cost estimates for riverbank protection works that can be undertaken within the budget • Progressive implementation of riverbank protection works at high priority sites 										
Investors:	Public Sector: 100 % RM 100 million										
Project Time Frame:	<p>SHORT TERM – Geomorphological site assessment and priority study including plans and cost estimates</p> <p>MEDIUM AND LONG TERM – Progressive delivery of drainage works and upgrades in accordance with priority ranking</p>										
Key Success Factors:	<ul style="list-style-type: none"> • Reduced number of sites affected by riverbank erosion • Protection of valuable productive land and/or infrastructure assets and buildings 										
Possible Barriers & Threats:	<ul style="list-style-type: none"> • The entire budget could end up being used in one location. This is to be avoided. In the event that one high priority site requires a very large budget, this should be carved off as a separate program and separate funding sought • Improvement in bank protection in one area can lead to exacerbated erosion in a nearby area downstream. The design needs to cater for this through an understanding of the geomorphological processes in action at each site • Riverbank protection works can be expensive. It will be important that the cost of works does not exceed the value of the land/assets being protected 										
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td>DID</td> <td>Manage and Deliver project</td> </tr> <tr> <td>Council</td> <td>Liaise with affected residential and commercial entities</td> </tr> <tr> <td>SADA</td> <td>Monitor outcomes and community benefits</td> </tr> </tbody> </table>			Agencies	Roles & Responsibilities	DID	Manage and Deliver project	Council	Liaise with affected residential and commercial entities	SADA	Monitor outcomes and community benefits
Agencies	Roles & Responsibilities										
DID	Manage and Deliver project										
Council	Liaise with affected residential and commercial entities										
SADA	Monitor outcomes and community benefits										

2.9.3 Irrigation projects

Sarawak is well endowed with relatively high rainfall and very rare periods of sustained drought. Generally speaking, the limitations on agriculture are more to do with inadequate drainage than with a lack of soil moisture.

Nevertheless, there are a number of agricultural projects proposed under SAMP that will benefit from an irrigation system. It is proposed to expand the areas of rice paddy, which requires flood irrigation for high levels of production. Further, it is proposed to double-crop this padi each year. This means that water for flooding the padi must be available ‘on-call and not subject to the vagaries of the weather.

Further, there is a range of specialised crops that will also benefit from controlled irrigation. This includes crops to be grown in the proposed agrotech parks.

Two irrigation projects are proposed, although each may be implemented at multiple sites.

2.9.3.1 IR 1: Flood Irrigation for Padi Projects

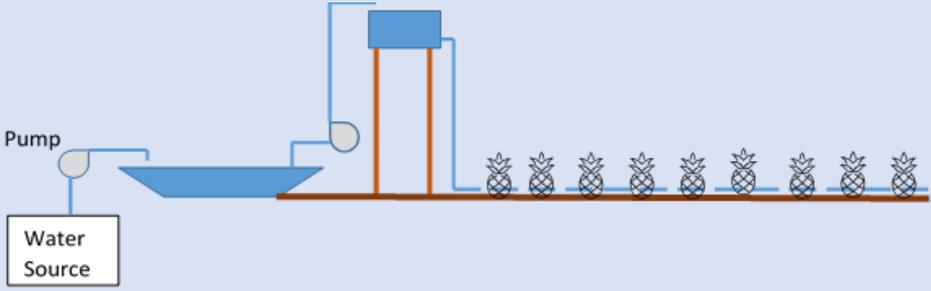
This will involve the construction of irrigation channels, together with control systems and pumps to deliver water to padi farms for flood irrigation.

Strategic Focus Area:	
Action/Project No:	IR 1: Flood Irrigation for Padi Projects
Project Description:	<p>This project will provide flood irrigation infrastructure to facilitate the intense, mechanised padi projects at two sites:</p> <ul style="list-style-type: none"> ● Batang Lupar Paddy Granary (~ 1,800 ha) ● Pantu Specialty Rice Project (~ 6,000 ha) <p>The project requires the design and construction of irrigation channels from freshwater supply sites to the padi fields where the water can be released for the purpose of flood irrigation.</p>
Project Site:	Various sites throughout the Division
Link Projects:	<ul style="list-style-type: none"> ● Batang Lupar Paddy Granary ● Pantu Specialty Rice Project
Project Rational:	<ul style="list-style-type: none"> ● These two padi projects are intended to be model projects for the implementation of high productivity mechanised padi production in Sri Aman. The provision of reliable irrigation water on-demand will be a critical component of the projects ● Increased padi production contributes to Malaysia’s food security
Impacts/Outcomes:	<ul style="list-style-type: none"> ● Higher productivity for padi production ● Increased confidence for investors and developers in these areas
Estimated Budget:	<p>Estimated budget is</p> <ul style="list-style-type: none"> ● Batang Lupar Granary RM 0 (Federal Govt project - funds already allocated) ● Pantu Specialty Rice RM150 million <p>It should be noted that these costs are generally inherent in the cost estimates for each of the agriculture projects.</p>

Strategic Focus Area: Infrastructure - Irrigation																					
Activities/Components:	<ul style="list-style-type: none"> • Approximately 230 km of irrigation channels (~ 30m / ha) plus pump supply systems. • Gate structures to direct flow into the various channels • Field gates to release flow onto the padi fields • Metering systems to measure the flow used 																				
Investors:	<p>Public Sector: 100 % RM150 million</p> <p>Note that a strong case can be made for federal funding through the Ministry of Agriculture as part of the Government strategy to increase rice production for food security</p>																				
Project Time Frame:	<p>SHORT TERM – Feasibility assessment and irrigation infrastructure design</p> <p>MEDIUM AND LONG TERM – Progressive delivery of irrigation works in accordance with farm development timetable</p>																				
Key Success Factors:	<ul style="list-style-type: none"> • Ability to deliver required quantities of water to target sites in a timely and efficient (minimal losses) manner 																				
Possible Barriers & Threats:	<ul style="list-style-type: none"> • Although the target areas are mostly flat lowland areas, there may be some topographic interruptions that would make water delivery by gravity feed problematic. These will need to be assessed, and appropriate solutions developed on a case-by-case basis • Irrigation channels through swamp areas, especially peat swamp, can be difficult and also lead to high losses if the local material is used for the channel. Constructed conduits using pipes or lined timber or other materials may be appropriate in these locations • Metering can be prone to vandalism 																				
Roles & Responsibilities:	<table border="1"> <thead> <tr> <th>Agencies</th> <th>Roles & Responsibilities</th> </tr> </thead> <tbody> <tr> <td colspan="2">Batang Lupar Granary</td> </tr> <tr> <td>Ministry of Agriculture (Federal)</td> <td>Funding</td> </tr> <tr> <td>Bahagian Pengairan dan Saliran (BPSP)</td> <td>Implementation</td> </tr> <tr> <td>SADA</td> <td>Monitor outcomes and community benefits</td> </tr> <tr> <td colspan="2">Pantu Paddy Project</td> </tr> <tr> <td>DID</td> <td>Manage and Deliver project</td> </tr> <tr> <td>Ministry of Agriculture (Federal)</td> <td>Funding</td> </tr> <tr> <td>LCDA / FELCRA</td> <td>land consolidation, farm management</td> </tr> <tr> <td>SADA</td> <td>Monitor outcomes and community benefits</td> </tr> </tbody> </table>	Agencies	Roles & Responsibilities	Batang Lupar Granary		Ministry of Agriculture (Federal)	Funding	Bahagian Pengairan dan Saliran (BPSP)	Implementation	SADA	Monitor outcomes and community benefits	Pantu Paddy Project		DID	Manage and Deliver project	Ministry of Agriculture (Federal)	Funding	LCDA / FELCRA	land consolidation, farm management	SADA	Monitor outcomes and community benefits
Agencies	Roles & Responsibilities																				
Batang Lupar Granary																					
Ministry of Agriculture (Federal)	Funding																				
Bahagian Pengairan dan Saliran (BPSP)	Implementation																				
SADA	Monitor outcomes and community benefits																				
Pantu Paddy Project																					
DID	Manage and Deliver project																				
Ministry of Agriculture (Federal)	Funding																				
LCDA / FELCRA	land consolidation, farm management																				
SADA	Monitor outcomes and community benefits																				

2.9.3.2 IR 2: Storage Pond and Feeder Mains for non-Padi Projects

This project provides suitable storage ponds and feeder mains to specialised agriculture projects for drip or sprinkler irrigation.

Strategic Focus Area: Infrastructure - Irrigation									
Action/Project No:	IR 2: Storage Pond and feeder mains for non-Padi Projects								
Project Description:	<p>This project will provide storage pond and feeder mains to provide these specialised agriculture projects with access to irrigation water for drip or sprinkler irrigation.</p> <p>The projects where this irrigation system will be required are:</p> <ul style="list-style-type: none"> ● Food basket (Pineapple) in Pantu area – 2,000 ha ● Food basket (Sweet Corn) in Simanggang area – 1,000 ha ● Agrotechnology Park in Lachau ● Agrotechnology Park in Temudok <p>The project requires the design and construction of lined storage ponds for each project and a reticulated water supply pipe fed from an elevated gravity feed tank supplied by a pump from the storage pond.</p> 								
Project Site:	Various sites throughout the Division								
Link Projects:	<ul style="list-style-type: none"> ● Food basket (Pineapple) in Pantu area – 2,000 ha ● Food basket (Sweet Corn) in Simanggang area – 1,000 ha ● Agrotechnology Park in Lachau ● Agrotechnology Park in Temudok 								
Project Rational:	<ul style="list-style-type: none"> ● Provision of irrigation for these specialised projects ensures consistently high production, which will be important for the downstream industries proposed for product value add ● Water supply costs can be recouped to some degree through water charges based on metered usage 								
Impacts/Outcomes:	<ul style="list-style-type: none"> ● Ability to reliably produce specialised crops ● Increased confidence for investors and developers in these areas 								
Estimated Budget:	<p>Estimated budget is</p> <table border="1"> <tbody> <tr> <td>● Lined storage pond</td> <td>RM250,000</td> </tr> <tr> <td>● Elevated tank</td> <td>RM500,000</td> </tr> <tr> <td>● Water supply pipe (150 mm dia)</td> <td>RM500,000 (allow for 10km@ RM50/m)</td> </tr> <tr> <td>● Pumps</td> <td>RM250,000</td> </tr> </tbody> </table>	● Lined storage pond	RM250,000	● Elevated tank	RM500,000	● Water supply pipe (150 mm dia)	RM500,000 (allow for 10km@ RM50/m)	● Pumps	RM250,000
● Lined storage pond	RM250,000								
● Elevated tank	RM500,000								
● Water supply pipe (150 mm dia)	RM500,000 (allow for 10km@ RM50/m)								
● Pumps	RM250,000								

Strategic Focus Area:		Infrastructure - Irrigation	
	Total for 4 schemes	RM6 million	
	It should be noted that these costs are generally inherent in the cost estimates for each of the agriculture projects.		
Activities/Components:	For each of the 4 projects: <ul style="list-style-type: none"> Storage pond sized in accordance with the projected water demand Elevated tank to allow gravity feed of supply Water main to project site, allowing the farm to connect to this supply for irrigation purposes (drip or sprinkler) Metering systems to measure the flow used 		
Investors:	Public Sector: 100 % RM6 million Metering charges can allow for the recovery of all or part of these costs		
Project Time Frame:	SHORT TERM – Feasibility assessment and irrigation infrastructure design MEDIUM AND LONG TERM – Progressive delivery of irrigation works in accordance with farm development timetable		
Key Success Factors:	<ul style="list-style-type: none"> Ability to deliver required quantities of water to target sites in a timely and efficient (minimal losses) manner 		
Possible Barriers & Threats	<ul style="list-style-type: none"> Identifying and developing a suitable water resource in close proximity to the proposed farm sites Metering can be prone to vandalism 		
Roles & Responsibilities:	Agencies		Roles & Responsibilities
	DID		Manage and Deliver projects
	Department of Agriculture		marketing/advice to farming entities
	SADA		Monitor outcomes and community benefits

2.9.4 Summary of Drainage, Irrigation and Erosion Projects

Table 2.13: Summary of Drainage Irrigation and Erosion Projects

Project Title	Project Components	Linked Projects	Estimated Costs	Agencies	Time Frame
SW-1 Drainage Upgrades for High Priority Areas	Identify priority sites	SW-2, SW-3	RM50,000,000	DID	S
	Design mitigation works			Council	S
	Implement designs			SADA	M-L
SW-2 Road Culvert Upgrades	Identify priority sites	SW-1, SW-3	RM50,000,000	JKR	S
	Design mitigation works			Council	S
	Implement designs			SADA	M-L
SW-3 Drainage planning linked to urban development	Policy development			Councils	M
RB-1 Riverbank Protection Works for High Priority Areas	Identify priority sites	-	RM100,000,000	DID	S
	Design mitigation works			Council	S
	Implement designs			SADA	M-L
IR-1 Flood Irrigation for Padi Projects	Design and construction of irrigation channels	AG-1 Batang Lupar Paddy Granary	Already allocated	DID	S-L
		AG-2 Pantu Specialty Rice Project	RM150,000,000	MoA LCDA/ FELCRA SADA	S-L
IR-2 Storage pond and feeder mains for non-Padi Projects	Storage ponds	AG-3 (Pineapple) in Pantu area	RM1,500,000	DID	S-L
	Feeder mains	AG-8 (Sweet Corn) in Simanggang	RM1,500,000	DoA	
	Drip or sprinkler irrigation	AG-10 Agrotechnology Park in Lachau	RM1,500,000	SADA	
	Pumps	AG-10 Agrotechnology Park in Temudok	RM1,500,000		
TOTAL			RM356 million		

SECTION 2.10 INFRASTRUCTURE (COMMUNICATIONS)

The proposed action plans have the following objectives:

- To increase the (location) exchange centre capacity based on future developments and population increase
- To ensure blanket coverage of Sri Aman with 4G wireless network coverage
- To require that all future greenfield sites have fibre optic cable installed

SACOFSA Sdn Bhd will play an important role to construct telecommunication tower(s) and provide remote areas wireless/cellular infrastructure. This will enable the promotion of IT knowledge, in line with the national vision to provide 100% telecommunication coverage nationwide, including Sri Aman Division, consistent under the Malaysia Communication and Multimedia Commission.

The overriding strategy in Sri Aman is to connect people and communities with services and markets, no matter where they live. Sri Aman can only develop fully once it has adopted the digital economy. The key to this is providing blanket wireless access for mobile phones and the internet.

2.10.1 Wireless Coverage

The use of wireless telecommunication systems is the key to development in the rural areas of Sri Aman. This will facilitate a rapid shift to a digital economy.

We recommend the role out of 4G technology as being the most appropriate for the Division at this time. (5G coverage is only about 1/20th of 4G and thus is really only suited to high-density population centres).

The planned rollout of new telecommunication towers is a critical component, and it is important that this has a very high priority for implementation in this region. We fully support the Government initiative to install an additional 85 towers across the division.

We also support the Government initiative to set up a government-owned company as a telecommunications service provider, especially if the various licensed wireless telecommunication companies indicate an unwillingness to utilise this infrastructure.

2.10.2 Remote Settlements

We recommend including two additional communication towers in Ulu Skrang to service approximately 10 settlements that will otherwise have no, or minimal, coverage.

We have also recommended the installation of an additional tower at Batang Ai Lake to service the proposed aquaculture landing and biosecurity complex there.

The Field Research Centre at Batang Ai National Park will also require a communication tower. This one will be powered by a local generator.

2.10.3 Upgrade Exchanges in Simanggang and Temudok

While we are not aware of capacity issues in these locations, we do expect that demand will increase dramatically as a result of the projects implemented under the Masterplan. In particular, Temudok will go from a minor demand centre to a major one.

The capacities of the exchanges that service these areas should be reviewed and upgraded in anticipation of forecast demand.

2.10.4 Committed Projects by Government

2.10.4.1 TC 1: Installation of 85 new towers across Sri Aman Division

This project will provide 4G wireless coverage for the majority of the population in the Sri Aman division.

Benefits:

- Rural and remote communities will have access to services, markets, and other communities via mobile phone and the internet
- This will facilitate access to and embracing the digital economy by the broader community

More than 20,000 people will benefit from this project.

Budget: RM77 million

Completion: 2030

Agency: SACOFA

2.10.4.2 TC 2: Installation of 20 VSAT units across Sri Aman Division

This project will provide limited wireless coverage for remote populations pending the installation of the towers under TC-1 and the implementation of wireless services. As the fixed towers are completed and services provided, the VSAT units can be relocated to other locations.

Benefits:

- Rural and remote communities will have limited access to services, markets, and other communities via mobile phone and internet while waiting for the fixed wireless infrastructure

Budget: RM15 million

Completion: 2025

Agency: SACOFA / TMB

2.10.4.3 TC 3: Review and Upgrade Telecom exchanges in Simanggang and Temudok

This project will ensure that capacity exists for the increasing populations in these growth centres.

Benefits:

- Demand from a growing population, increasing use of telecommunication services, and increasing reliance on the digital economy will be well accommodated into the foreseeable future

Budget: RM30 million

Completion: 2030

Agency: Telecom Malaysia

2.10.4.4 TC 4: Establish State Government-owned digital services provider

This project will allow the government to provide wireless communication services in the rural and remote parts of Sri Aman, where existing commercial providers are reluctant to do so.

Benefits:

- Rural and remote communities will have access to services, markets, and other communities via mobile phone and the internet
- This will facilitate access to and embracing the digital economy by the broader community

Budget:

To be funded by a levy on existing communications providers (in this way the well-serviced urban customers will be subsidising services to rural and remote communities. This could be seen as an 'equalisation' strategy)

Completion:	Establishment of entity	2025
	Roll out of services	2030
Agency:	Sarawak State Government	

2.10.5 New projects by SAMP

2.10.5.1 TC 5: Installation of 2 new towers in Ulu Skrang

This project will provide 4G wireless coverage for approximately 10 communities that will not be covered under the Government's current program.

Benefits:

- These 10 remote communities will have access to services, markets, and other communities via the internet

Budget: RM1.8 million

Completion: 2030

Agency: SACOFA

2.10.5.2 TC 6: Installation of 1 new tower for proposed Research Centre at Batang Ai NP

This project will provide 4G wireless coverage for the proposed new research centre at Batang Ai NP. This will facilitate wireless mobile and internet access for scientists, researchers, school groups, and other workers at this location.

The type of system required will need to be determined and will likely be based on topography and proximity to other towers. It may be that a VSAT solution will be the most appropriate.

Benefits:

- Scientific research activities will be enhanced through the provision of internet access
- This will enhance the experience of those using the facility and encourage demand for its use
- This will simplify logistics, supplies, and maintenance of the facility to a high standard
- This will facilitate responding to emergency and similar situations promptly
- This will allow early advice to authorities if illegal activities are observed in the NP

Budget: RM1.2 million

Completion: 2030

Agency: SACOFA

2.10.5.3 TC 7: Installation of 1 new tower for proposed Aquaculture Complex at Batang Ai Lake

This project will provide 4G wireless coverage for the proposed aquaculture landing complex and biosecurity station at Batang Ai Lake. This will facilitate wireless mobile and internet access for ice works, labs, processing, lighting, and admin buildings.

Budget: RM1.0 million

Completion: 2023

Agency:

SACOFA

2.10.6 Summary of Telecommunications Projects

Table 2.14: Summary of Telecommunications Projects

Project Title	Project Components	Linked Projects	Estimated Costs	Agencies	Time Frame
TC-1 Installation of 85 new towers across Sri Aman Division	New mobile phone/internet towers	-	RM77,000,000	SACOFA	S-L
TC-2 Installation of 20 VSAT units across Sri Aman Division	VSAT towers	TC-1	RM15,000,000	SACOFA / TMB	S-L
TC-3 Upgrade Telecom exchanges in Simanggang and Temudok		-	RM30,000,000	TMB	L
TC-4 Establish State Government-owned digital services provider	Set Up New Government Business	TC-1, TC-2, TC-5, TC-6, TC-7			M-L
TC-5 Installation of 2 new towers in Ulu Skrang	New mobile phone/internet towers	-	RM1,800,000	SACOFA	L
TC-6 Installation of 1 new tower for proposed Research Centre at Batang Ai NP	New mobile phone/internet tower	S1-4	RM1,200,000	SACOFA	M-L
TC-7 Installation of 1 new tower for proposed Aquaculture Complex at Batang Ai Lake	New mobile phone/internet tower	AQ-1	RM1,000,000	SACOFA	S-M
		Total	RM126 million		

SECTION 2.11 UTILITIES (ELECTRICITY)

2.11.1 SEB Proposed Projects

The following projects are planned by SEB and are supported by the SAMP. They consist of a series of Substation upgrades and transmission line extensions.

2.11.1.1 EL 1: Serudit to Sri Aman 132kV Transmission Line

This project will help to improve the grid system reliability.

Benefits

- Estimated to improve the system reliability to 14,000 customers in Sri Aman

Budget: RM90 million

Completion: 2023

Agency: SEB

2.11.1.2 EL 2: 33kV Overhead Line from Lachau EHV Substation to Temudok 33/11kV Transformer Station

This project will reinforce the Sri Aman system and improve supply to rural areas.

Benefits

- Estimated to benefit 1,000 customers

Budget: RM6 million

Completion: 2022

Agency: SEB

2.11.1.3 EL 3: Sri Aman 132/33kV Substation

This project will cater for load growth and mix development at Simanggang.

Benefits

- Provide voltage support and improve the reliability of supply to Simanggang and Temudok areas
- Estimated to benefit 14,000 Customers

Budget: RM100 million

Completion: 2030

Agency: SEB

2.11.1.4 EL 4: Ng Kesit Substation

This project will allow for the connection of supply to villages in Ng. Kesit, Ulu Lemanak, Ulu Engkari and Sekunyit.

Benefits

- Estimated to benefit 1,500 Customers

Budget: RM15 million

Completion: 2022
(completed Q2 2021)

Agency: SEB

2.11.1.5 EL 5: Second EHV 275/33kV transformer at Lachau

This project will improve the system reliability.

Benefits

- Estimated to benefit 1,000 Customers

Budget: RM20 million

Completion: 2022
(Completed Q2 2021)

Agency: SEB

2.11.1.6 EL 6: Upgrading of Sri Aman Sub transformer

This project will reinforce the Simanggang system leading to greater reliability.

Benefits

- Estimated to benefit 10,000 Customers

Budget: RM3.8 million

Completion: 2022

Agency: SEB

2.11.1.7 EL 7: Laying Double circuit from Sri Aman EHV to Sri Aman 33/11 kV Substation, Including CB Extension

This project will reinforce the Simanggang system reliability.

Benefits

- Estimated to benefit 10,000 Customers

Budget: RM25 million

Completion: 2025

Agency: SEB

2.11.1.8 EL 8: 33kV Covered Conductor line to Banting and new 33kV Substation at Banting

This project will provide a reliable supply to Banting and enable the closure of the Banting Power Station.

Budget: RM40 million

Completion: 2025

Agency: SEB

2.11.2 Summary of SEB Proposed Projects

Table 2.15: Summary of SEB Projects

Project Title	Project Components	Linked Projects	Estimated Costs	Agencies	Time Frame
EL-1 Serudit to Sri Aman 132kV Transmission Line	Transmission towers, HV line	EL-3	RM90,000,000	SEB	M
EL-2 33kV overhead line from Lachau EHV Substation to Temudok 33/11kV transformer station	Transmission towers/poles	-	RM6,000,000	SEB	M
EL-3 Sri Aman 132/33kV Substation	Substation	EL-1	RM100,000,000	SEB	L
EL-4 Ng Kesit Substation	Substation	-	RM15,000,000	SEB	M
EL-5 Second EHV 275/33kV transformer at Lachau	Transformer	EL-2	RM20,000,000	SEB	M
EL-6 Upgrading of Sri Aman Sub transformer	Transformer works	-	RM3,800,000	SEB	M
EL-7 Double circuit from Sri Aman EHV to Sri Aman 33/11 kV Sub station	Power lines	-	RM25,000,000	SEB	M
EL-8 33kV Covered Conductor line to Banting and new 33kV Substation at Banting	Power lines, Substation	-	RM40,000,000	SEB	M
		Total	RM299.8 million		

2.1.1.3 Electricity Supply for new SAMP Projects

2.1.1.3.1 Aquaculture Landing Area and Biosecurity Complex - Batang Ai

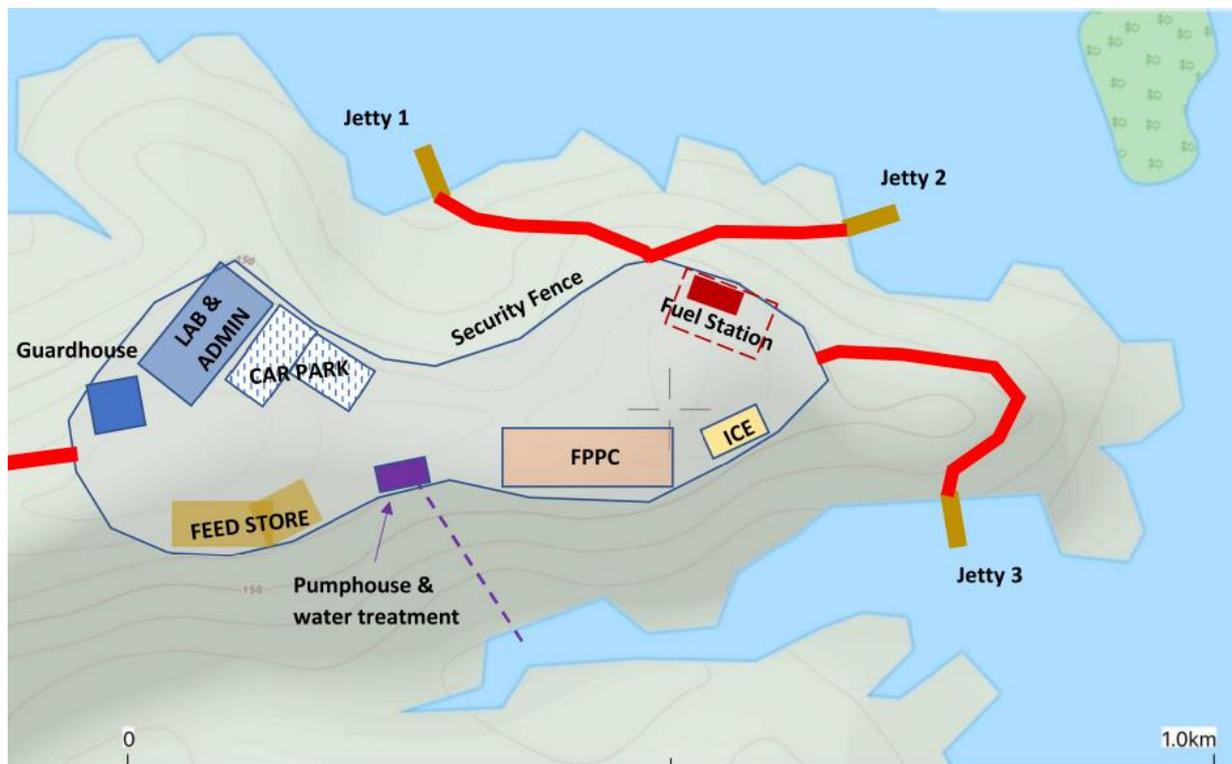
Refer to Project AQ-1 for details of this project.

The additional power demand for the new aquaculture complex (Fish landing, feed store, fish processing and packaging, biosecurity facilities) at Batang Ai is set out in Table 2.16. A possible arrangement for the Complex is shown in Figure 2-3.

Table 2.16: Power Demand Calculation for Aquaculture Complex at Batang Ai

Facilities	Unit	Daily Amount	Elec Rate	Energy/Day	Total	Rating
			kWh	kWh	kWh/d	MW
FPPC	per kg	35,000	0.8	28,000	84,160	3.5
FPPC (Cooler/Freezer)	per m2	200	150	30,000		
FPPC (General Facilities)	per m2	400	20	8,000		
Lab & Admin (incl A.C)	per m2	200	50	10,000		
Feed store	per m2	200	10	2,000		
Ice works	per kg	20,000	0.15	3,000		
Security lighting	day	1	20	20		
General lighting	day	1	40	40		
Pumphouse and WT	hour	6	500	3,000		
Telecom Tower	day	1	100	100		

Figure 2-3: Possible Arrangement for Aquaculture and Biosecurity Complex at Batang Ai



Source: UNIMAS Holdings

2.11.3.2 Fish hatchery, Temudok

The fish hatchery is expected to have a power rating of less than 2MW. The demand is estimated in Table 2.17.

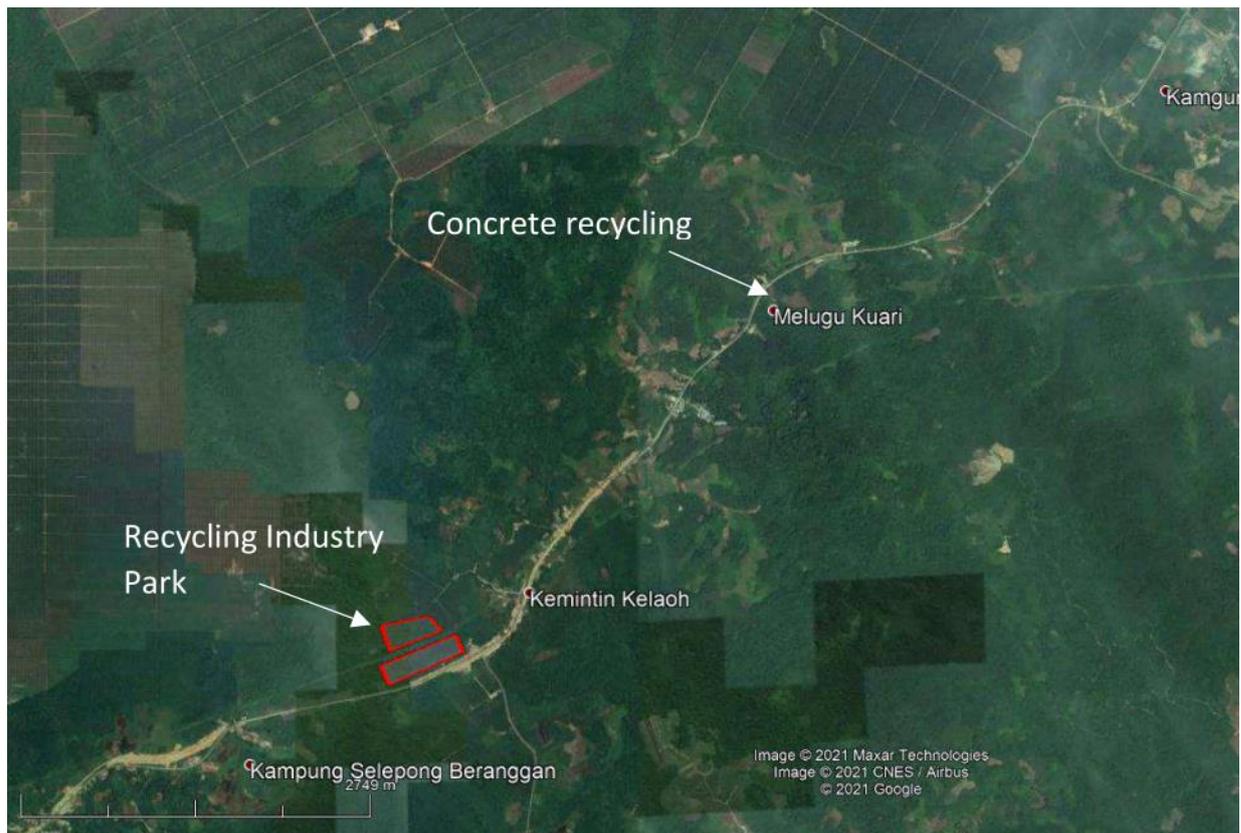
Table 2.17: Power Demand for Fish Hatchery at Temudok

Facilities	Unit	Daily Amount	Elec Rate kWh	Energy/ Day kWh	Total kWh/d	Rating MW
Aerators for ponds	ea	50	36	1,800	45,860	1.9
Operations Building	per m2	400	50	20,000		
Admin (incl. A.C)	per m2	200	50	10,000		
Feed store	per m2	200	10	2,000		
Security lighting	day	1	20	20		
General lighting	day	1	40	40		
Pumphouse and WT	hour	24	500	12,000		

2.11.3.3 Recycling Industry Park

Refer to Project WM-10 for details of this project. The location of the park is shown in Figure 2-4 and Figure 2-5.

Figure 2-4: Proposed Location of Recycling Industry Park



Source: Google Earth and UNIMAS Holdings analysis

The Recycling Industry Park will cater to many recycled products, focusing on plastics, glass, and metals. The processes all require energy input. The additional power demand is estimated in Table 2.18.

A proposed arrangement of the site is shown in Figure 2-6.

Figure 2-5: Land Requirement for Recycling Industry Park

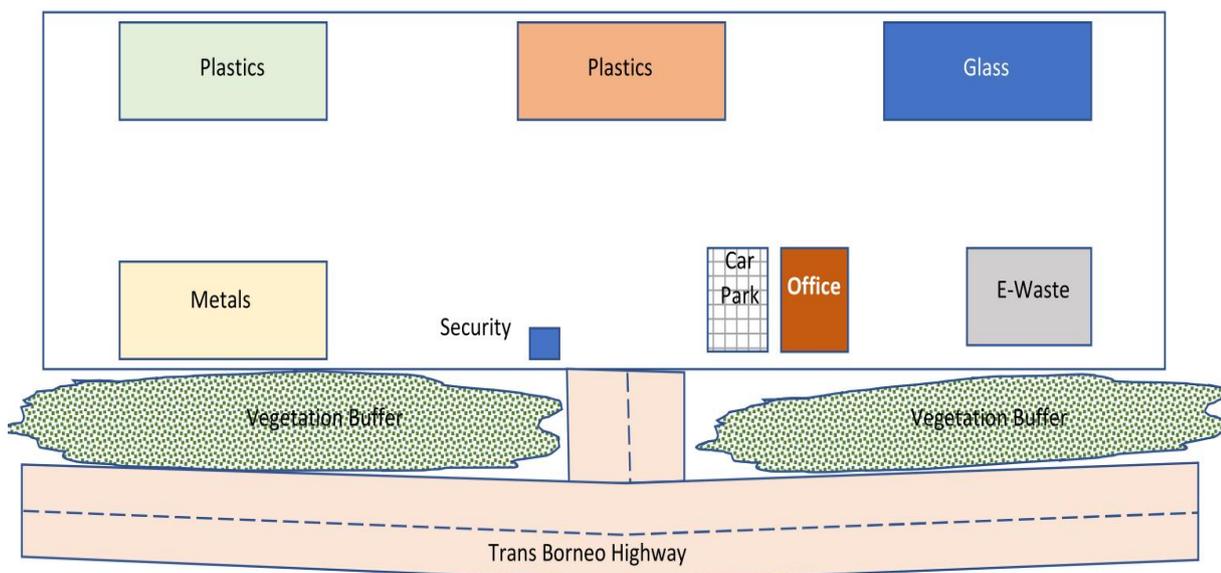


Source: Google Earth and UNIMAS Holdings analysis

Table 2.18: Power Demand from Proposed Recycling Industry Park

Facilities	Unit	Daily	Elec	Energy/	Total	Rating
		Amount	Rate	Day		
		kg	kWh	kWh	kWh/d	MW
Plastics Recycling Factory 1	per kg	20,000	0.15	3,000	410,500	17.1
Plastics Recycling Factory 2	per kg	20,000	0.15	3,000		
Metal Recycling Factory	per kg	5,000	0.05	250		
Glass Recycling Factory	per kg	2,500	0.7	1,750		
E-Waste Recycling	per kg	5,000	0.1	500		
General facilities (all factories)	per m2	20,000	20	400,000		
Admin (incl. A.C)	per m2	50	40	2,000		

Figure 2-6: Possible Arrangement for Recycling Industry Park



Source: Daya Rancang

2.11.3.4 CPPC Lachau

The CPPC in Lachau will have an estimated power rating of less than 10 MW.

2.11.3.5 CPPC Temudok

The CPPC in Temudok will have an estimated power rating of less than 10 MW.

2.11.3.6 Temudok Industrial Park (200 ha)

200 Ha is being set aside for an Industrial Park in Temudok. Whilst the nature of the industries is yet to be determined; it is expected that they will be related to the food and crop processing operations.

Given the uncertainties around the processes at this site, we recommend a conservative estimate of 100 MW be allowed.

2.11.3.7 Agrotech Park Lachau

The power demand from Agrotech Park is expected to be relatively low, say 3 MW.

2.11.3.8 Agrotech Park Temudok

The power demand from Agrotech Park is expected to be relatively low, say 3 MW.

2.11.3.9 Summary of Power Requirements for SAMP Projects

Table 2.19 summarises the power requirements for the SAMP projects expected to require significant additional power load from the current system.

Table 2.19: Power Requirements for SAMP Projects

Project Title	Power (MW)	Linked Projects	District	Location
Aquaculture Landing Area - Batang Ai	3.5	AQ-1	Lubok Antu	Batang Ai
Crocodile Farm in Simanggang	1.8	AQ-3	Sri Aman	Simanggang
Aquaculture for marine fish in Lingga	1.2	AQ-4	Lingga	Lingga
Fish hatchery, Temudok	1.9	AQ-5	Sri Aman	Temudok
Recycling Industry Park	17.1	WM-10	Sri Aman	Kpg Selepong Berangan
CPPC Lachau	10	AG-14	Pantu	Lachau
CPPC Temudok	10	AG-14	Sri Aman	Temudok
Temudok Industrial Park (200 Ha)	100		Sri Aman	Temudok
Agrotech Park Lachau	3	AG-10	Pantu	Lachau
Agrotech Park Temudok	3	AG-10	Sri Aman	Temudok
TOTAL	151.5			

SECTION 2.12 UTILITIES (WATER SUPPLY)

The following projects are planned by JBALB or SAWAS and are supported by the SAMP. We have no additional project proposals for water supply. JBALB current and proposed projects are shown in Figure 2-7 and Figure 2-8.



Figure 2-7: JBALB Current and Proposed Projects

Source: JBALB Sri Aman

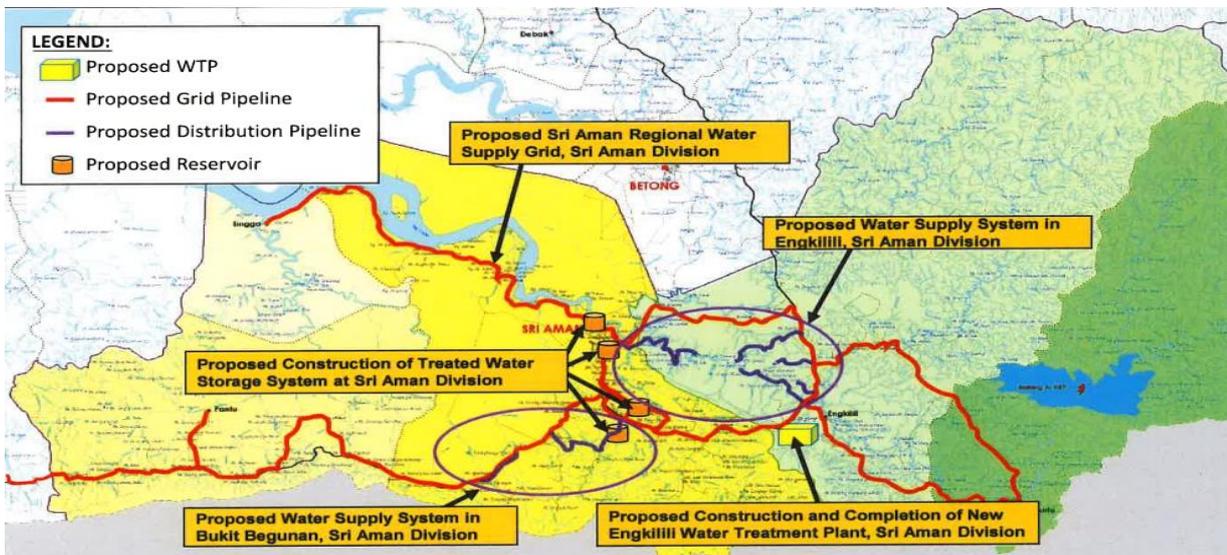


Figure 2-8: Proposed Water Supply Projects under 12MP in Sri Aman

Source: JBALB Sri Aman

2.12.1 Current Projects Under Implementation

2.12.1.1 Bayai Water Treatment Plant Upgrade and Resource Transfer Project

JBALB is upgrading the Bayai Water Treatment Plant to increase capacity from 33MLD to 53.3MLD. The project is approximately 60 per cent completed as of February 2021. It represents the first component

of a major raw water transfer project that will transfer water from Batang Lupar (near Engkilili) to Bayai WTP to supplement the current supply from Undup River. Project budget is RM161.5 million.

2.12.1.2 Improvement Works at Treatment Plants

JBALB is also undertaking improvement works at Skrang Water Treatment Plant, Seduku Agropolitan Water Treatment Plant. The main water supply will be extended to more communities in Batu Lintang / Undop area, by which 669 households will benefit from the improvements.

2.12.1.3 SAWAS Projects

SAWAS projects are being undertaken at Lepong Kepadang, Ng. Sepaya and Banting.

2.12.2 JBALB Proposed Projects

2.12.2.1 WS 1: Proposed Construction and Completion of New 75 MLD Engkilili Water Treatment Plant, Sri Aman Division

Increase production, water pressure and water quality by connecting the missing link of treated water supply between Sri Aman District and Lubok Antu District. It will benefit 19,000 households in Sri Aman Division. (It is noted that the second phase of this project will double the capacity to 150 ML/d by the year 2040).

Benefits

- Increase of production, water pressure and water quality
- Connecting missing link of treated water supply between the Sri Aman District and Lubok Antu District

Benefits over 19,000 household

Budget:	RM220	Completion:	2025	Agency:	JBALB
million					

2.12.2.2 WS 2: Proposed Construction of Treated Water Storage System near SMK Simanggang, Taman Sri Jaya, Pakit Cramp and Simpang Kiassan at Sri Aman Division

This project will provide a minimum of 24 hours storage of treated water as well as increasing water pressure in the local area. The project will benefit approximately 11,000 households.

Benefits

- 24 hours storage of treated water and increase water pressure
- Benefits 11,000 households

Budget:	RM30 million	Completion	2025	Agency:	JBALB
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2.12.2.3 WS 3: Proposed Sri Aman Regional Water Supply Grid, Sri Aman Division

Improve shortage of water quantity and quality within Sri Aman Division, especially during drought season, by interconnecting supply systems.

Benefits

- Improve raw water quantity and quality to all WTP within Sri Aman Division, especially during drought season
- Benefits for over 19,000 households

Budget: RM500 million

Completion 2030

Agency: JBALB

2.12.2.4 WS 4: Proposed Water Supply System in Bukit Begunan, Sri Aman Division

This project will extend treated water from the upgraded mains system to 450 households including those at Kpg Enkeramut, Kpg Nyelam, Kpg Nyelam Tengah, Kpg Nyelam Ulu, Po Ai, Poi Ai Enggat, Panggau, Batu Besai, Gua Bukat, Gua Dalam, Gua Ming, Gua Dunggat, Ran Iti, Ran Ulu

Budget: RM50 million

Completion 2030

Agency: JBALB

2.12.2.5 WS 5: Proposed Water Supply System in Engkilili, Sri Aman Division

This project will extend treated water from the upgraded WTP to 670 households including those at Kpg Basi, Kpg Spalau, Kpg Empelam, Kpg Engsura, SK Empelam, SK Basi, Geligau, Tebarong, Ng. Buno, Tawai, Langkang, Ijok, SK Ijok, Pedalai, Pak Tanjung

Budget: RM70 million

Completion 2030

Agency: JBALB

2.12.2.6 WS 6: Rural Water Supply Project for Pantu Area (Phase III)

This project involves upgrading the Pantu WTP to 5.3 MLD, installing 6 x High-Level Water Tanks, 6 x Booster Pump stations and 140km of reticulation pipes.

Benefits

- 2,291 households along Jalan Jaong, Jalan Ubah to Stapak and Jalan Kara/Punggu/Ran, Sk Jaong, Sk Leo Gayau, SJK Chung Hua Bangkok, SK Selanjan and SK Munggu Bringin)

Budget: RM120 million

Completion 2025

Agency: JBALB

2.12.2.7 WS 7: Sarawak Alternative Water Supply (SAWAS) for rural/remote parts of Lubok Antu, Skrang, Lingga and Pantu

This project involves RC water dam, reticulation pipe, storage tank complete with membrane systems.

Benefits

- 630 households (incl Banting, Ng Spaya and Lepong Kepadang)

Budget: RM152 million

Completion 2025

Agency: SAWAS

2.12.3 SAMP Proposed Project

2.12.3.1 WS-8 Water Grid Extension proposed under SAMP

In addition to the JBALB planned projects SAMP is proposing that JBALB consider extending the water grid connection from Pantu to Lingga once the new roads between these two towns are completed. This pipeline connection will add a lot of resilience to the water grid. It has not been a practical option up till now as there is currently no road connection through this area. However, the SAMP will construct a number of new roads and upgrade others so that transportation from Pantu to Lingga will be easily achieved. In these circumstances it will be feasible to install a pipeline along the road alignment. Total pipeline length would be approximately 50 km (Figure 2-9).

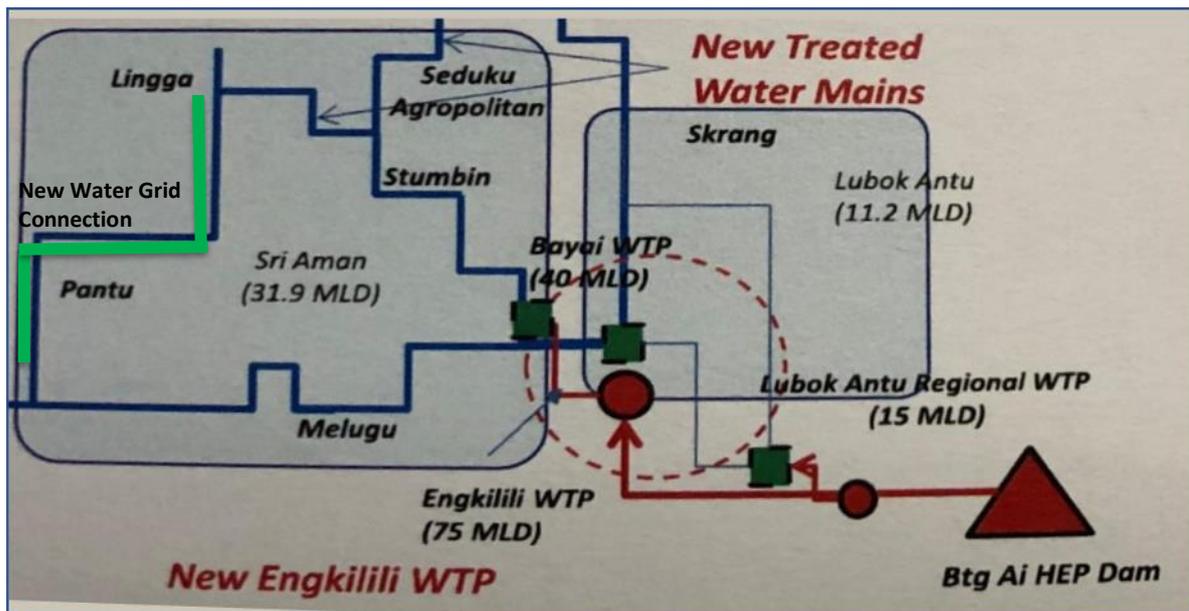


Figure 2-9: Proposed water grid extension (Pantu – Lingga) in relation to associated JBALB Projects

Based on indicative costings used in the *Sarawak Water Supply Master Plan and Water Grid DFR (Dec 2019)*, unit cost for this connecting pipeline would be RM1.3 million / km for a 600 mm dia pipeline. For 50 km this is a capital cost of RM65 million.

Budget: RM65 million

Completion 2030

Agency: JBALB

2.12.4 Summary of JBALB Projects and SAMP Projects

The water supply projects proposed by JBALB for the Sri Aman Division are shown in Table 2.20.

Table 2.20: JBALB Proposed Projects and SAMP Proposed Project

Project Title	Project Components	Linked Projects	Estimated Costs
Current water transfer and WTP upgrade for Bayai WTP on Sg Undup	Pipeline Intake WTP upgrade Pipe replacements		RM140,000,000
WS-1 New 75 MLD Engkilili Water Treatment Plant	Pumps	WS-5	RM220,000,000
	Treatment systems		
	Ponds		
	Office and Admin		
	Pipes, etc		
WS-2 Treated Water Storage System SMK Simanggang, and Simpang Kiassan	Storage tank and storage pond	-	RM30,000,000
WS-3 Sri Aman Regional Water Supply Grid	Pipe mains interconnected	-	RM500,000,000
WS-4 Water Supply System in Bukit Begunan	Extend water mains to settlements	-	RM50,000,000
WS-5 Water Supply System in Engkilili	Extend water mains to settlements	WS-1	RM70,000,000
WS-6 Rural Water Supply Project for Pantu Area (Phase III)	Upgrade WTP to 5.3 ML/d	EL-2	RM120,000,000
	Install 6 x High-level water tanks		
	^ booster pumps		
	140 km of water reticulation pipes		
WS-7 SAWAS) for rural/remote parts of Lubok Antu, Skrang, Lingga and Pantu	RC dam on the waterway	-	RM152,000,000
	Storage tanks		
	Treatment if required		
	Reticulation piping		
WS-8 Water Grid Pipeline extension from Pantu to Lingga	600 mm dia Pipeline (50 km)	-	RM65,000,000
		Total	RM1,347 million

2.12.5 Water supply for new SAMP Projects

Following are estimates for significant water supply-demand from specific projects proposed under SAMP.

2.12.5.1 Water supply for Recycling Industry Park

The recycling industry park will cater for a range of recycled products. Whilst most of these (plastics, metals) are not large users of water, there is potential for glass recycling to be a major user if the recycling approach focuses on washing and disinfecting bottles for re-use.

A rough estimate of additional supply that should be allowed for the recycling industry park is 1,000 m³/day.

2.12.5.2 Water supply for CPPC Lachau

Much of the crop processing and packaging will involve washing. These are the following operations: (1) raw produce washing, grading, and trimming, (2) washing after steam/lye peeling and/or size reducing, (3) There are five major activities involving water supply fluming, (4) filling, (5) sanitation/plant cleanup.

An average value for processing vegetables and fruit products is 20 L/kg.

For a throughput of 50 ton/day, this will require 1000 m³/day. (1 ML/d)

2.12.5.3 Water supply for CPPC Temudok

The water demand for this CPPC will be similar to that for the Lachau CPPC. Allow for 1000 m³/d. (1 ML/d)

2.12.5.4 Water Supply for Temudok Industrial Park (200 Ha)

The nature of the industries here is still to be determined. However, it is expected that they will relate to the food processing industry. Given that the Park is 20 times the size of the CPPC, we recommend that a water supply-demand of 8 ML/d (8,000 m³/d) be allowed for.

2.12.5.5 Water supply for Agrotech Park Lachau

The Agrotech Park will require a continuous, reliable supply of high-quality water. This can be supplied from local water sources such as rivers and streams, with some primary treatment. Potable water from the town supply is not preferred as the nutrients are usually removed, and chlorination can be harmful to plants. It is also more expensive.

Water demand from town supply would be less than 100 m³/d.

2.12.5.6 Water Supply for Agrotech Park Temudok

As for Agrotech park in Lachau, allow for 100 m³/d.

2.12.5.7 Summary of Water Demand from SAMP Projects

Table 2.21: Water Supply Demand Estimates for Major SAMP Projects (M³/d)

Project	M ³ /d	
WS-8	Water supply for Recycling Industry Park	1,000
WS-9	Water supply for CPPC Lachau	1,000
WS-10	Water supply for CPPC Temudok	1,000
WS-11	Water Supply for Temudok Industrial Park (200 Ha)	8,000
WS-12	Water supply for Agrotech Park Lachau	100
WS-13	Water Supply for Agrotech Park Temudok	100
TOTAL		11,200

SECTION 2.13 WASTE MANAGEMENT (SOLID AND LIQUID WASTE)

2.13.1 Solid Waste Management

Strategies to manage the collection and disposal of solid waste in Sri Aman cover a number of themes:

- Increase collection coverage
- Improve/upgrade existing landfill sites
- Establish a new landfill site to meet high sanitary standards and current best practice
- Reduce waste in the community
- Improve waste management in remote settlements
- Establish a viable recycling industry

The new sanitary landfill site is to be located at Lubok Antu (likely adjacent to the existing site).

There is also a plan to establish an additional sanitary landfill site in, or near, Simanggang. However this plan is beyond the 10 year time frame of the SAMP.

2.13.1.1 WM I: Upgrading of existing dumpsites/landfills in Sri Aman

Four of the five existing dumpsites/landfills (Entulang, Lingga, Pantu and Engkilili) in Sri Aman should be upgraded. Given that each of these sites is nearing capacity, the upgrades can be fairly basic to facilitate the transition to a single sanitary landfill site for the Division. It is anticipated that, by 2026, these dumpsites are to be safely closed and replaced with the new Lubok Antu level 4 sanitary landfill. Once these sites reach their capacity, they should be safely closed, capped and the site rehabilitated appropriately.

Cost for temporary upgrade/improvements = RM 1 million for each landfill = RM 4 million

Cost to close the existing landfill/dumpsites and rehabilitate when new Level sanitary landfill at Lubok Antu is available = RM2.5 million each = RM12.5 million

Total Budget: RM16.5 million

<u>Completion:</u>	Upgrade landfills	2023
	Close landfills	2026
	Rehabilitation of sites	2030

Agency: Local Council

2.13.1.2 WM 2: Expand and upgrade the Lubok Antu site to a Level 4 Sanitary Landfill

The existing Lubok Antu landfill is recommended to be upgraded to a level 4 sanitary landfill catering for the entire region (Eco-Ideal Consulting Sdn Bhd, 2018). A level 4 landfill will be equipped with leachate collection and treatment facilities and a gas collection system.

Cost for new Level 4 sanitary landfill at Lubok Antu to service the Division = RM12 million (not including any land purchase cost).

Budget: RM12.5 million

Completion: Establish new Level 4 sanitary Landfill 2026

Agency: Local Council

2.13.1.3 WM 3: Waste Transfer Stations to be established at Entulang, Pantu, Lingga, Engkilili, and Lubok Antu

Once the Lubok Antu Level 4 Sanitary Landfill is in place, all MSW in the Division will be sent there. To facilitate this, waste transfer stations will need to be established at each of the existing four landfill sites.

Budget: RM2.5 million per site x 5 sites = RM12.5 million

Completion: 2026

Agency: Local Councils

2.13.1.4 WM 4: Extend solid waste collection services to more rural areas within the Sri Aman Division

Waste collection services should be extended to more of the rural areas in Sri Aman as road upgrading, and new road projects make settlements more accessible.

Approximately 150 km of new or upgraded roads will be available for this. An additional cost is estimated at RM10,000/km.

Budget: RM1.5 million/year

Schedule: This will gradually be rolled out across the 10 years as access roads become available.

2.13.1.5 WM 5: Waste segregation and Scheduled collection for household bulky, green and recyclables waste

The Study on Integrated Solid Waste Management for Sarawak (2018) concluded that a separate scheduled collection for household bulky, green waste, and recyclables should be implemented to reduce illegal dumping. However, an ideal collection schedule has to optimise collection frequency, size of truck and number of trips to the designated disposal sites or treatment facilities (e.g., Civic Amenity Sites) (Eco-Ideal Consulting Sdn Bhd, 2018).

We recommend a separate study to establish the feasibility of this and plan its roll-out in suitable areas in Sri Aman. We expect implementation to follow take-up in Kuching and Sibul and will be beyond 2030.

Cost for study: RM750,000

Study completion: 2025

2.13.1.6 WM 6: Set-up of Civic Amenity Sites (CAS)

Consistent with the recommendations from the Study on Integrated Solid Waste Management for Sarawak (2018), Civic Amenity Sites (CAS) can be established at strategic locations in Sri Aman Division. The CAS shall provide a permanent and convenient location for waste generators to deliver their waste, such as bulky and green waste (Eco-Ideal Consulting Sdn Bhd, 2018). These sites may coincide with the waste transfer stations.

Budget Included in WM-3

2.13.1.7 WM 7: Composting plant/Green centres for food waste at commercial premises

Green centres with compost machine/harvester can be installed in commercial premises such as community markets. Composting projects introduced consists of the provision of separate bins for the segregation of wastes (food/compostable waste) into a separate bin while remaining wastes are placed in another bin for disposal, as well as training hawkers to segregate waste for compost. Such composting projects (Green Centres) have been implemented by the Majlis Bandaraya Kuching Selatan (MBKS) in collaboration with the hawkers at the Stutong Wet Market and Petanak Wet Market since 2011.

Budget: RM1 million per District = RM5 million

Schedule: Implementable in 2027

2.13.1.8 WM 8: Public awareness on waste minimisation, recycling, and composting

Public awareness on waste minimisation, recycling and composting at home and in the community can be raised through engagement with governmental agencies and non-profit organisation (NGOs).

No separate budget required.

2.13.1.9 WM 9: Waste management in Remote communities

There is currently no regular collection of municipal solid wastes at settlements upstream of Batang Ai Dam. There are facilities at Batang Ai commercial village and jetty that are serviced by the Council. The settlements in the catchment dispose of their household waste by burning, throwing it into rubbish pits or throwing it into the nearby forest area. A proportion of this finds its way into the Rivers and the Lake. The lack of proper waste disposal systems is a community development issue but impacts navigation, tourism, and health.

Collection by the council, transport to the Dam, and carriage to the Council waste disposal site, is an option but will be very expensive and complex.

We recommend a more cost-effective approach of establishing suitable waste disposal sites for each settlement, putting in place a system for collection and disposal of inorganic waste at each site, and education/training to complement the system.

The remote, isolated areas should be equipped with a proper self-sustaining waste disposal system. The Water Supply and Environmental Sanitation Unit (BAKAS) in the Ministry of Health has developed a set of guidelines to manage solid waste in rural settings (Garis Panduan Pelupusan Sisa Pepejal Luar Bandar, 2010). This includes the development of disposal facilities or containers, e.g., garbage pit with cover and garbage bins, to effectively manage solid waste in the rural areas (Eco-Ideal Consulting Sdn Bhd, 2018). Besides developing suitable disposal sites, a waste collection system and disposal practices should also be established.

This can be implemented for all remote communities, not just those at Batang Ai.

2.13.2 Summary of Solid Waste Management Projects

Table 2.22 provides a summary of the solid waste management projects discussed above.

Table 2.22: Summary – Solid Waste Management Projects

Project Title	Project Components	Linked Projects	Estimated Costs	Agencies	Time Frame
WM-1 Upgrading of existing dumpsites/landfills at Entulang, Lingga, Pantu, Engkilili	Temporary upgrade	WM-2	RM4,000,000	Councils	S
	Closure in 2026 and Rehabilitation		RM12,500,000		
WM-2 Expand and upgrade the Lubok Antu site to a Level 4 Sanitary Landfill	Leachate collection and treatment	-	RM12,500,000	MDLA	M
	Gas collection				
	Waste segregation				
	Recycled Waste Transfer Station				
WM-3 Waste Transfer Stations to be established at Entulang, Pantu, Lingga, Engkilili, and Lubok Antu	Close ex landfills and create new Waste Transfer Stations	WM-2	RM12,500,000	Councils	M
WM-4 Extend solid waste collection services to more rural areas	Annual cost	-	RM1,500,000	Councils	S-L
WM-5 Waste segregation and Scheduled collection for HH bulky, green and recyclables waste	Investigative study	WM-10	RM750,000		S
WM-6 Set-up of Civic Amenity Sites (CAS)		WM-10	Incl in WM-3	Councils	M
WM-7 Composting plant/Green centres for food waste at commercial premises		-	RM5,000,000	Councils	S-M
WM-8 Public awareness on waste minimization, recycling, and composting		WM-10	-	Councils	S-L
WM-9 Waste management in Remote communities	Design and Construction for 23 longhouses	-	RM690,000	MDLA	S-L
	Maintenance (Annual)		RM345,000		
Total (Capital)			RM48 Million		
Total (Maintenance)			RM1.85 million		

2.13.3 Solid Waste Recycling

The recycling industry is in its infancy in Sarawak but has incredible potential to grow and be very profitable, both economically and environmentally. It is envisaged that Sri Aman is well placed to play a key role in the development of this industry by establishing a Recycling Industry Park to service Kuching, Sibu, and intermediate urban centres.

2.13.3.1 WM 10: Recycling Industry Park

2.13.3.1.1 *The Concept*

A State-of-the-Art recycling Industry Park will be established at a suitable site in Sri Aman. It will have facilities dedicated to the recycling of various waste materials:

- Metal (steel, aluminium, copper, etc.)
- Electronics (extracting important elements from computers, TV's, phones, etc.)
- Plastics
- Glass
- Concrete

Materials are to be delivered to the site following segregation. That is, segregation is not part of the facility but needs to be undertaken by Local Authorities or suppliers within their jurisdiction. A secondary sorting may be applicable at the site for some applications (e.g., types of plastic, electronic components).

Suppliers will be paid for the raw materials provided, but the cost will be reduced if segregation/sorting is sub-standard.

2.13.3.1.2 *Recycled materials*

The raw materials will be reprocessed into marketable products. Some examples are:

Glass

Glass is infinitely recyclable without loss in quality. Recycling glass has many environmental benefits – it reduces emissions, saves energy, and reduces the consumption of raw materials.

To recycle glass, it first goes through a pre-treatment process which removes any paper or plastic using blown air. Any metal objects are removed with magnets. Next, it is sorted by colour and washed to remove any further impurities. Then it is crushed, melted, and moulded into new products such as bottles and jars.

Generally, only bottles and glass containers are recycled. Drinking glasses, glass objects, and window glass have different chemical properties and melt at different temperatures than recyclable bottles and containers.

The cost savings of recycling glass is that it requires less energy. Also, as the cost of silica sand continues to increase as the demand exceeds supply, the recycled material becomes more economically attractive.

Uses for recycled glass (as crushed glass material called 'cullet') are:

- Fibreglass manufacturing
- Abrasives (sandblast media, etc.)
- Flux/binder in ceramics and bricks
- Soil amendment (an alternative to natural clays and zeolites)
- Filtration medium (swimming pools, and potentially municipal water)

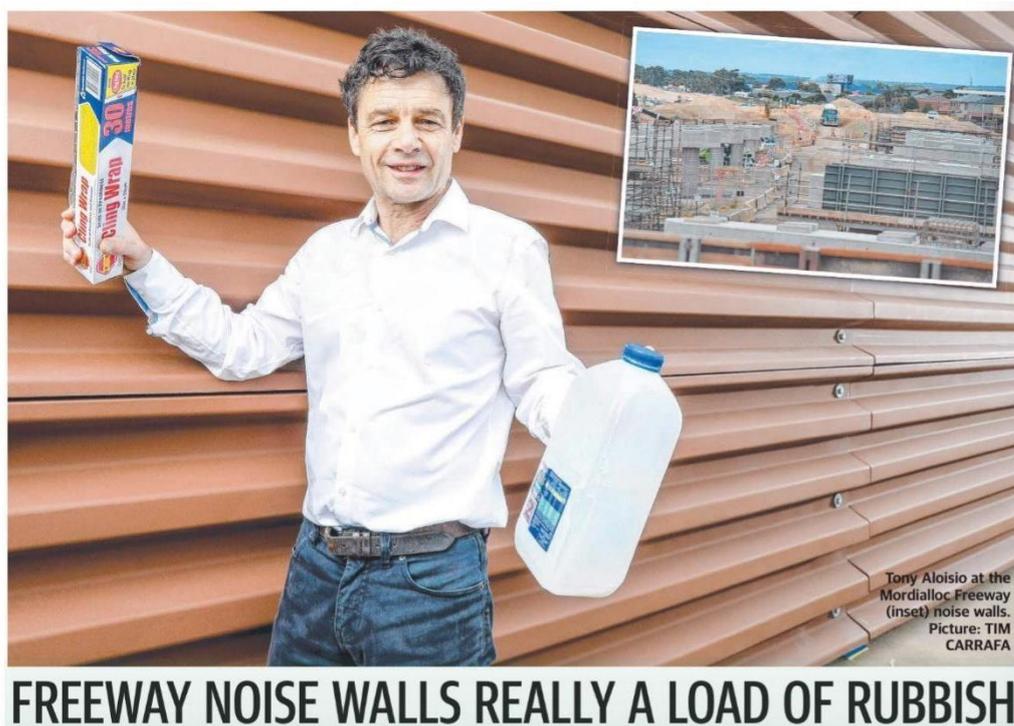
- Fractionator in matches and ammunition
- Additive and flux in metal foundry
- Filler in paint and plastic
- Hydroponic rooting medium

Plastics

Plastics are an incredibly versatile material that lends itself to recycling in many different forms.

There are two ways to recycle plastic: (1) mechanical recycling ("chop and wash"), where the plastic is washed, ground into powders, and melted, and (2) chemical recycling, where the plastic is broken down into monomers.

Figure 2-10: Freeway Noise Walls Manufactured from Recycled Plastic



Source: (Melbourne Herald Sun)

There are six common types of plastics:

- PS (Polystyrene) – Example: foam hot drink cups, plastic cutlery, containers, and yoghurt
- PP (Polypropylene) – Example: lunch boxes, take-out food containers, ice cream containers
- LDPE (Low-density polyethene) – Example: garbage bins and bags
- PVC (Plasticised Polyvinyl chloride or polyvinyl chloride)—Example: cordial, juice, or squeeze bottles
- HDPE (High-density polyethene) – Example: shampoo containers or milk bottles
- PET (Polyethylene terephthalate) – Example: fruit juice and soft drink bottles

Figure 2-11: Recycled Plastic Floating Mats for Environmental Works



Each plastic type needs to be subject to a different recycling process. The cost-effective and efficient recycling of the mixed plastic waste stream is perhaps the biggest challenge facing the recycling industry.

Figure 2-12: Plastic Bottle Recycling



Recycled concrete

Concrete building waste is often excluded from local landfills and can be designated as prescribed waste. This means that it is difficult and expensive to dispose of. Recycling the concrete is not only good use of resources but also benefits landfill capacity.

Concrete from demolition can be crushed to form aggregate suitable for many purposes:

- Road base
- Crushed rock applications
- Use in concrete for ground slabs and pavements.
- Used for environmental fill in remediation projects.



Electronic Waste (e-waste)

Electronic Waste (known as e-waste) refers to electronics and electronic parts which are no longer deemed useful or already nearing the end of practical use. Some of the causes and sources of e-waste include computers and other IT hardware, electronic appliances such as microwaves and televisions, and devices such as mobile phones, printers, photocopiers, etc.

Due to the effects of e-waste on the environment, careful e-waste collection is crucial.

Lead from cathode ray tubes, chromium found in tapes, and polychlorinated biphenyls found in computer parts can contaminate soil and water. If burned with traditional waste, it can affect air quality. Toxic substances such as lead, chromium, cadmium, and PCB can trigger serious health conditions like heart disease, lung failure, and even reduced fertility.

Each electronic device is made from precious metals like gold in circuit boards, copper for connective wires and silver in solder. When these electronic devices are properly recycled, the precious materials can be sold for profit and turned into something new. For instance, cell phone batteries can be used to make new smartphones and batteries, while zinc and aluminium from laptops and tablets can be used for metal plates, jewellery, cars or art.

Figure 2-13: Typical E-Waste



The process generally involves workers manually disassembling end-of-lifecycle home appliances. Custom-developed automated machinery is available (e.g., from Mitsubishi Electric), which then crush the products, separating metals and plastics, before further crushing the plastics into mixed plastic flakes.

In 2010-2011 Mitsubishi reported the following recovery rates for end-of-life home appliances that were taken back (Table 2.23). That indicates that an 82% recycling rate was able to be achieved.

Table 2.23: Recovery Rates for recycling of home appliances

End-of-Life products (tons)			Resources Recovered (tons)	
Air conditioners	17,587		Metals	36,607
Televisions	35,605	Glass	14,842	
Refrigerators	23,753	Fluorocarbon	367	
Washing machines/driers	7,135	Other	17,542	
Personal computers	69			
TOTAL	84,149	TOTAL	69,358	

Source: Mitsubishi Electric Group Environmental Sustainability Report 2011

Metals

Almost All Metals are Recyclable · Aluminium, Brass and Bronze, Cast Iron, Copper, Steel, Tin.

Scrap metal can be recycled into many components such as furnishings, fixtures, and metal roofing materials. Recycled aluminium and steel are commonly reused as new food packaging.

Recycling of metals comes with significant materials and energy savings compared with creating a new product.

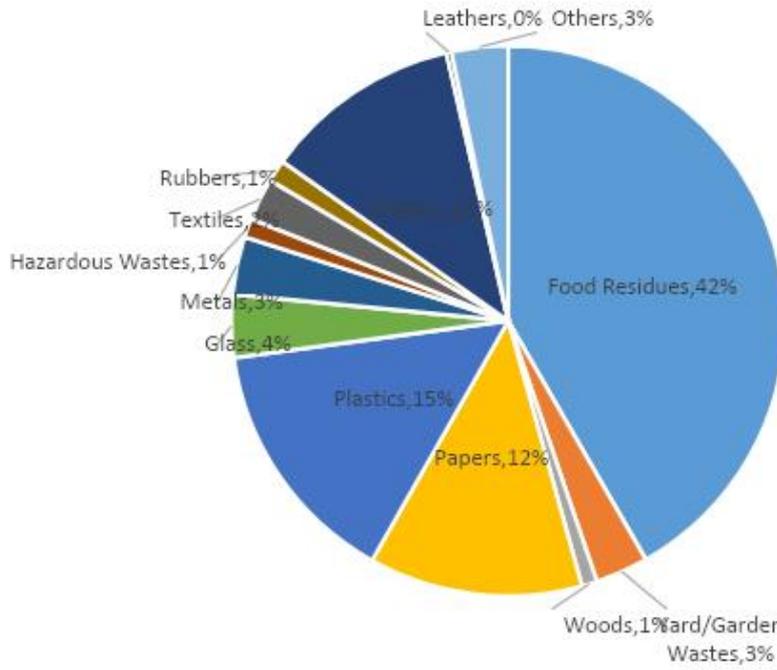
2.13.3.1.3 Potential for Recycling

The average household waste composition from five local government areas in Sarawak is shown in Figure 2-14. From this, it can be seen that approximately 39% of the waste stream is potentially recyclable.

The average makes up of construction, and demolition waste is shown in Figure 2-15. More than 50% of these materials can be considered to be recyclable.

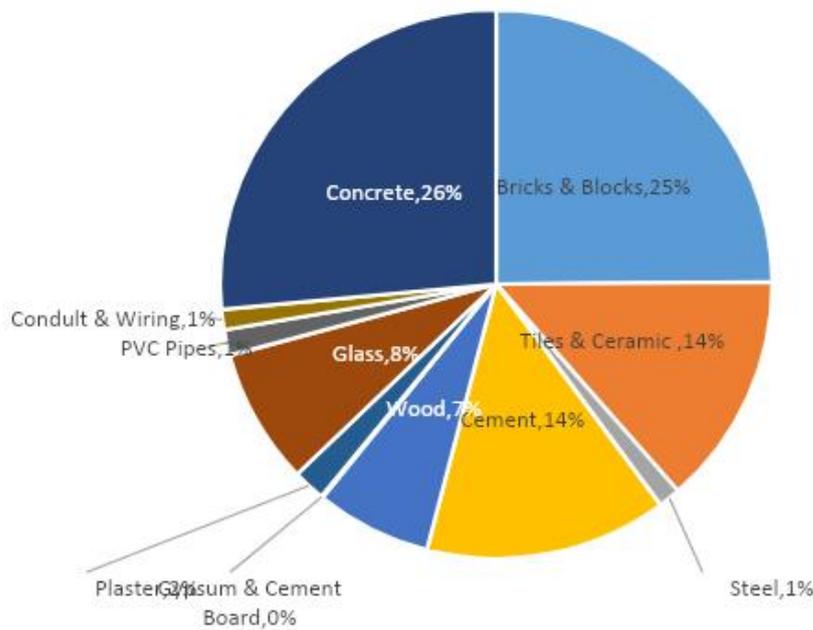
The current number of recyclables collected in Kuching and Sibul is shown in Table 2.24, and the effective recycling rate in Table 2.25. The potential to improve the rate of recycling is apparent. These figures emphasise an imperative for Sarawak to start to focus on a practical strategy to ramp up the recycling industry.

Figure 2-14: Average Composition of the Waste Stream in Sarawak



Source: Study on Integrated Solid Waste Management in Sarawak, 2020

Figure 2-15: Composition of Construction and Demolition Waste in Sarawak



Source: Study on Integrated Solid Waste Management in Sarawak, 2020

Table 2.24: Recyclables Collected by LA's in Kuching and Sibü (tonnes)

Local Authority	Paper / Cardboard	Plastics	Aluminium (cans)	Metals	Total
MBKS (Kuching)	94.7	7.8	0.5	2.9	105.9
SMC (Sibü)	156.3	15.0	1.4	11.1	183.8
TOTAL	251.0	22.8	1.9	14.0	189.7

Source: Study on Integrated Solid Waste Management in Sarawak, 2020

Table 2.25: Recycling Rate for LA's in Kuching and Sibü

Local Authority	Total waste Generation (tonnes/year)			Recycling rate
	Household	Commercial & Ind	Total	
MBKS (Kuching)	65,666	11,251	76,917	0.14%
SMC (Sibü)	63,621	10,234	73,855	0.25%

Source: Study on Integrated Solid Waste Management in Sarawak, 2020

If there is an objective to increase the recycling rate to 10% by 2030, the total amount of recyclable materials from Kuching and Sibü alone would be 15,000 tonnes. If 20% of those materials were directed to Sri Aman for recycling, that would be 3,000 tonnes/year. That would certainly be sufficient raw material to get the recycling park established and provide for sustainable production.

Once the facilities are available and the recycled products are in the market, the potential for these businesses to grow must be considered very high.

2.13.3.1.4 Business Model

The Sri Aman Recycling Park will be an industry that relies on a secure supply of raw materials obtained at a low cost. It can produce valuable commodities from this material at a significant profit. It is an industry that the government has an inherent interest in supporting. It provides an important service to the community and stands to enhance Council and State Government esteem in the eyes of its citizens. Further, it will be a key strategy in managing waste to minimise impacts on the environment.

The Recycling Park will produce recycled goods. It is not intended to be a waste sorting centre. Waste delivered to the Recycling Park is to already be segregated into its material components. In the case of plastics, some secondary segregation into different plastic types can take place at the park, but the plastic must arrive uncontaminated by other materials.

Suppliers will be paid for their raw material, with the price paid depending on the quality supplied.

The Government will select a suitable site and develop the land as an industrial park, providing services (power, water, telecommunications, drainage, etc.). The sites will be leased or sold to private enterprise companies at attractive rates. A corporate body type of management system will manage the site, including maintenance, landscaping, and security.

In this way, the initial outlay by the government can be kept within reasonable limits, and the expenditure recouped over the operational period.

2.13.3.1.5 Location and Size

The site should be close to the Trans Borneo Highway and utilise land less suitable for agricultural development. Thus, a site in shallow peat would be suitable.

The actual site should be subject to investigation, but we can suggest that one of the areas that should be considered could be southwest of Kemintin Kelaoh, on the north side of the highway. According to the soils map, this area is shallow peat. The location is shown in Figure 2-16.

Figure 2-16: Possible Location for Sri Aman Recycling Industrial Park



Source: Google Earth and Daya Rancang

The site is approximately 166 km from Kuching and 235 km from Sibü. It is also approximately halfway between Lachau and Sri Aman and will, thus, contribute to development along this corridor.

Land ownership and availability is unknown at this stage. However, there is a HV power transmission line corridor that is adjacent to this site.

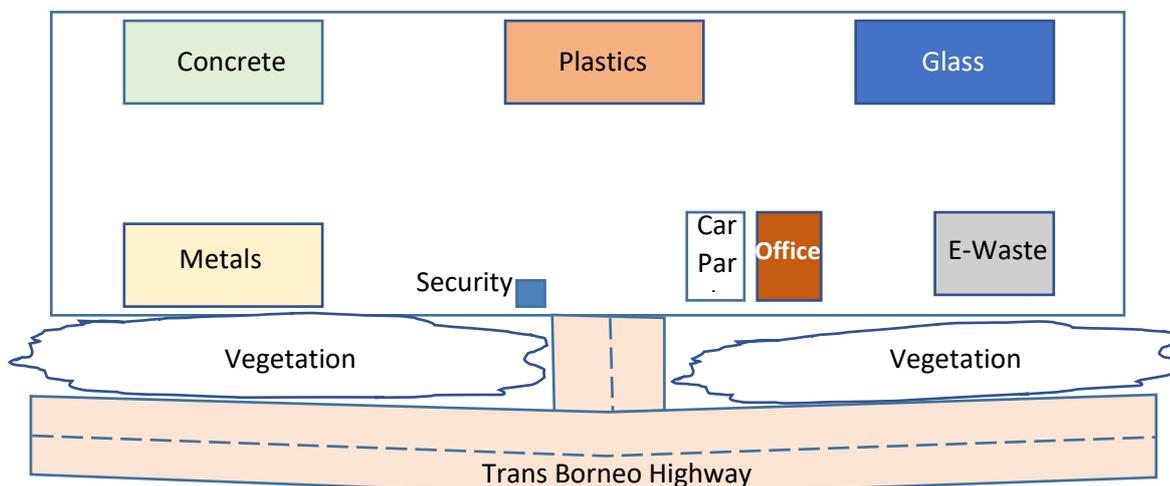
We suggest an area of approximately 10 Hectares will be suitable initially. An additional 7 Ha should be purchased with a view to future expansion.

A possible configuration for the park is shown in Figure 2-17.

Concrete recycling has not been included in the park, though it remains an important component of the initiative. Concrete recycling has many similarities with the quarrying process. In particular, it requires crushing and grading of the material. This can be a process that creates significant amounts of noise and dust.

As such, we recommend that a suitable facility be established at the existing Melugu Quarry site, some 4 km north of the proposed recycling Industry Park. The concrete recycling facility may well be able to share some of the quarry facilities.

Figure 2-17: Possible Layout for Sri Aman Recycle Industry Park



Source: *Daya Rancang*

2.13.3.1.6 Cost of Development

Government capital expenditure will relate to land purchase, land clearing and development, including fill material, security fencing, infrastructure for drainage, water supply, power, and telecommunications.

Land purchase 17 ha @ RM300,000/ha	= RM5,100,000
Land development 10 ha @ RM100,000/ha	= RM1,000,000
Pavement and entry roads	= RM1,000,000
Infrastructure (provisional)	= RM5,000,000
Security	= RM250,000
TOTAL	= RM12,350,000

Lots on the site are to be leased to private industry operators who will set up their facilities.

The lease payments will offset the capital investment by Government and should enable all costs to be recouped over time.

Nevertheless, it is expected that significant incentives will be required initially to establish the park as a going concern.

Once a recycling facility is available, we anticipate that there will be strong support from LA's across the southern part of Sarawak, who are keen to reduce landfill waste and enhance their green credentials through an active recycling initiative.

2.13.3.1.7 Recommendation

We recommend that a feasibility study be undertaken into setting up a waste recycling centre in the Sri Aman Division to service segregated waste from Kuching and Sibul, as well as neighbouring Divisions and Sri Aman itself.

The Study should also establish the appetite of private enterprise businesses to be a part of this venture. It will investigate suitable sites, including the site proposed in this report.

2.13.4 Liquid Waste (Sewerage) Management

Sri Aman relies predominantly on a septic tank treatment system. The efficacy of this system is highly dependent on regular maintenance, including regular desludging of the tanks. However, there is currently no local disposal facility for sludge that is removed from the tanks. The nearest suitable facility is in Kuching.

2.13.4.1 Current projects

2.13.4.1.1 Construction of Regional Septic Sludge Treatment Facility

Under the eleventh Malaysian Plan (RMK-11), the Sri Aman-Betong Septic Sludge Treatment Plant has been proposed to serve the Sri Aman and Betong Division. The proposed Sri Aman-Betong Septic Sludge Treatment Plant is located next to the existing Betong Landfill, approximately 5 km from Betong Town. This treatment plant is designed to have an ultimate capacity of 100 m³/day. The project has a budget of RM15 million. While the design is completed, a completion date for the project has not yet been set.

Treated sludge can be further dried into fertilizers for landscaping purposes.

2.13.4.2 Proposals under SAMP

The SAMP has a number of recommendations with respect to the management of liquid wastes in the Division.

2.13.4.2.1 LW 1: Localised sewage treatment plants

Commercial and institutional establishments such as hotels, resorts, large eateries, schools, learning centres, army camps, police station should be equipped with sewage treatment infrastructure such as packaged plants. Sewerage design is to comply with the Sarawak Urban Sewerage Systems Guidelines and the Malaysian Sewerage Industry Guidelines.

This approach could also be adapted for larger-scale greenfields residential developments.

Budget:

This constitutes a policy approach, and no budget is required.

Agency:

To be made a component of development approval. Thus, it will involve the Local Council, JKR, DID and development proponents.

2.13.4.2.2 LW 2: Industrial effluent treatment systems

Industrial premises are to design an industrial effluent treatment system as per the Environmental Quality (Industrial Effluent) Regulations, 2009. New sources of industrial effluent must be notified to the Department of Environment. The discharge of industrial effluent must comply with the Environmental Quality (Industrial Effluent) Regulations, 2009.

Furthermore, a downstream effluent treatment system for an industrial park such as a centralised industrial effluent treatment can be proposed if necessary. For premises that process oil-palm fruit or oil palm fresh fruit bunches into crude palm oil, whether as an intermediate or final product, the wastewater must meet the Environmental Quality (Prescribed Premise) (Crude Palm Oil) Regulations, 1977.

These proposals will be incorporated into the industrial projects in this Master Plan (e.g., the CPPC and FPPC)

Budget:

No separate budget involved. To be included in development costs.

2.13.4.2.3 LW 3: Establish downstream treatment for remote communities

Many remote communities are provided with communal septic tank facilities. However, the maintenance of these is not practical, and most are operating inefficiently as a result of a lack of desludging.

Water polluted by sewage, if inadequately treated, represents a potential health issue for anyone who ingests the water or, in extreme cases, even comes in contact with it. At current levels, there are risks associated with swimming, bathing, washing, drinking the river water downstream of settlements.

It is also likely that local communities are not trained in the management and maintenance of the systems and the hazards associated with systems that work inefficiently.

We propose that these facilities be provided with simple sand filters or septic tank effluent holding ponds planted with water plants. These can provide further treatment of sewage effluent before discharging to the waterway.

A number of Agencies will need to be involved, with tasks set out as follows:

Ministry of Health and JKKK

- Inspect septic tanks at each settlement and assess the adequacy of the system provided. Also, establish maintenance requirements and current regimes.
- Desludge septic tanks when required or at a regular interval.
- Assess the provision, or need for, downstream treatment of effluent. For example:
 - Establish a sand filter for effluent.
 - Establish septic tank effluent holding pond planted with water plants.
- Provide training/instruction in the management and maintenance of the sewerage system.

Ministry of Tourism (MoT) and Tourism Agencies

- Establish protocols and standards for toilet facilities at tourism sites and agency established accommodation facilities.
- Establish additional toilet facilities in regularly used tourist areas to reduce risks of untreated human wastes being deposited in the forest or Lake.

Department of Agriculture (DoA)

- All cage farms supporting a working population of 2 or more persons must be equipped with toilets.
- Toilets will have to be desludged.
- Establish a sewage collection and treatment centre to receive and treat sewage from cage farms.

Budget

Repair or replace septic tank systems where deemed necessary:	RM1 million
Provide downstream effluent treatment systems to suitable longhouses. (Allow for 23 longhouses). Approx RM10,000 per longhouse:	RM230,000
Maintenance and desludging: RM10,000 per longhouse/year.	
Allow for 40 longhouses :	RM400,000/year.

Timeline

Short to Long term

SECTION 2.14 INFRASTRUCTURE (COMMUNITY AND SOCIAL AMENITIES)

Based on a predicted increase in residential population of around 34,000 in the next decade there will be a need for additional schools, sports facilities and hospital beds in the Sri Aman Division.

2.14.1 Schools

Current enrolments are 6,130 at secondary level and 7,703 at primary level. Based on the current proportion of school children to total population (approx. 12.5%) the anticipated additional requirement is approximately 4,300 students by 2030.

The average enrolment for the 64 current primary schools in Sri Aman is 120 and the average enrolment for the 7 secondary schools is 870.

2.14.1.1 Secondary Schools

We anticipate that 3 new secondary schools will be required, each with 600 students.

2.14.1.1.1 Location

These can be located at Engkilili, Lingga, and Temudok.

One of the prime considerations for location for secondary schools is being able to attract good quality teachers to the schools. If the school is very remote it will not have the attraction needed for a reliable, quality teaching staff. Thus Engkilili, Lingga and Temudok are all in reasonable distance of Simanggang.

New and upgraded roads will make these schools more accessible for surrounding towns and settlements. With the improved road systems proposed under SAMP a school bus system can be established to ferry students to and from school.

2.14.1.1.2 Estimated Budget

The average construction cost of each secondary school complex is around RM70 million (average school complex including land development and supporting facilities). For 3 new secondary schools this will be RM210 million.

2.14.1.2 Primary Schools

New primary schools will need to cater for approximately 2,500 students. It is estimated that 20 new primary schools will be required for this purpose.

2.14.1.2.1 Location

These schools will need to be distributed fairly evenly across the Division.

2.14.1.2.2 Estimated budget

The average construction cost of each primary school complex is around RM12 million (average school complex including land development and supporting facilities). For 20 new primary schools this will be RM240 million.

2.14.2 Hospitals and clinics

2.14.2.1 Hospital

A new 103 bed hospital is currently under construction in Simanggang. It is recommended that a new hospital be established in the Sri Aman Division prior to 2030.

2.14.2.1.1 Location

The new hospital should be located in Engkilili as currently there is no hospital there. It should be designed for approximately 100 beds and will mainly serve Lubok Antu District.

The location of the hospital has to consider its ability to attract quality trained staff to stay there for long periods. Thus, proximity to the Division capital of Simanggang is important.

2.14.2.1.2 Estimated budget

Based on the cost for the nearly completed hospital in Simanggang, we suggest that a budget of RM200 million will be needed.

2.14.2.2 Clinics

The provision of future public medical clinics should mainly target the Lubok Antu District. Medical clinics should also be provided in medium and low-level centres including Lingga, Pantu, Lachau and Bakong.

2.14.2.2.1 Estimated budget

We suggest that allowance be made for an additional 20 medical clinics by 2030. The estimated cost for establishing each clinic is RM2 million. Total budget is RM40 million.

2.14.3 Sports Stadium

The increase in population will justify a new major sports stadium. It is recommended that one major sports stadium be constructed in Simanggang and one minor one in Lubok Antu. The new sports facilities can promote sporting events. Maintaining and establishing regionally significant infrastructure for recreation and sport will foster creative art, recreation and leisure industries that will stimulate the local economy and increase job opportunities in the area.

2.14.3.1.1 Estimated budget

Major Stadium RM 40 million, Minor Stadium RM15 million.

2.14.4 Cultural Centres

Cultural spaces, centres, and facilities play an important role in providing a place for community events, functions, meetings, and festivals, used by a range of different cultural groups. Cultural centres also attract tourists and visitors to the area and, as such, that will stimulate wealth and job creation for the Sri Aman region. Cultural heritage places and landscapes are important to the community because of their cultural heritage significance.

2.14.4.1 Iban Cultural Centre Simanggang

We propose the development of an Iban cultural centre which could become a catalyst project attracting tourists to the area.

The Iban Cultural Heritage Centre (or Sri Aman Cultural Heritage Centre), will include galleries, F&B outlets, event / performing arts space, handicraft centre, co-working space for young entrepreneurs, guest house / AirBnB style rooms, etc.

This project is covered under tourism sector as Project S1-7

2.14.4.1.1 Estimated Budget

The estimated budget is RM8 million. This has been included in project S1-7

2.14.4.2 Cultural heritage Centre at Gunung Lesong

It is proposed to establish a cultural heritage centre at Gunung Lesong to showcase the culture and traditions of the local people. It will include galleries and exhibits, restaurant, gift shop and office space for the Gunung Lesong Community-Based Ecotourism Committee. In particular it

- Provides a centre to showcase the cultural heritage of the Gunung Lesong area
- Provides a base for the Gunung Lesong Community-Based Ecotourism Committee
- Provides a retail outlet to promote local handicrafts
- New cultural attraction
- Job and business opportunities for local communities
- HQ / office for the local CBT organization

2.14.4.2.1 Estimated budget

Budget is RM 2 million, and has been included in Tourism Project S2-6

2.14.5 Summary of Social Infrastructure Projects

Project Title	Project Components	Estimated Costs	Time Frame
SCHOOLS	New Secondary Schools (3)	RM210,000,000	M-L
	New Primary Schools (20)	RM240,000,000	S-L
HEALTH	New Hospital (Engkilili)	RM200,000,000	M
	New Clinics (20)	RM40,000,000	M-L
SPORTS STADIUM	New major stadium in Simanggang	RM40,000,000	L
	New minor stadium in Lubok Antu	RM15,000,000	M
CULTURAL CENTRE	Iban Cultural Centre, Simanggang	Incl in S1-7	S-M
	Cultural Heritage Centre at Gunung Lesong	Incl in S2-6	L
TOTAL		RM745,000,000	

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PART 3 **RESILIENCE PLANNING**

SECTION 3.1 **INTRODUCTION**

The National Disaster Management Agency (NADMA) was established and became the leading disaster management agency for regional and international disaster management efforts in Malaysia. Malaysia aims to pursue green growth for sustainability and resilience as one of the strategic thrusts under the Eleventh Malaysia Plan 2016-2020. Under the thrust, Malaysia intends to achieve the following focuses:

- a) strengthening the enabling environment for green growth,
- b) adopting the sustainable consumption and production concept,
- c) conserving natural resources for present and future generations and
- d) strengthening resilience against climate change and natural disasters.

Under the resilience planning against climate change and natural disasters, Malaysia aims to strengthen disaster risk management, improve flood mitigation, and enhance climate change adaptation.

Besides the national level, Malaysia also participates in several ASEAN programs and initiatives. Among others, these include ASEAN ERAT, ASEAN Safe Schools Initiative, and ASEAN's Disaster Emergency Logistics System (DELSA), a repository of relief goods and supplies housed in Malaysia for countries affected by the disaster in the region. Malaysia also embarks on international partnerships that focus on resilience planning to manage disasters with innovative technology mechanisms. Among others, these include (a) MOBILISE and (b) TRANSCEND. Funded in the UK, the projects focus on the challenges faced by three low and middle-income countries (LMICs), which include Sri Lanka, Pakistan, and Malaysia. The aims of MOBILISE and TRANSCEND are aimed to achieve three UN Sustainable Development Goals: Sustainable Cities and Communities (SDG 11), Partnerships for the Goals (SDG 17) and Industry Innovation and Infrastructure (SDG 9).

Additionally, UNDP Malaysia aims to achieve sustainable development so that no one is left behind, in line with the UNDP Strategic Plan 2018 - 2020 and UNDP's mission of eradicating poverty, structural

transformations, and building resilience to crisis and shocks. Under the six signature solutions, UNDP Malaysia aims to realize crisis prevention and increased resilience through various initiatives. Malaysia also works with the World Health Organisation (WHO) to focus on sustaining universal health coverage. WHO efforts in Malaysia include periodic review of the implementation of national plans for health and collaboration to reach strategic priorities while addressing critical bottlenecks in the health system. Out of seven initiatives, WHO supports focus on the development of strategies and capacities to prevent, prepare for, respond to, and recover from health emergencies to ensure public health resilience in the long term.

SECTION 3.2 STRUCTURE OF RESILIENCE MANAGEMENT IN SARAWAK

Sarawak Disaster Management Committee (Jawatankuasa Pengurusan Bencana Negeri Sarawak (JPBN) leads disaster management throughout all the divisions in Sarawak. JPBN consists of one chairman (Deputy Chief Minister), deputy chairman (Deputy State Secretary), while the secretariat consists of Sarawak Civil Defence Force (Angkatan Pertahanan Awam (APM)), and State Security and Enforcement Unit (Unit Keselamatan Dan Penguatkuasaan Negeri (UKPN)). The members of JPBN consists of 32 various governmental agencies and departments, as detailed in Table 3.1. The JPBN adopts various mechanisms to manage various hazards and disasters in Sarawak, which includes the COVID-19 pandemic, rabies, flood, haze, and landslides.

Table 3.1: Members of Sarawak Disaster Management Committee (JPBN)

No	Members of JPBN:	No	Members of JPBN:
1	Setiausaha Persekutuan Sarawak (SUPS)	17	FAMA
2	Angkatan Tentera Malaysia (ATM)	18	Jabatan Alam Sekitar (JAS)
3	Polis Diraja Malaysia (PDRM)	19	Jabatan Kerja Raya (JKR)
4	Jabatan Bomba dan Penyelamat Malaysia (JBPM)	20	Lembaga Sungai-sungai Sarawak (LSS)
5	Agensi Penguatkuasaan Maritim Malaysia (APMM)	21	Residen Bahagian Kuching
6	Tentera Udara Diraja Malaysia (TUDM)	22	Residen Bahagian Samarahan
7	Jabatan Sukarelawan Malaysia (RELA)	23	Residen Bahagian Serian
8	Tentera Udara Diraja Malaysia (TUDM)	24	Residen Bahagian Sri Aman
9	Jabatan Kebajikan Masyarakat (JKM)	25	Residen Bahagian Betong
10	Jabatan Meteorologi Malaysia	26	Residen Bahagian Sarikei
11	Jabatan Pengairan dan Saliran (JPS)	27	Residen Bahagian Sibul
12	Jabatan Kesihatan Negeri Sarawak (JKNS)	28	Residen Bahagian Kapit
13	Majlis Keselamatan Negara (MKN)	29	Residen Bahagian Mukah
14	Jabatan Penerangan	30	Residen Bahagian Bintulu
15	Jabatan Penyiaran (RTM)	31	Residen Bahagian Miri
16	Jabatan Pendidikan Negeri Sarawak (JPN)	32	Residen Bahagian Limbang

Sri Aman has faced resilience risks, hazards, and disasters over the decades. As a result, the Sri Aman population is subject to livelihood dependency, poverty, climate change, community disengagement, unemployment, resources depletion, institutional rigidity, and the recent health crisis.

The situation becomes more challenging in every aspect of life after the COVID-19 pandemic outbreak. Thus, it is important to build community resilience in order to achieve a sustainable and prosperous community, which is the foundation of national resilience. Community resilience building is essential to improve availability and access to economic resources, improve skills and human capital, recover from and reduce vulnerabilities.

Community is the greatest asset in preventing and reducing resilience threats in their environment. In addition to relying on government agencies and professional supports for resilience training, the success of community disaster prevention is largely driven by the actual participation of the community itself in Sri Aman. Public self-help and commitment are key factors in determining the continuity of disaster prevention efforts. Furthermore, the community will become more mature through their own active application, experience, discussion, education, and promotion to reduce risks of resilience threats.

SECTION 3.3 ACTION PLANS OF RESILIENT COMMUNITY GROUPS IN SRI AMAN

The Sri Aman community is exposed to various risks, hazards, and disasters. To build a resilient community, several target groups are emphasised in order to achieve risk management and adaptation more efficiently. The emphasis is placed on the overall community to respond and adapt to disturbances in a sustainable manner. Community resilience can be improved through the gradual accumulation of knowledge and changes in the community's awareness and behaviour. Overall, six groups are targeted for building a resilient community in Sri Aman, as shown Figure 3-1.



Figure 3-1: Focus Groups of Sri Aman Community Resilience Building

Source: UNIMAS Holdings

3.3.1 Community

Community refers to all the residents in the Sri Aman division. The CREC provides a platform for all communities, regardless of their background of income, ethnicity, religion, and location, to actively participate in disaster risk reduction activities, gain knowledge, skills, and competencies in disaster risk reduction (DRR).

Action/ Project No:		Local Government: Community Resilience Excellence Centre (CREC)																																																										
Project Description:	CREC is a one-stop centre of resilience management in Sri Aman. It is owned by SADA and will be managed by Sri Aman District Council. CREC aims to improve lives and unite the community. CREC is committed to response, recovery and rebuilding resilience by mobilising technologies and community empowerment.																																																											
Project Rational:	<p>CREC is formed due to the following reasons:</p> <ul style="list-style-type: none"> • Strong sense of belonging and kinship among community members. • Deficiencies in health care access and other social services • Social capital capacity building and foundation of national resilience <p>Reasons of selection of Sri Aman District Council</p> <ul style="list-style-type: none"> • Simanggang is the centre of economic activities in Sri Aman. • Higher percentage of population & prone to climate change hazards and disasters • More established local networks, infrastructures, health services and resources 																																																											
Outputs of Project & KPIs:	<p>District Council:</p> <ul style="list-style-type: none"> • Hours of resilience training • Good reputation • Participation in real-life hazards/disaster rescue 					<p>Livelihoods of Sri Aman:</p> <ul style="list-style-type: none"> • Increased numbers of working days. • Increase in income/reduced poverty. • Well-being improved. • Number of co-creation/social innovations 																																																						
Estimated Budget and Implementation Phase:	<table border="1"> <thead> <tr> <th>2021</th> <th>2022</th> <th>2023</th> <th>2024</th> <th>2025</th> <th>2026</th> <th>2027</th> <th>2028</th> <th>2029</th> <th>2030</th> </tr> </thead> <tbody> <tr> <td>2mil</td> </tr> <tr> <td colspan="3">Short Term</td> <td colspan="3">Medium Term</td> <td colspan="4">Long term</td> </tr> <tr> <td colspan="3">Phase 1</td> <td colspan="3">Phase 2</td> <td colspan="4">Phase 3</td> </tr> <tr> <td colspan="3"> <ul style="list-style-type: none"> • Setting up • Human resources • Initial operations </td> <td colspan="3"> <ul style="list-style-type: none"> • Operations • Conduct training • Management of resilience planning </td> <td colspan="4"> <ul style="list-style-type: none"> • Full operations of Total Disaster Risk Management (TDRM) Approach • Research and development • International Collaborations • Knowledge transfer </td> </tr> </tbody> </table>										2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2mil	Short Term			Medium Term			Long term				Phase 1			Phase 2			Phase 3				<ul style="list-style-type: none"> • Setting up • Human resources • Initial operations 			<ul style="list-style-type: none"> • Operations • Conduct training • Management of resilience planning 			<ul style="list-style-type: none"> • Full operations of Total Disaster Risk Management (TDRM) Approach • Research and development • International Collaborations • Knowledge transfer 												
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Activities/Components:	<ul style="list-style-type: none"> • Coordinate all five resilience groups in Sri Aman at the community level and other stakeholders • Management of resilience planning in Sri Aman 																																																											
Funding Sources:	SADA																																																											
Agencies:	MPHLG, district councils, JKKK, professional expertise, local academics, and foreign partnerships																																																											

Strategy to Address the Social Issues

The issue of drug and substance abuse is said to be significant as it affects not only those individuals who are addicted to drugs and substances, but their actions may, to a certain extent, affect the wellbeing of a community. Discussion with Majlis Pembangunan Sosial and the Resident Office indicated that this issue should be taken into consideration in the preparation of a Master Plan.

Creation of CREC in the Master Plan is to include and/or provide a service facility and/or infrastructure that can address the social-related issues. This community-based social centre led by the Local Council and SADA, that is complete with facilities and infrastructure relevant in addressing social issues should be provided in the Division. The establishment of such facility, coupled with community and institutional support, and suitably located in the Division, can be one way to address the multiple social issues that are persistent in the Division. In other words, it is an integrated social centre that can become the focal point for related agencies as well as communities and other interested bodies to come together to address the social development issues in Sri Aman.

3.3.2 Schools

In the context of this report, schools refer to all the existing nurseries, kindergartens, primary schools, secondary schools, colleges, and other educational institutions in Sri Aman. It is important to cultivate a culture of disaster awareness and response amongst school children, teachers, and staff. School children, teachers and staff are taught simple, hands-on activities to prepare them to take responsibility for their own safety in the event of an emergency.

Action/ Project No:		Schools: Sri Aman School Watching Workshop
Project Description:	Sri Aman School Watching Workshop manages resilience planning and actions at the school level. The workshop provides a hazard mapping tool to help school communities identify hazards and risks in and around the schools, especially remote schools. It is owned by SADA and will be managed by Pejabat Pendidikan Daerah Sri Aman. The Sri Aman School Watching Workshop will be implemented in all schools in Sri Aman.	
Project Site:	Pejabat Pendidikan Daerah Sri Aman	
Project Rational:	<ul style="list-style-type: none"> • Be able to respond to an increase of hazards and disasters such as flood, fire, drought, and haze • Cultivate a more responsible and proactive response from students • Encouraging students to take responsibility for their safety in the event of an emergency • Developing a culture of resiliency from young 	
Outputs of Project & KPIs:	<ul style="list-style-type: none"> • Increase productivity of teaching and learning by teachers and students. • Save lives and properties. • Reduce injuries due to hazards and disasters. 	

Action/ Project No:		Schools: Sri Aman School Watching Workshop										
		<ul style="list-style-type: none"> Reduce social problems such as absenteeism, drug abuse and crime 										
Estimated Budget and Implementation Phase:		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
		1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	
		Short Term			Medium Term			Long term				
		Phase 1			Phase 2			Phase 3				
		<ul style="list-style-type: none"> Set up Human resources Equipments Initial operations 			<ul style="list-style-type: none"> Operations Conduct training Management of networks 			<ul style="list-style-type: none"> Full operations Research and development Local and international collaborations Resilient infrastructures/innovations Knowledge transfer 				
Activities/Components:		<ul style="list-style-type: none"> Conduct basic training and rescue drills at schools for both teachers and students. Awareness campaigns of resilience Provide for basic needs for teachers and students, such as clean water and food during disasters Knowledge transfer programs 										
Funding Sources:		SADA										
Agencies:		CREC, District Office, Ministry of Education, schools, and JKKK										

3.3.3 Hospital and Clinics

Hospital and clinics refer to all the stakeholders of hospital and clinics in Sri Aman. The purpose is to increase and introduce the stakeholders of hospital and clinics to disaster risk management (DRM) and improve their disaster preparedness and critical infrastructure's resilience through the implementation of DRM to improve the health and well-being of residents in Sri Aman. The hospital and clinics play an important role as front-liners during disasters, especially the search and rescue operations.

Action/ Project No:		Hospital and Clinics: Sri Aman Emergency Team
Project Description:		Sri Aman Emergency Team focuses on providing medical relief, sustainable health-related development, risk reduction activities and building resilient communities for vulnerable communities in crisis and non-crisis situations, especially in inland areas. Sri Aman Emergency Team is owned by SADA and managed by the Pejabat Kesihatan Bahagian Sri Aman. Sri Aman Emergency Team is a modular team equipped with lightweight items and provides immediate responses.
Project Site:		Pejabat Kesihatan Bahagian Miri
Project Rational:		<ul style="list-style-type: none"> A need for increased medical support during disasters A need for increased medical support for rural and inland areas Lower awareness of resilient building for vulnerable communities
Outputs of Project & KPIs:		<ul style="list-style-type: none"> Increased number of treatments of basic illnesses and injuries Increase in the number of mental health and psychological support (MHPSS) provision

Action/ Project No:		Hospital and Clinics: Sri Aman Emergency Team										
		<ul style="list-style-type: none"> • Increase in the number of medical supports during the public health crisis • Increase in the number of lives saved during emergencies 										
Estimated Budget and Implementation Phase:		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
		2mil	2mil	2mil	2mil	2mil	2mil	2mil	2mil	2mil	2mil	
		Short Term			Medium Term			Long term				
		Phase 1			Phase 2			Phase 3				
		<ul style="list-style-type: none"> • Set up • Human resources • Equipments • Initial operations 			<ul style="list-style-type: none"> • Operations • Conduct training • Management of networks 			<ul style="list-style-type: none"> • Full operations • Research and development • Local and international collaborations • Resilient infrastructures/innovations • Knowledge transfer 				
Activities/Components:		<ul style="list-style-type: none"> • Identify root causes and underlying factors that lead to public health disasters. • Treatment of basic illnesses and injuries • Provide mental health and psychological support (MHPSS) • Provide medical and technical support during public health crisis such as COVID-19. • Providing support at the temporary makeshift/field hospitals • Establish Kampung first-aid programs 										
Funding Sources:		SADA										
Agencies:		CREC, Ministry of Health, Sri Aman hospital and clinics, District Office, JPBN										

3.3.4 Private Sector

The private sector refers to all private entities in Sri Aman such as individual, corporates, firms, SME, businesses, associations, and other non-government agencies. The CREC provides disaster risk reduction (DRR) and DRM education for the private and corporate sector through DRR for Private Sector and Business Continuity Plan (BCP).

Action/ Project No:		Private Sector: Sri Aman Business Continuity Management (SABCM)									
Project Description:		Sri Aman Business Continuity Management is a centre of resilience management for the private sector in Sri Aman. The private sector plays a crucial role in developing the economy of Sri Aman, and thus the continuity and sustainability of businesses in every sector are important. SABCM is owned by SADA and will be managed by business associations in Sri Aman.									
Project Site:		Business Associations									
Project Rational:		<ul style="list-style-type: none"> • Private sector is an important engine of economic growth in Sri Aman • Protect private sector investments and properties • Protect and continue the provision of services to the communities • Long-term sustainability recovery and preparedness • Added value to attract investment 									
Outputs of		<ul style="list-style-type: none"> • Increase productivity of the private sector 									

Action/ Project No:		Private Sector: Sri Aman Business Continuity Management (SABCM)									
Project and KPIs:	<ul style="list-style-type: none"> • Continuity of business services to both public and private after disasters • Better preparedness for hazards and disasters • Increase successes of government policies relating to long term disaster preparedness and mitigation • Attract investment and improve tax revenue for the government 										
Estimated Budget and Implementation Phase:	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	
	Short Term		Medium Term			Long term					
	Phase 1		Phase 2			Phase 3					
	<ul style="list-style-type: none"> • Set up • Human resources • Equipments • Initial operations 		<ul style="list-style-type: none"> • Operations • Conduct training • Management of networks 			<ul style="list-style-type: none"> • Full operations • Research and development • Local and international Collaborations • Resilient infrastructures/innovations 					
Activities/Components:	<ul style="list-style-type: none"> • Coordinate resilient training relating to business resilience resulting from disasters • Working with the government to prepare for and mitigate disasters/hazards • Supporting government policies relating long term disaster preparedness and mitigation 										
Funding Sources:	SADA										
Agencies:	CREC, Business associations, District Office, District Councils, ministries										

3.3.5 Local Government

The local government refers to all stakeholders of the third tier of government, particularly district councils. The purposes of resilience-building are to educate, train and strengthen relevant stakeholders of local government on DRR and DRM. The local government has the comparative advantage in managing community resilience due to its legislation, local network, and resources.

Action/ Project No:		Community: e-Smart and Connected Community
Project Description:	<p>e-Smart and Connected Community is a community resilient project with a focus on community resilient buildings. It is committed to providing resilience awareness and training to all residents in Sri Aman. Besides infrastructure, the e-Smart and Connected Community project aims to ensure all communities are accessible to good social needs such as education, utilities, medical care, and recreation via technology and digital applications. The e-smart and Connected Community is owned by SADA and will be managed by all district councils in Sri Aman.</p>	
Project Site:	Sri Aman District Council and Lubok Antu District Council	
Outputs of Project & KPIs:	<ul style="list-style-type: none"> • Save life and properties • Reducing losses of disasters such as flood, haze, fire, and landslides • Long-term sustainability recovery and preparedness • Unity and harmony community • Reducing social-economic problems such as poverty and crime 	

Action/ Project No:		Community: e-Smart and Connected Community																		
Activities/ Components:	<ul style="list-style-type: none"> • Conduct community resilient training • Increase awareness and importance of resilience in the community • Identifying roots of hazards and disasters and disaster prevention programs • Provide technical and monetary assistance during and after disasters • Incorporation of digital applications 																			
Estimated Budget and Implementation Phase:	2021		2022		2023		2024		2025		2026		2027		2028		2029		2030	
	1.5mil		1.5mil		1.5mil		1.5mil		1.5mil		1.5mil		1.5mil		1.5mil		1.5mil		1.5mil	
	Short Term			Medium Term						Long term										
	Phase 1			Phase 2						Phase 3										
	<ul style="list-style-type: none"> • Set up • Human resources • Equipment • Initial operations 			<ul style="list-style-type: none"> • Operations • Conduct training • Management of networks 						<ul style="list-style-type: none"> • Full operations of Total Disaster Risk Management (TDRM) Approach • Research and development • International Collaborations 										
Funding Sources:	SADA																			
Agencies:	MPHLG, district councils, JKKK, professional expertise, local academics, and foreign partnerships																			

3.3.6 B40

B40 group refers to the 40% bottom tier income earners and has a mean household monthly income of less than RM4,850 (DOSM, 2019). The B40 group is comparatively vulnerable and less advantaged in terms of income, employment, living standards, livelihoods and living environment. Thus, The CREC provides a platform for the B40 group to participate in disaster risk reduction activities, gain knowledge, skills, and competencies in DRR, and further diversify livelihood potentials and income.

The community resilience projects are targeted at the overall community in Sri Aman and other focus groups such as schools, private sector, local government, hospital, and health clinics and B40 groups.

The CREC, as the main governance of community resilience building, will manage and coordinate the planning and implementation of community resilience projects. The CREC will manage 5 community projects, namely: (a) Sri Aman School Watching Workshop, (b) e-Smart and Connected Community, (c) Sri Aman Business Continuity Management (SABCM), (d) Sri Aman Emergency Team, and (e) i-Care B40 Team. The details of the proposed community resilience projects are shown in the following section, with a total budget of RM10 million per year.

Action/ Project No:		B40: i-Care B40 Team
Project Description:	i-Care B40 Team is a local community team that focuses on resilience building for B40 residents in Sri Aman. I-Care B40 Team is owned by SADA and managed by JKKK in Sri Aman. JKKK plays an important role in maintaining security and development in the villages.	
Project Site:	JKKK	
Project Rational:	<ul style="list-style-type: none"> • Vulnerable communities such as coastal and inland areas are more exposed to natural disasters such as flood, drought, landslides, and fire • JKKK has a good network with local stakeholders to perform rescue works 	

Action/ Project No:		B40: i-Care B40 Team										
		<ul style="list-style-type: none"> B40 lacks financial sources and connectivity with health cares and other social needs 										
Outputs of Project & KPIs:		<ul style="list-style-type: none"> Increase preparedness for disasters Increase number of working days Increase confidence to invest in local businesses Reduced injuries and mortality associated with disasters 										
Estimated Budget and Implementation Phase:		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
		1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	1.5mil	
		Short Term			Medium Term			Long term				
		Phase 1			Phase 2			Phase 3				
		<ul style="list-style-type: none"> Set up Human resources Equipments Initial operations 			<ul style="list-style-type: none"> Operations Conduct training Management of networks 			<ul style="list-style-type: none"> Full operations of Total Disaster Risk Management (TDRM) Approach Research and development International Collaborations Resilient infrastructures Knowledge transfer 				
Activities/ Components:		<ul style="list-style-type: none"> Provide immediate support to B40 group after a disaster such as cash, food and fuels, clean water, sanitation, and relief centre. Resilience awareness and training Long term sustainable recovery Diversifying economic activities and income sources Special care for elderly and children Develop specific community disaster response plans for each settlement 										
Funding Sources:		SADA										
Agencies:		CREC, JKKK, JPBN, and MPH LG										



PART 4 SUMMARY OF PROJECTS

SECTION 4.1 SUMMARY OF PROJECTS (COSTS AND BENEFITS)

4.1.1 List of Projects by Sectors

4.1.1.1 Agriculture and Livestock

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Batang Lupar Integrated Agriculture Development Area (IADA) - Paddy	SADA, IADA, DOA, BERNAS, MARDI	Batang Lupar - Batang Lingga	132,156,863	2,000	1,332	668	0
Batang Lupar Integrated Agriculture Development Area (IADA) - Pineapple	SADA, IADA, DOA, BERNAS, MARDI	Batang Lupar - Batang Lingga	204,843,137	3,100	332	1,168	1,600
Total			337,000,000	5,100	1,664	1,836	1,600

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectareage of Paddy	Cumulative Hectareage of Pineapple
2021	54,977,255	7,473,822	96	1,200	16,232,573	666	166
2022	54,977,255	15,141,964	191	1,250	32,887,194	1,332	332
2023	55,241,569	23,069,769	288	1,300	50,097,637	2,000	500
2024	33,039,216	36,364,972	393	1,350	76,225,265	2,000	1,000
2025	33,039,216	50,001,951	499	1,400	103,023,744	2,000	1,500
2026	33,039,216	63,987,345	605	1,450	130,506,102	2,000	2,000
2027	18,171,569	72,248,982	663	1,500	146,768,281	2,000	2,275
2028	18,171,569	80,714,607	721	1,550	163,431,222	2,000	2,550
2029	18,171,569	89,388,129	779	1,600	180,502,595	2,000	2,825
2030	18,171,569	98,273,521	837	1,650	197,990,203	2,000	3,100
2031	0	99,551,076	837	1,700	200,564,076	2,000	3,100
2032	0	100,845,240	837	1,750	203,171,409	2,000	3,100
2033	0	102,156,229	837	1,800	205,812,637	2,000	3,100
2034	0	103,484,260	837	1,850	208,488,202	2,000	3,100
2035	0	104,829,555	837	1,900	211,198,548	2,000	3,100

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-54,977,255	-7,473,822	-1,377,795	16,232,573	-47,596,298
2022	-54,977,255	-15,141,964	-2,870,406	32,887,194	-40,102,431
2023	-55,241,569	-23,069,769	-4,487,265	50,097,637	-32,700,966
2024	-33,039,216	-36,364,972	-6,371,303	76,225,265	449,774
2025	-33,039,216	-50,001,951	-8,382,116	103,023,744	11,600,462
2026	-33,039,216	-63,987,345	-10,519,703	130,506,102	22,959,838
2027	-18,171,569	-72,248,982	-11,928,339	146,768,281	44,419,392
2028	-18,171,569	-80,714,607	-13,406,700	163,431,222	51,138,346
2029	-18,171,569	-89,388,129	-14,954,787	180,502,595	57,988,110
2030	-18,171,569	-98,273,521	-16,572,600	197,990,203	64,972,514
2031	0	-99,551,076	-17,074,800	200,564,076	83,938,200
2032	0	-100,845,240	-17,577,000	203,171,409	84,749,169
2033	0	-102,156,229	-18,079,200	205,812,637	85,577,209
2034	0	-103,484,260	-18,581,400	208,488,202	86,422,542
2035	0	-104,829,555	-19,083,600	211,198,548	87,285,393
				IRR	22%

Data:

1. Paddy - Maintenance Cost per Hectare per Year Source: Machinery Utilization and Production Cost of Wetland, Direct Seeding Paddy Cultivation in Malaysia. Agriculture and Agricultural Science Procedia 2 (2014).	4,926
2. Paddy - Manpower Required	10.99
3. Paddy - Yield per Hectare per Year	10
4. Paddy - Average Price per Tan	1,200
5. Pineapple - Maintenance Cost per Hectare per Year Source: Malaysian Palm Oil Board. Integration of Pineapple (Sarawak Variety) with Oil Palm Planted in Double Avenue Planting System. MPOB Information Series TT No. 311.	24,682
6. Pineapple - Manpower Required	4.73
7. Pineapple - Yield per Hectare per Year	24.19
8. Pineapple - Average Price per tan	2,000

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Pantu Specialty Rice Project	SADA, DOA, DID, Farmers Cooperative, MARDI, Nestle	Pantu	210,000,000	6,000	1,332	2,000	2,668
Total			210,000,000	6,000	1,332	2,000	2,668

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectareage
2021	23,310,000	3,323,365	67	1,200	13,493,160	666
2022	23,310,000	6,733,138	133	1,250	27,337,142	1,332
2023	23,380,000	10,241,245	200	1,300	41,580,368	2,000
2024	23,310,000	13,829,050	267	1,350	56,147,177	2,666
2025	23,310,000	17,508,407	333	1,400	71,085,695	3,332
2026	23,380,000	21,291,736	400	1,450	86,446,350	4,000
2027	17,500,000	24,264,595	450	1,500	98,516,421	4,500
2028	17,500,000	27,311,149	500	1,550	110,885,705	5,000
2029	17,500,000	30,432,814	550	1,600	123,559,941	5,500
2030	17,500,000	33,631,026	600	1,650	136,544,968	6,000
2031	0	34,068,229	600	1,700	138,320,052	6,000
2032	0	34,511,116	600	1,750	140,118,213	6,000
2033	0	34,959,760	600	1,800	141,939,750	6,000
2034	0	35,414,237	600	1,850	143,784,967	6,000
2035	0	35,874,622	600	1,900	145,654,171	6,000

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-23,310,000	-3,323,365	-959,040	13,493,160	-14,099,245
2022	-23,310,000	-6,733,138	-1,998,000	27,337,142	-4,703,996
2023	-23,380,000	-10,241,245	-3,120,000	41,580,368	4,839,123
2024	-23,310,000	-13,829,050	-4,318,920	56,147,177	14,689,207
2025	-23,310,000	-17,508,407	-5,597,760	71,085,695	24,669,528
2026	-23,380,000	-21,291,736	-6,960,000	86,446,350	34,814,614
2027	-17,500,000	-24,264,595	-8,100,000	98,516,421	48,651,827
2028	-17,500,000	-27,311,149	-9,300,000	110,885,705	56,774,556
2029	-17,500,000	-30,432,814	-10,560,000	123,559,941	65,067,128
2030	-17,500,000	-33,631,026	-11,880,000	136,544,968	73,533,942
2031	0	-34,068,229	-12,240,000	138,320,052	92,011,824
2032	0	-34,511,116	-12,600,000	140,118,213	93,007,097
2033	0	-34,959,760	-12,960,000	141,939,750	94,019,990
2034	0	-35,414,237	-13,320,000	143,784,967	95,050,729
2035	0	-35,874,622	-13,680,000	145,654,171	96,099,549
				IRR	68%

Data:

1. Maintenance Cost per Hectare per Year	4,926
Source: Machinery Utilization and Production Cost of Wetland, Direct Seeding Paddy Cultivation in Malaysia. Agriculture and Agricultural Science Procedia 2 (2014).	
2. Manpower Required	10
3. Paddy Yield per Hectare per Year	10
4. Average Price of Paddy per Tan	2,000

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Pineapple	SADA, PELITA, DID, DOA, Private Sector	Lachau	50,000,000	5,000	500	1,500	3,000
Total			50,000,000	5,000	500	1,500	3,000

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectare
2021	2,500,000	6,250,688	125	1,200		250
2022	2,500,000	12,663,894	250	1,250	17,957,958	500
2023	5,000,000	25,657,049	500	1,300	36,382,822	1,000
2024	5,000,000	38,985,886	750	1,350	73,711,597	1,500
2025	5,000,000	52,656,937	1,000	1,400	112,004,772	2,000
2026	6,000,000	69,343,921	1,300	1,450	151,281,112	2,600
2027	6,000,000	86,455,867	1,600	1,500	199,222,096	3,200
2028	6,000,000	104,001,004	1,900	1,550	248,383,980	3,800
2029	6,000,000	121,987,704	2,200	1,600	298,790,404	4,400
2030	6,000,000	140,424,482	2,500	1,650	350,465,418	5,000
2031	0	142,250,000	2,500	1,700	403,433,486	5,000
2032	0	144,099,250	2,500	1,750	408,678,122	5,000
2033	0	145,972,541	2,500	1,800	413,990,937	5,000
2034	0	147,870,184	2,500	1,850	419,372,819	5,000
2035	0	149,792,496	2,500	1,900	424,824,666	5,000

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-2,500,000	-6,250,688	-1,800,000	0	-10,550,688
2022	-2,500,000	-12,663,894	-3,750,000	17,957,958	-955,937
2023	-5,000,000	-25,657,049	-7,800,000	36,382,822	-2,074,227
2024	-5,000,000	-38,985,886	-12,150,000	73,711,597	17,575,711
2025	-5,000,000	-52,656,937	-16,800,000	112,004,772	37,547,835
2026	-6,000,000	-69,343,921	-22,620,000	151,281,112	53,317,191
2027	-6,000,000	-86,455,867	-28,800,000	199,222,096	77,966,230
2028	-6,000,000	-104,001,004	-35,340,000	248,383,980	103,042,976
2029	-6,000,000	-121,987,704	-42,240,000	298,790,404	128,562,700
2030	-6,000,000	-140,424,482	-49,500,000	350,465,418	154,540,936
2031	0	-142,250,000	-51,000,000	403,433,486	210,183,486
2032	0	-144,099,250	-52,500,000	408,678,122	212,078,871
2033	0	-145,972,541	-54,000,000	413,990,937	214,018,397
2034	0	-147,870,184	-55,500,000	419,372,819	216,002,636
2035	0	-149,792,496	-57,000,000	424,824,666	218,032,170
				IRR	92%

Data:

1. Maintenance Cost per Hectare per Year	24,682
Source: Malaysian Palm Oil Board. Integration of Pineapple (Sarawak Variety) with Oil Palm Planted in Double Avenue Planting System. MPOB Information Series TT No. 311.	
2. Manpower Required	2
3. Pineapple Yield per Hectare per Year	35
4. Average Price of Pineapple per tan	2,000

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Coconut	SADA, MANRED, DOA, DID, FAMA, Local Farmers Organization, Anchor Company	Simanggang, Engkilili	100,000,000	10,000	1,000	4,000	5,000
Total			100,000,000	10,000	1,000	4,000	5,000

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectare
2021	5,000,000	658,450	60	1,200		500
2022	5,000,000	1,334,020	120	1,250		1,000
2023	13,333,333	3,153,178	280	1,300		2,333
2024	13,333,333	5,019,409	440	1,350	17,374,876	3,667
2025	13,333,333	6,933,629	600	1,400	35,201,500	5,000
2026	10,000,000	8,428,519	720	1,450	83,204,612	6,000
2027	10,000,000	9,961,105	840	1,500	132,449,855	7,000
2028	10,000,000	11,532,113	960	1,550	182,961,414	8,000
2029	10,000,000	13,142,285	1,080	1,600	222,407,894	9,000
2030	10,000,000	14,792,372	1,200	1,650	262,849,063	10,000
2031	0	14,984,672	1,200	1,700	304,304,115	10,000
2032	0	15,179,473	1,200	1,750	346,792,578	10,000
2033	0	15,376,806	1,200	1,800	390,334,312	10,000
2034	0	15,576,705	1,200	1,850	395,408,658	10,000
2035	0	15,779,202	1,200	1,900	400,548,971	10,000

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-5,000,000	-658,450	-864,000	0	-6,522,450
2022	-5,000,000	-1,334,020	-1,800,000	0	-8,134,020
2023	-13,333,333	-3,153,178	-4,368,000	0	-20,854,511
2024	-13,333,333	-5,019,409	-7,128,000	17,374,876	-8,105,866
2025	-13,333,333	-6,933,629	-10,080,000	35,201,500	4,854,538
2026	-10,000,000	-8,428,519	-12,528,000	83,204,612	52,248,092
2027	-10,000,000	-9,961,105	-15,120,000	132,449,855	97,368,750
2028	-10,000,000	-11,532,113	-17,856,000	182,961,414	143,573,300
2029	-10,000,000	-13,142,285	-20,736,000	222,407,894	178,529,610
2030	-10,000,000	-14,792,372	-23,760,000	262,849,063	214,296,692
2031	0	-14,984,672	-24,480,000	304,304,115	264,839,443
2032	0	-15,179,473	-25,200,000	346,792,578	306,413,104
2033	0	-15,376,806	-25,920,000	390,334,312	349,037,506
2034	0	-15,576,705	-26,640,000	395,408,658	353,191,954
2035	0	-15,779,202	-27,360,000	400,548,971	357,409,769
				IRR	69%

Data:

1. Maintenance Cost per Hectare per Year	1,300
Source: 10th Malaysia Plan: Coconut Industry Development Programme. DOA Sarawak.	
2. Manpower Required	8.33
3. Coconut Nuts Yield per Hectare per Year	22,000
4. Average Price of Coconut per piece	1.50
5. Year of First Harvest - 4th year	4

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Durian	MANRED, DOA, DID, Anchor Company	Skrang Valley, Lachau	30,000,000	3,000	500	1,000	1,500
Total			30,000,000	3,000	500	1,000	1,500

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Prod uctivity of Project	Cumulative Hectare
2021	2,500,000	246,919	125	1,200		250
2022	2,500,000	500,257	250	1,250		500
2023	3,333,333	844,601	417	1,300		833
2024	3,333,333	1,197,813	583	1,350		1,167
2025	3,333,333	1,560,066	750	1,400	18,667,462	1,500
2026	3,000,000	1,896,417	900	1,450	37,820,278	1,800
2027	3,000,000	2,241,249	1,050	1,500	63,853,236	2,100
2028	3,000,000	2,594,726	1,200	1,550	90,556,659	2,400
2029	3,000,000	2,957,014	1,350	1,600	117,943,580	2,700
2030	3,000,000	3,328,284	1,500	1,650	143,372,216	3,000
2031	0	3,371,551	1,500	1,700	169,442,064	3,000
2032	0	3,415,381	1,500	1,750	196,165,498	3,000
2033	0	3,459,781	1,500	1,800	223,555,106	3,000
2034	0	3,504,759	1,500	1,850	251,623,692	3,000
2035	0	3,550,320	1,500	1,900	254,894,800	3,000

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/ Productivity of Project	Net Annual Savings
2021	-2,500,000	-246,919	-1,800,000	0	-4,546,919
2022	-2,500,000	-500,257	-3,750,000	0	-6,750,257
2023	-3,333,333	-844,601	-6,500,000	0	-10,677,935
2024	-3,333,333	-1,197,813	-9,450,000	0	-13,981,147
2025	-3,333,333	-1,560,066	-12,600,000	18,667,462	1,174,062
2026	-3,000,000	-1,896,417	-15,660,000	37,820,278	17,263,861
2027	-3,000,000	-2,241,249	-18,900,000	63,853,236	39,711,987
2028	-3,000,000	-2,594,726	-22,320,000	90,556,659	62,641,934
2029	-3,000,000	-2,957,014	-25,920,000	117,943,580	86,066,566
2030	-3,000,000	-3,328,284	-29,700,000	143,372,216	107,343,933
2031	0	-3,371,551	-30,600,000	169,442,064	135,470,513
2032	0	-3,415,381	-31,500,000	196,165,498	161,250,117
2033	0	-3,459,781	-32,400,000	223,555,106	187,695,325
2034	0	-3,504,759	-33,300,000	251,623,692	214,818,933
2035	0	-3,550,320	-34,200,000	254,894,800	217,144,479
				IRR	56%

Data:

1. Maintenance Cost per Hectare per Year	975
Source: 10th Malaysia Plan: Fruits Industry Development Programme. DOA Sarawak.	
2. Manpower Required	2
3. Durian Yield per Hectare per Year	10
4. Average Price of Durian per MT	7,000
5. Year of First Harvest - 5th year	5

Strategic Initiative (Program/ Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Rambutan	SADA, MANRED, DOA, DID, Private Sector	Lachau	4,000,000	500	100	200	200
Total			4,000,000	500	100	200	200

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Prod uctivity of Project	Cumulative Hectare
2021	400,000			1,200		50
2022	400,000	76,963	25	1,250		100
2023	533,333	155,926	50	1,300		167
2024	533,333	263,256	83	1,350	1,263,627	233
2025	533,333	373,349	117	1,400	2,560,109	300
2026	320,000	486,261	150	1,450	4,322,317	340
2027	320,000	558,260	170	1,500	6,129,911	380
2028	320,000	632,049	190	1,550	7,983,771	420
2029	320,000	707,661	210	1,600	9,165,901	460
2030	320,000	785,134	230	1,650	10,377,418	500
2031	0	864,500	250	1,700	11,618,884	500
2032	0	875,739	250	1,750	12,890,876	500
2033	0	887,123	250	1,800	14,193,975	500
2034	0	898,656	250	1,850	14,378,497	500
2035	0	910,339	250	1,900	14,565,417	500

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Pro ductivity of Project	Net Annual Savings
2021	-400,000	0	0	0	-400,000
2022	-400,000	-76,963	-375,000	0	-851,963
2023	-533,333	-155,926	-780,000	0	-1,469,260
2024	-533,333	-263,256	-1,350,000	1,263,627	-882,962
2025	-533,333	-373,349	-1,960,000	2,560,109	-306,574
2026	-320,000	-486,261	-2,610,000	4,322,317	906,057
2027	-320,000	-558,260	-3,060,000	6,129,911	2,191,651
2028	-320,000	-632,049	-3,534,000	7,983,771	3,497,722
2029	-320,000	-707,661	-4,032,000	9,165,901	4,106,240
2030	-320,000	-785,134	-4,554,000	10,377,418	4,718,284
2031	0	-864,500	-5,100,000	11,618,884	5,654,384
2032	0	-875,739	-5,250,000	12,890,876	6,765,137
2033	0	-887,123	-5,400,000	14,193,975	7,906,852
2034	0	-898,656	-5,550,000	14,378,497	7,929,841
2035	0	-910,339	-5,700,000	14,565,417	7,955,079
				IRR	38%

Data:

1. Maintenance Cost per Hectare per Year	1,500
Source: 10th Malaysia Plan: Fruits Industry Development Programme. DOA Sarawak.	
2. Manpower Required	2
3. Rambutan Yield per Hectare per Year	8
4. Average Price of Rambutan per tan	3,000
5. Year of First Harvest - 4th year	4

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Sweet Corn	SADA, PELITA, DID, DOA, Private Sector	Sri Aman District	13,500,000	300	100	100	100
Total			13,500,000	300	100	100	100

Year	Project Cost	Production Cost	Estimated Revenue/ Productivity of Project	Cumulative Hectarage
2021	2,250,000	253,250	1,519,500	1,200
2022	2,250,000	513,085	3,078,507	1,250
2023	1,500,000	693,006	4,158,037	1,300
2024	1,500,000	877,519	5,265,114	1,350
2025	1,500,000	1,066,712	6,400,273	1,400
2026	900,000	1,188,637	7,131,824	1,450
2027	900,000	1,313,552	7,881,314	1,500
2028	900,000	1,441,514	8,649,085	1,550
2029	900,000	1,572,581	9,435,486	1,600
2030	900,000	1,706,812	10,240,873	1,650
2031	0	1,729,001	10,374,004	1,700
2032	0	1,751,478	10,508,866	1,750
2033	0	1,774,247	10,645,481	1,800
2034	0	1,797,312	10,783,873	1,850
2035	0	1,820,677	10,924,063	1,900

Year	Project Cost	Production Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-2,250,000	-253,250	-720,000	1,519,500	-1,703,750
2022	-2,250,000	-513,085	-1,500,000	3,078,507	-1,184,578
2023	-1,500,000	-693,006	-2,080,000	4,158,037	-114,969
2024	-1,500,000	-877,519	-2,700,000	5,265,114	187,595
2025	-1,500,000	-1,066,712	-3,360,000	6,400,273	473,561
2026	-900,000	-1,188,637	-3,828,000	7,131,824	1,215,187
2027	-900,000	-1,313,552	-4,320,000	7,881,314	1,347,761
2028	-900,000	-1,441,514	-4,836,000	8,649,085	1,471,571
2029	-900,000	-1,572,581	-5,376,000	9,435,486	1,586,905
2030	-900,000	-1,706,812	-5,940,000	10,240,873	1,694,060
2031	0	-1,729,001	-6,120,000	10,374,004	2,525,003
2032	0	-1,751,478	-6,300,000	10,508,866	2,457,388
2033	0	-1,774,247	-6,480,000	10,645,481	2,391,234
2034	0	-1,797,312	-6,660,000	10,783,873	2,326,560
2035	0	-1,820,677	-6,840,000	10,924,063	2,263,386
				IRR	25%

Data:

1. Production Cost per Hectare per Year	5,000
2. Manpower Required	1
3. Sweet Corn Yield per Hectare per Year	60,000
4. Average Price of Sweet Corn per Cob	0.50

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Banana Agro-based	SADA, MANRED, PELITA/SALCRA, DOA, DID, Private Sector	Temudok	7,500,000	500	100	150	250
Total			7,500,000	500	100	150	250

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectareage
2021	750,000	334,290	30	1,200		50
2022	750,000	677,272	60	1,250	1,539,254	100
2023	750,000	1,029,114	90	1,300	3,118,528	150
2024	750,000	1,389,990	120	1,350	4,738,603	200
2025	750,000	1,760,075	150	1,400	6,400,273	250
2026	750,000	2,139,547	180	1,450	8,104,345	300
2027	750,000	2,528,588	210	1,500	9,851,642	350
2028	750,000	2,927,383	240	1,550	11,642,999	400
2029	750,000	3,336,118	270	1,600	13,479,266	450
2030	750,000	3,754,987	300	1,650	15,361,309	500
2031	0	3,803,801	300	1,700	17,290,007	500
2032	0	3,853,251	300	1,750	17,514,777	500
2033	0	3,903,343	300	1,800	17,742,469	500
2034	0	3,954,087	300	1,850	17,973,121	500
2035	0	4,005,490	300	1,900	18,206,771	500

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-750,000	-334,290	-432,000	0	-1,516,290
2022	-750,000	-677,272	-900,000	1,539,254	-788,018
2023	-750,000	-1,029,114	-1,404,000	3,118,528	-64,587
2024	-750,000	-1,389,990	-1,944,000	4,738,603	654,613
2025	-750,000	-1,760,075	-2,520,000	6,400,273	1,370,198
2026	-750,000	-2,139,547	-3,132,000	8,104,345	2,082,798
2027	-750,000	-2,528,588	-3,780,000	9,851,642	2,793,054
2028	-750,000	-2,927,383	-4,464,000	11,642,999	3,501,616
2029	-750,000	-3,336,118	-5,184,000	13,479,266	4,209,148
2030	-750,000	-3,754,987	-5,940,000	15,361,309	4,916,322
2031	0	-3,803,801	-6,120,000	17,290,007	7,366,205
2032	0	-3,853,251	-6,300,000	17,514,777	7,361,526
2033	0	-3,903,343	-6,480,000	17,742,469	7,359,126
2034	0	-3,954,087	-6,660,000	17,973,121	7,359,034
2035	0	-4,005,490	-6,840,000	18,206,771	7,361,282
				IRR	47%

Data:

1. Maintenance Cost per Hectare per Year	6,600
Source: 10th Malaysia Plan. Fruits Industry Development Programme. DOA Sarawak.	
2. Manpower Required	1.67
3. Banana Yield per Hectare per Year	20
4. Average Price of Banana per tan	1,500

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Oil Palm	SALCRA, MPOB	Lubok Antu, Engkelili, Pantu	510,897,600	24,712	0	16,712	8,000
Mill & Biogas	SADA, SALCRA	Sri Aman	30,000,000				
Total			540,897,600	24,712	0	16,712	0

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectare
2021	15,000,000	0	0	1,200	0	0
2022	15,000,000	0	0	1,250	0	0
2023	106,299,200	14,476,898	524	1,300	0	5,571
2024	106,299,200	29,330,196	1,047	1,350	0	11,141
2025	106,299,200	44,567,232	1,571	1,400	0	16,712
2026	38,400,000	49,468,924	1,721	1,450	64,516,640	18,312
2027	38,400,000	54,490,527	1,872	1,500	130,710,712	19,912
2028	38,400,000	59,634,332	2,022	1,550	198,614,927	21,512
2029	38,400,000	64,902,667	2,173	1,600	220,459,431	23,112
2030	38,400,000	70,297,901	2,323	1,650	242,838,327	24,712
2031	0	71,211,774	2,323	1,700	265,761,816	24,712
2032	0	72,137,527	2,323	1,750	289,240,276	24,712
2033	0	73,075,315	2,323	1,800	313,284,263	24,712
2034	0	74,025,294	2,323	1,850	317,356,958	24,712
2035	0	74,987,622	2,323	1,900	321,482,599	24,712

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-15,000,000	0	0	0	-15,000,000
2022	-15,000,000	0	0	0	-15,000,000
2023	-106,299,200	-14,476,898	-8,169,200	0	-128,945,298
2024	-106,299,200	-29,330,196	-16,966,800	0	-152,596,196
2025	-106,299,200	-44,567,232	-26,392,800	0	-177,259,232
2026	-38,400,000	-49,468,924	-29,952,480	64,516,640	-53,304,764
2027	-38,400,000	-54,490,527	-33,692,648	130,710,712	4,127,537
2028	-38,400,000	-59,634,332	-37,613,305	198,614,927	62,967,290
2029	-38,400,000	-64,902,667	-41,714,449	220,459,431	75,442,315
2030	-38,400,000	-70,297,901	-45,996,082	242,838,327	88,144,343
2031	0	-71,211,774	-47,389,903	265,761,816	147,160,139
2032	0	-72,137,527	-48,783,724	289,240,276	168,319,026
2033	0	-73,075,315	-50,177,544	313,284,263	190,031,404
2034	0	-74,025,294	-51,571,365	317,356,958	191,760,300
2035	0	-74,987,622	-52,965,186	321,482,599	193,529,791
				IRR	10%

Data:

1. Maintenance Cost per Hectare per Year Source: Arshad, F., Ahmad, S. M., Salleh, K. M., Hashim, K., Rahami, M. S., Nambiappan, B., & Ismail, A. (2020). A Comparative Analysis of Agricultural Practices, Costs and Yields of Pre- and Post-Malaysian MSPO Certification for Independent Smallholders in Malaysia. <i>Oil Palm Industry Economic Journal</i> , 20(1), 36-44.	2,500
2. Manpower Required	11
3. Oil Palm Yield per Hectare per Year	18
4. Average Price of Oil Palm Fruits per Tan Source: Malaysian Palm Oil Board.	600
5. Year of First Harvest - 4th year	4

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Coffee	SADA, MANRED, DOA, DID	Engkilili, Lubok Antu	13,500,000	1,000	200	300	500
Total			13,500,000	1,000	200	300	500

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectare
2021	1,350,000	266,115	400	1,200		100
2022	1,350,000	539,149	800	1,250		200
2023	1,350,000	819,237	1,200	1,300	3,118,528	300
2024	1,350,000	1,106,516	1,600	1,350	6,318,137	400
2025	1,350,000	1,401,126	2,000	1,400	9,600,409	500
2026	1,350,000	1,703,209	2,400	1,450	12,966,952	600
2027	1,350,000	2,012,909	2,800	1,500	16,419,404	700
2028	1,350,000	2,330,374	3,200	1,550	19,959,427	800
2029	1,350,000	2,655,752	3,600	1,600	23,588,716	900
2030	1,350,000	2,989,197	4,000	1,650	27,308,994	1,000
2031	0	3,028,056	4,000	1,700	31,122,012	1,000
2032	0	3,067,421	4,000	1,750	35,029,553	1,000
2033	0	3,107,298	4,000	1,800	35,484,937	1,000
2034	0	3,147,693	4,000	1,850	35,946,242	1,000
2035	0	3,188,613	4,000	1,900	36,413,543	1,000

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-1,350,000	-266,115	-480,000	0	-2,096,115
2022	-1,350,000	-539,149	-1,000,000	0	-2,889,149
2023	-1,350,000	-819,237	-1,560,000	3,118,528	-610,710
2024	-1,350,000	-1,106,516	-2,160,000	6,318,137	1,701,621
2025	-1,350,000	-1,401,126	-2,800,000	9,600,409	4,049,283
2026	-1,350,000	-1,703,209	-3,480,000	12,966,952	6,433,743
2027	-1,350,000	-2,012,909	-4,200,000	16,419,404	8,856,494
2028	-1,350,000	-2,330,374	-4,960,000	19,959,427	11,319,053
2029	-1,350,000	-2,655,752	-5,760,000	23,588,716	13,822,964
2030	-1,350,000	-2,989,197	-6,600,000	27,308,994	16,369,797
2031	0	-3,028,056	-6,800,000	31,122,012	21,293,955
2032	0	-3,067,421	-7,000,000	35,029,553	24,962,132
2033	0	-3,107,298	-7,200,000	35,484,937	25,177,640
2034	0	-3,147,693	-7,400,000	35,946,242	25,398,549
2035	0	-3,188,613	-7,600,000	36,413,543	25,624,930
				IRR	57%

Data:

1. Maintenance Cost per Hectare per Year Source: Thanuja, P. & Singh, N. K. (2017). An economic analysis of cost and returns of coffee production in Kodagu district of Karnataka. <i>International Research Journal of Agricultural Economics and Statistics</i> , 8(2), 366-375.	2,627
2. Manpower Required	0.25
3. Dried Coffee Beans Yield per Hectare per Year	20
4. Average Price of Liberica Coffee per kg	1,500
5. Year of First Harvest - 3rd year	3

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Sacha Inchi	SADA, DOA	Pantu	10,000,000	500	100	150	250
Total			10,000,000	500	100	150	250

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectareage
2021	1,000,000	133,058	50	1,200		50
2022	1,000,000	269,575	100	1,250	1,519,500	100
2023	1,000,000	409,619	150	1,300	3,078,507	150
2024	1,000,000	553,258	200	1,350	4,677,791	200
2025	1,000,000	700,563	250	1,400	6,318,137	250
2026	1,000,000	851,605	300	1,450	8,000,341	300
2027	1,000,000	1,006,455	350	1,500	9,725,214	350
2028	1,000,000	1,165,187	400	1,550	11,493,582	400
2029	1,000,000	1,327,876	450	1,600	13,306,285	450
2030	1,000,000	1,494,598	500	1,650	15,164,175	500
2031	0	1,514,028	500	1,700	17,068,121	500
2032	0	1,533,711	500	1,750	17,290,007	500
2033	0	1,553,649	500	1,800	17,514,777	500
2034	0	1,573,846	500	1,850	17,742,469	500
2035	0	1,594,306	500	1,900	17,973,121	500

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-1,000,000	-133,058	-60,000	0	-793,058
2022	-1,000,000	-269,575	-125,000	1,519,500	524,925
2023	-1,000,000	-409,619	-195,000	3,078,507	1,873,888
2024	-1,000,000	-553,258	-270,000	4,677,791	3,254,533
2025	-1,000,000	-700,563	-350,000	6,318,137	4,667,574
2026	-1,000,000	-851,605	-435,000	8,000,341	6,113,736
2027	-1,000,000	-1,006,455	-525,000	9,725,214	7,593,760
2028	-1,000,000	-1,165,187	-620,000	11,493,582	9,108,395
2029	-1,000,000	-1,327,876	-720,000	13,306,285	10,658,408
2030	-1,000,000	-1,494,598	-825,000	15,164,175	12,244,576
2031	0	-1,514,028	-850,000	17,068,121	14,704,093
2032	0	-1,533,711	-875,000	17,290,007	14,881,296
2033	0	-1,553,649	-900,000	17,514,777	15,061,128
2034	0	-1,573,846	-925,000	17,742,469	15,243,622
2035	0	-1,594,306	-950,000	17,973,121	15,428,815
				IRR	113%

Data:

1. Maintenance Cost per Hectare per Year (Assumption)	2,627
2. Manpower Required	1
3. Dried Seeds Yield per Hectare per Year	2
4. Average Price of Sacha Inchi per Tan	15,000
5. Year of First Harvest - 2nd year	2

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Head)	Implementation (Head)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Cattle Integration	SADA, FELCRA, DVS	Lubok Antu, Batu Lintang	5,000,000	2,000	400	800	800
Total			5,000,000	2,000	400	800	800

Year	Project Cost	Maintenance Cost	Purchase of New Breed	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Population of Cattle
2021	500,000	4,619		10	1,200		200
2022	500,000	9,359		20	1,250		400
2023	666,667	15,801	142,413	33	1,300	831,607	667
2024	666,667	22,408	288,528	47	1,350	1,684,837	933
2025	666,667	29,185	487,132	60	1,400	2,844,566	1,200
2026	400,000	33,507	690,850	68	1,450	4,034,163	1,360
2027	400,000	37,935	899,783	76	1,500	5,254,209	1,520
2028	400,000	42,474	1,033,011	84	1,550	6,032,182	1,680
2029	400,000	47,124	1,169,551	92	1,600	6,829,495	1,840
2030	400,000	51,887	1,309,466	100	1,650	7,646,518	2,000
2031	-	52,562	1,452,822	100	1,700	8,483,630	2,000
2032	-	53,245	1,599,683	100	1,750	9,341,214	2,000
2033	-	53,937	1,620,479	100	1,800	9,462,650	2,000
2034	-	54,638	1,641,545	100	1,850	9,585,664	2,000
2035	-	55,349	1,662,885	100	1,900	9,710,278	2,000

Year	Project Cost	Maintenance Cost	Purchase of New Breed	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-500,000	-4,619	0	-144,000	0	-648,619
2022	-500,000	-9,359	0	-300,000	0	-809,359
2023	-666,667	-15,801	-142,413	-520,000	831,607	-513,273
2024	-666,667	-22,408	-288,528	-756,000	1,684,837	-48,767
2025	-666,667	-29,185	-487,132	-1,008,000	2,844,566	653,582
2026	-400,000	-33,507	-690,850	-1,183,200	4,034,163	1,726,606
2027	-400,000	-37,935	-899,783	-1,368,000	5,254,209	2,548,490
2028	-400,000	-42,474	-1,033,011	-1,562,400	6,032,182	2,994,297
2029	-400,000	-47,124	-1,169,551	-1,766,400	6,829,495	3,446,420
2030	-400,000	-51,887	-1,309,466	-1,980,000	7,646,518	3,905,165
2031	0	-52,562	-1,452,822	-2,040,000	8,483,630	4,938,247
2032	0	-53,245	-1,599,683	-2,100,000	9,341,214	5,588,286
2033	0	-53,937	-1,620,479	-2,160,000	9,462,650	5,628,234
2034	0	-54,638	-1,641,545	-2,220,000	9,585,664	5,669,481
2035	0	-55,349	-1,662,885	-2,280,000	9,710,278	5,712,044
					IRR	47%

Data:

1. Maintenance Cost per Head per Year Source: Department of Veterinary Services Malaysia. Cash flow – beef cow/calf integration in oil palm estates. Retrieved from http://www.dvs.gov.my/dvs/resources/auto%20download%20images/56319a7381e10.pdf .	22.8
2. Manpower Required	20
3. Average Price of Cattle per Head	4,000
4. Cost of New Breed per Head Source: ABC News. Live export cattle price hits record \$4 per kilo, but Indonesian feedlots warn market unsustainable. ABC News on 18 March 2020.	685
5. Year of First Harvest - 3rd year	3

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (House)	Implementation (House)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Swiftlet Commercial Farming	DVS, Village Cooperatives	Lingga	15,000,000	100	20	30	50
Total			15,000,000	100	20	30	50

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative House
2021	2,580,000	10,130	15	1,200	1,215,600	10
2022	2,580,000	20,523	30	1,250	2,462,806	20
2023	1,230,000	31,185	45	1,300	3,742,233	30
2024	1,230,000	42,121	60	1,350	5,054,510	40
2025	1,230,000	53,336	75	1,400	6,400,273	50
2026	1,230,000	64,835	90	1,450	7,780,171	60
2027	1,230,000	76,624	105	1,500	9,194,866	70
2028	1,230,000	88,709	120	1,550	10,645,028	80
2029	1,230,000	101,094	135	1,600	12,131,340	90
2030	1,230,000	113,787	150	1,650	13,654,497	100
2031	0	115,267	150	1,700	13,832,005	100
2032	0	116,765	150	1,750	14,011,821	100
2033	0	118,283	150	1,800	14,193,975	100
2034	0	119,821	150	1,850	14,378,497	100
2035	0	121,378	150	1,900	14,565,417	100

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-2,580,000	-10,130	-216,000	1,215,600	-510,530
2022	-2,580,000	-20,523	-450,000	2,462,806	492,282
2023	-1,230,000	-31,185	-702,000	3,742,233	1,509,048
2024	-1,230,000	-42,121	-972,000	5,054,510	2,540,389
2025	-1,230,000	-53,336	-1,260,000	6,400,273	3,586,937
2026	-1,230,000	-64,835	-1,566,000	7,780,171	4,649,337
2027	-1,230,000	-76,624	-1,890,000	9,194,866	5,728,242
2028	-1,230,000	-88,709	-2,232,000	10,645,028	6,824,319
2029	-1,230,000	-101,094	-2,592,000	12,131,340	7,938,245
2030	-1,230,000	-113,787	-2,970,000	13,654,497	9,070,709
2031	0	-115,267	-3,060,000	13,832,005	10,656,739
2032	0	-116,765	-3,150,000	14,011,821	10,745,056
2033	0	-118,283	-3,240,000	14,193,975	10,835,692
2034	0	-119,821	-3,330,000	14,378,497	10,928,676
2035	0	-121,378	-3,420,000	14,565,417	11,024,039
				IRR	198%

Data:

1. Maintenance Cost per House per Year	1,000
Source: Department of Veterinary Services Malaysia. Cost and Earning Structure of the Swiftlet Farming Industry.	
2. Manpower Required	0.67
3. Bird's Nest Yield per House per Year	24
4. Average Price of Bird's Nest per kg	5,000

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Hive)	Implementation (Hive)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Apiculture (Honeybees)	SADA, MANRED, DOA	Skrang Valley, Lubok Antu	2,000,000	60,000	20,000	20,000	20,000
Total			2,000,000	60,000	20,000	20,000	20,000

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Pro ductivity of Project	Cumulative Hive
2021	333,333	1,306,000	50	1,200		10,000
2022	333,333	2,604,676	100	1,250	4,648,546	20,000
2023	222,222	3,464,049	133	1,300	9,417,953	26,667
2024	222,222	4,320,152	167	1,350	12,720,516	33,333
2025	222,222	5,173,697	200	1,400	16,107,353	40,000
2026	133,333	5,681,098	220	1,450	19,580,098	44,000
2027	133,333	6,188,418	240	1,500	21,818,103	48,000
2028	133,333	6,696,113	260	1,550	24,110,988	52,000
2029	133,333	7,204,649	280	1,600	26,459,800	56,000
2030	133,333	7,714,497	300	1,650	28,865,606	60,000
2031	-	7,712,005	300	1,700	31,329,492	60,000
2032	-	7,711,821	300	1,750	31,736,775	60,000
2033	-	7,713,975	300	1,800	32,149,353	60,000
2034	-	7,718,497	300	1,850	32,567,295	60,000
2035	-	7,725,417	300	1,900	32,990,670	60,000

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Pro ductivity of Project	Net Annual Savings
2021	-333,333	-1,306,000	-720,000	0	-2,359,333
2022	-333,333	-2,604,676	-1,500,000	4,648,546	210,536
2023	-222,222	-3,464,049	-2,080,000	9,417,953	3,651,682
2024	-222,222	-4,320,152	-2,700,000	12,720,516	5,478,141
2025	-222,222	-5,173,697	-3,360,000	16,107,353	7,351,434
2026	-133,333	-5,681,098	-3,828,000	19,580,098	9,937,666
2027	-133,333	-6,188,418	-4,320,000	21,818,103	11,176,352
2028	-133,333	-6,696,113	-4,836,000	24,110,988	12,445,541
2029	-133,333	-7,204,649	-5,376,000	26,459,800	13,745,818
2030	-133,333	-7,714,497	-5,940,000	28,865,606	15,077,776
2031	0	-7,712,005	-6,120,000	31,329,492	17,497,487
2032	0	-7,711,821	-6,300,000	31,736,775	17,724,954
2033	0	-7,713,975	-6,480,000	32,149,353	17,955,378
2034	0	-7,718,497	-6,660,000	32,567,295	18,188,798
2035	0	-7,725,417	-6,840,000	32,990,670	18,425,253
				IRR	111%

Data:

1. Maintenance Cost per Hive per Year Source: Ismail, M. M. (2014). Competitiveness of Beekeeping Industry in Malaysia. Universiti Putra Malaysia Press: Selangor, Malaysia.	200
2. Manpower Required	200
3. Honey Yield per Hive per Year	4.53
4. Average Price of Honey per kg Source: Ismail, M. M. (2014). Competitiveness of Beekeeping Industry in Malaysia. Universiti Putra Malaysia Press: Selangor, Malaysia.	150

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Total Targeted Implementation (Ha)	Implementation (Ha)		
					Short Term	Mid Term	Long Term
					2021 – 2022	2023 – 2025	2026 – 2030
Agrotechnology Parks at Lachau & Temudok	SADA, DOA, DOF, DVS, MARDI	Lachau, Temudok	80,000,000	400	132	200	68
Total			80,000,000	400	132	200	68

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project	Cumulative Hectare
2021	13,200,000	334,290	132	1,200		66
2022	13,200,000	677,272	264	1,250		132
2023	13,600,000	1,039,509	400	1,300	38,420,260	200
2024	13,200,000	1,400,520	532	1,350	77,839,447	266
2025	13,200,000	1,770,742	664	1,400	119,471,757	332
2026	13,600,000	2,161,159	800	1,450	160,963,103	400
2027	0	2,189,254	800	1,500	203,513,034	400
2028	0	2,217,714	800	1,550	248,383,980	400
2029	0	2,246,544	800	1,600	251,612,971	400
2030	0	2,275,749	800	1,650	254,883,940	400
2031	0	2,305,334	800	1,700	258,197,431	400
2032	0	2,335,304	800	1,750	261,553,998	400
2033	0	2,365,662	800	1,800	264,954,200	400
2034	0	2,396,416	800	1,850	268,398,604	400
2035	0	2,427,570	800	1,900	271,887,786	400

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/Productivity of Project	Net Annual Savings
2021	-13,200,000	-334,290	-1,900,800	0	-15,435,090
2022	-13,200,000	-677,272	-3,960,000	0	-17,837,272
2023	-13,600,000	-1,039,509	-6,240,000	38,420,260	17,540,751
2024	-13,200,000	-1,400,520	-8,618,400	77,839,447	54,620,526
2025	-13,200,000	-1,770,742	-11,155,200	119,471,757	93,345,815
2026	-13,600,000	-2,161,159	-13,920,000	160,963,103	131,281,944
2027	0	-2,189,254	-14,400,000	203,513,034	186,923,780
2028	0	-2,217,714	-14,880,000	248,383,980	231,286,266
2029	0	-2,246,544	-15,360,000	251,612,971	234,006,427
2030	0	-2,275,749	-15,840,000	254,883,940	236,768,191
2031	0	-2,305,334	-16,320,000	258,197,431	239,572,097
2032	0	-2,335,304	-16,800,000	261,553,998	242,418,694
2033	0	-2,365,662	-17,280,000	264,954,200	245,308,537
2034	0	-2,396,416	-17,760,000	268,398,604	248,242,188
2035	0	-2,427,570	-18,240,000	271,887,786	251,220,217
				IRR	107%

Data:

1. Maintenance Cost per Hectare per Year (Assumption)	5,000
2. Manpower Required	0.5
3. Yield per Hectare per Year	80
4. Average Price of Produce per MT	7,000

4.1.1.2 Fisheries and Aquaculture

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Development of Recreational Fisheries	Sri Aman District Council	Batang Ai	1,540,000	1,500,000	20,000	20,000
Exploring the Potential of the adjoining Kalimantan Market for Supply of Additional Products	SADA, KASTAM, MAQIS	Lubok Antu	350,000	175,000	175,000	0
Expansion of Aquaculture Industry at Batang Ai Reservoir, with a View of Creating Processing Spin-offs	Inland Fisheries Branch of the Department of Agriculture	Batang Ai	50,000,000	10,000,000	20,000,000	20,000,000
Integration of 'Smart Farming' Systems in Aquaculture Using Remote Monitoring and Management Systems	Inland Fisheries Branch of the Department of Agriculture, Aquaculture Operators	Sri Aman	500,000	0	500,000	0
Masterplan for the Economic Development of Tagang Site	SADA	Sri Aman	220,000	220,000	0	0
Proposed New Jetties at Batang Ai (Budgeted under Infrastructure)	SEB, SRB	Batang Ai	21,300,000	0	21,300,000	0
Total			52,610,000	11,895,000	20,695,000	20,020,000

Year	Project Cost	Maintenance Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue/Productivity of Project
2021	5,947,500	5,105,520	30	1,200	0
2022	5,947,500	10,343,784	50	1,250	10,752,199
2023	13,998,333	17,791,200	82	1,300	21,783,955
2024	13,998,333	25,098,799	108	1,350	36,669,063
2025	13,998,333	32,604,056	135	1,400	51,937,502
2026	4,004,000	37,384,804	151	1,450	67,596,723
2027	4,004,000	42,284,343	167	1,500	77,582,776
2028	4,004,000	47,304,951	183	1,550	87,817,043
2029	4,004,000	52,448,949	199	1,600	98,304,289
2030	4,004,000	57,718,696	215	1,650	109,049,363
2031	0	58,469,039	215	1,700	120,057,195
2032	0	59,229,136	215	1,750	121,617,938
2033	0	59,999,115	215	1,800	123,198,972
2034	0	60,779,104	215	1,850	124,800,558
2035	0	61,569,232	215	1,900	126,422,965

Year	Project Cost	Maintenance Cost	Estimated Total Cost of Labour	Estimated Revenue/ Productivity of Project	Net Annual Savings
2021	-5,947,500	-5,105,520	-432,000	0	-11,485,020
2022	-5,947,500	-10,343,784	-750,000	10,752,199	-6,289,085
2023	-13,998,333	-17,791,200	-1,274,000	21,783,955	-11,279,579
2024	-13,998,333	-25,098,799	-1,755,000	36,669,063	-4,183,070
2025	-13,998,333	-32,604,056	-2,268,000	51,937,502	3,067,113
2026	-4,004,000	-37,384,804	-2,627,400	67,596,723	23,580,519
2027	-4,004,000	-42,284,343	-3,006,000	77,582,776	28,288,434
2028	-4,004,000	-47,304,951	-3,403,800	87,817,043	33,104,292
2029	-4,004,000	-52,448,949	-3,820,800	98,304,289	38,030,541
2030	-4,004,000	-57,718,696	-4,257,000	109,049,363	43,069,667
2031	0	-58,469,039	-4,386,000	120,057,195	57,202,156
2032	0	-59,229,136	-4,515,000	121,617,938	57,873,802
2033	0	-59,999,115	-4,644,000	123,198,972	58,555,856
2034	0	-60,779,104	-4,773,000	124,800,558	59,248,455
2035	0	-61,569,232	-4,902,000	126,422,965	59,951,734
				IRR	39%

Data:

1. Maintenance Cost per Year (Development of Recreational Fisheries)	2,500
2. Manpower Required	10
3. Estimated Revenue per Year	156,000
4. Maintenance Cost per Year (Development of Aquaculture at Batang Ai Reservoir)	312,500
5. Manpower Required	200
6. Estimated Revenue per Year	104,000,000
7. Manpower Required (Integration of 'Smart Farming' Systems in Aquaculture Using Remote Monitoring and Management Systems)	5
8. Estimated Revenue per Year - 0	0
9. Maintenance Cost of Aquaculture per Cage per Year	5,040
Source: Islam, G. M. N., Shzee, Y. T., and Kusairi, M. N. (2016). A stochastic frontier analysis of technical efficiency of fish cage culture in Peninsular Malaysia. SpringPlus, 5:1127.	
10. Projected Aquaculture Cages by 2030	10,000

4.1.1.3 Tourism

Strategic Initiative (Program/Project)	Implementing Agencies	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Product Development			36,000,000	1,180,000	14,163,750	20,656,250
Develop the Gunung Lesong-Lingga Ecotourism Cluster with an initial focus on building park HQ facilities (office, staff quarters, interpretation centre, etc.) and community-managed accommodation (CBT)	SFC, Ministry of Infrastructure, Sri Aman Resident Office, MTCP Sarawak, STB, Tour Operators, Gunung Lesong Community-based Ecotourism Committee	Gunung Lesong-Lingga	8,050,000	0	3,018,750	5,031,250
Promote Sri Aman Division as a camping destination and develop five high-quality camping sites with a full range of facilities.	MTCP Sarawak, Local Community, Sri Aman Resident's Office, Local Councils, STB	Sri Aman	2,500,000	1,000,000	1,500,000	-
Develop specific sites/attractions for domestic tourists and residents of the Sri Aman division, particularly for families and the youth travel segment.	-	Sri Aman	-	/	/	/
Develop a Rainforest Field Studies Centre at Batang Ai National Park and partner with a local and foreign university to manage the centre and research activities.	SFC, Foreign University, UNIMAS	Batang Ai	17,000,000	-	6,375,000	10,625,000
Allocate sufficient funds for local recreation and picnic spots so that local councils can maintain facilities and keep them clean.	Resident's Office, Local Councils	Sri Aman				
Continue to fund local events and festivals (e.g., Pesta Benak).	MTCP, STB, Private Sector	Sri Aman	-	/	/	/
Develop visitor centre style attractions (e.g., a handicraft centre, cultural centre) in Simanggang Town, not in small towns where use and visitation will be limited.	MTCP, Sarawak Crafts Council, Resident's Office, Sarawak Museum	Simanggang	8,000,000	-	3,000,000	5,000,000
Continue to allocate funds to preserve heritage sites such as Fort Arundell, Lingga Bazaar, etc.) as part of Sarawak's wider policy of investing in important cultural and heritage assets.	MTCP, Sarawak Museum	Sri Aman	-	/	/	/

Develop agro-tourism products around the fish cage culture at Batang Ai as an add-on tour / new attraction.	Fish Cage Operators, Batang Ai Longhouse Resort, Ministry of Modernization of Agriculture (Agro-tourism unit), DOA, Tour Operators, STB	Batang Ai	-	/	/	-
Promote fishing at Batang Ai Lake as a leisure activity and way of dealing with the lake's 'feral' fish problem.	Longhouse Resort, SRB, DOA, STB, Tour Operators, Fish Cage Operators	Batang Ai	450,000	180,000	270,000	-
Set Aside Land at Batang Ai for Future Lakeside Tourism Development (A Lakeside Tourism Corridor)	Land & Survey Office / EPU, Sarawak Energy	Batang Ai	-	/	/	/
Community-based Tourism			8,100,000	2,940,000	5,160,000	0
Pioneer a CBT kampung stay with 'stand-alone' accommodation at the base of the current summit trek at Gunung Lesong (Kpg Munggu Sawa)	MTCP/SFC, Gunung Lesong Community-based Ecotourism Committee, STB, Tour Operators	Gunung Lesong	1,250,000	500,000	750,000	-
Pioneer a community-managed 'homestay' camping site at the northern borders of G. Lesong (Kpg Menuang)	MTCP, SFC, Gunung Lesong Community-based Ecotourism Committee, Tour Operators	Gunung Lesong	300,000	120,000	180,000	-
Develop a community-based tourism project, campsite and associated facilities at Wong Ajong, Engkilili.	MTCP, Local Community, Local Council, STB	Engkilili	1,500,000	600,000	900,000	-
Develop a 'kampung stay' project with 'stand-alone' accommodation at Banting when the village is accessible by road.	MTCP, Local Community, Local Council, STB	Banting	750,000	-	750,000	-
Continue to promote private sector-led and community-focused ecotourism operations at Batang Ai.	Local Tour Operators, Local Community, STB	Batang Ai	2,000,000	800,000	1,200,000	
Develop a Cultural Heritage Centre at Gunung Lesong	MTCP/SFC, Gunung Lesong Community-based Ecotourism Committee, STB, Tour Operators	Gunung Lesong	2,000,000	800,000	1,200,000	-
CBT Capacity Building	MTCP, SFC, STB, ASIA, Gunung Lesong Community-based Ecotourism Committee	Engkilili	300,000	120,000	180,000	
Conserving Natural Tourism Assets			22,600,000	100,000	8,437,500	14,062,500
Gazette Ulu Sungai Menyang landscape as a national park (or other forms of a protected forest) to protect the orangutan population.	Sarawak Forestry	Sungai Menyang	-	-	/	-

Establish a wildlife corridor between Gunung Lesong and Sebuyau National Parks.	Sarawak Forestry, Local Community, Local Research Institutes, International NGOs	Gunung Lesong, Sebuyau	22,500,000	-	8,437,500	14,062,500
Conduct wildlife surveys to estimate the population of Bornean Banded Langur (or Sarawak langur) at Gunung Lesong and surroundings.	Sarawak Forestry, Local Community, NGOs	Gunung Lesong	100,000	100,000	-	-
Gazette the proposed extensions to Batang Ai National Park	Sarawak Forestry	Batang Ai	-	-	/	-
Re-assess the need to build roads through irreplaceable orangutan habitat. Instead of roads in these fragile areas, improve river and lake transport for communities (new jetties, lake ferry service, etc.).	Sarawak EPU	Sri Aman	-	/	/	/
Marketing & Promotion			985,000	585,000	400,000	0
Set up a dedicated website for the tidal bore (e.g. borneotidalbore.com). This site should include general information about the tidal bore, daily 'wave' times at key sites along the Lupar River (e.g., times at Seduku, Sri Aman, etc.), and webcam feeds of the tidal bore.	STB, Resident's Office	Sri Aman	35,000	35,000	-	-
Set up a photo library of high-quality images of attractions and experiences in Sri Aman Division to be used for marketing and promotion.	STB, Resident's Office	Sri Aman	50,000	50,000	-	-
Ensure key attractions and recreation sites have correct locations in Google Maps.	STB, Resident's Office	Sri Aman	50,000	50,000	-	-
Develop interpretation materials and collaterals (trail maps, guides, etc.) and digital content (videos, photos, blog content, etc.) for the Gunung Lesong-Lingga Ecotourism Cluster	STB, Resident's Office	Gunung Lesong-Lingga	50,000	50,000	-	-
Consider setting up a visitor information desk at Fort Alice, the Resident's Office or somewhere on the new waterfront development.	STB, Resident's Office/ Local Council	Sri Aman	-	/	-	-

Produce a destination video featuring the key attractions in the Sri Aman Division and a series of video blogs on different attractions and experiences.	STB, Resident's Office	Sri Aman	50,000	50,000	-	-
Promote an adventure race in Sri Aman Division (e.g., the Sarawak Adventure Challenge). Potential locations include Gunung Lesong and Batang Ai.	MTCP, Ministry of Youth and Sports, Local Councils, Resident's Office, Private Sector, STB	Sri Aman	250,000	250,000	-	-
Promote a Road Cycling Race in Sri Aman when the Borneo Highway is completed. A potential route is Lingga--Simanggang-Engkilili.	MTCP, Ministry of Youth and Sports, Local Councils, Resident's Office, Private Sector, STB	Sri Aman	250,000	-	250,000	-
Develop a water-based event or festival at Batang Ai Lake (e.g., jet ski regatta, kayaking races, longboat races, etc.).	MTCP, Ministry of Youth and Sports, Local Councils, Resident's Office, Private Sector, STB	Batang Ai	250,000	100,000	150,000	-
Accessibility			1,900,000	720,000	630,000	550,000
Build a road from Pantu to Gunung Lesong to unlock the potential of the Gunung Lesong-Lingga Ecotourism Cluster.	Ministry of Infrastructure	Gunung Lesong-Lingga	-	/	/	-
Clear the piles of logs and fallen trees (log jams) on the Ai and Delok Rivers. This should be done each year. This will create faster and safer river travel for both communities and tourists.	Sarawak Energy, Local Council, SRB	Ai and Delok Rivers	1,100,000	220,000	330,000	550,000
Improve river transport for upriver communities at Batang Ai. Study the merits of introducing river/lake taxis, building better jetties and boat ramps, having a fuel depot near the lake, etc.	Resident's Office, Sarawak Energy, Local Council, SRB	Batang Ai	-	-	-	-
Build boat jetties at Banting and an appropriate site near G. Lesong to connect the tourism cluster and facilitate boat cruises along the Sungai Seterap.	Ministry of Infrastructure, SRB	Banting, Gunung Lesong	-	-	/	-
Allocate funds to maintain the tourist jetty and reception area/toilet block at the Batang Ai. With the resort closed, this building is going into disrepair. Even without a resort, this facility is needed and should be	Local Council/ Longhouse Resort, Sarawak Energy	Batang Ai	500,000	200,000	300,000	-

maintained by the local council, Sarawak Energy, or a relevant agency.						
SEB to continue to maintain the water level of the reservoir so that upriver areas remain safe and navigable and rapids do not appear (e.g., Wong Taong).	Sarawak Energy	Sri Aman	-	/	/	/
Examine the feasibility of floatplane service to Batang Ai.	EPU, Hornbill Skyways	Batang Ai	300,000	300,000	-	-
Total			69,585,000	5,525,000	28,791,250	35,268,750

Year	Project Cost	Estimated Manpower Required	Estimated Average Cost of Labour (per person)	Estimated Revenue and Economic Value
2021	2,762,500	27	1,200	2,548,303
2022	2,762,500	27	1,250	2,581,431
2023	9,597,083	27	1,300	2,614,989
2024	9,597,083	92	1,350	8,267,154
2025	9,597,083	92	1,400	8,382,524
2026	7,053,750	92	1,450	8,499,709
2027	7,053,750	92	1,500	8,618,746
2028	7,053,750	92	1,550	8,739,672
2029	7,053,750	92	1,600	8,862,526
2030	7,053,750	92	1,650	8,987,346

Year	Project Cost	Estimated Total Cost of Labour	Estimated Revenue and Economic Value	Net Annual Savings
2021	-2,762,500	388,800	2,548,303	74,603
2022	-2,762,500	405,000	2,581,431	123,931
2023	-9,597,083	421,200	2,614,989	-6,560,894
2024	-9,597,083	1,490,400	8,267,154	160,471
2025	-9,597,083	1,545,600	8,382,524	331,041
2026	-7,053,750	1,600,800	8,499,709	3,046,759
2027	-7,053,750	1,656,000	8,618,746	3,220,996
2028	-7,053,750	1,711,200	8,739,672	3,397,122
2029	-7,053,750	1,766,400	8,862,526	3,575,176
2030	-7,053,750	1,821,600	8,987,346	3,755,196
			Economic IRR	25%

Data:

Project	Action No	Action	Timeframe	No. of Jobs Created	Estimated Revenue per Year (RM)	Estimated No. of Tourists/ Visitors Arrival	Data
Product Development	S1-1	Develop the Gunung Lesong-Lingga Ecotourism Cluster with an initial focus on building park HQ facilities (office, staff quarters, interpretation centre, etc.) and community-managed accommodation (CBT)	Medium to long term	20	250,000	20,000	RM10/pax (Local) and RM20/pax (Foreigner)
	S1-2	Promote Sri Aman Division as a camping destination and develop five high-quality camping sites with a full range of facilities.	Short to medium term		219,000		RM10/pax
	S1-4	Develop a Rainforest Field Studies Centre at Batang Ai National Park and partner with a local and foreign university to manage the centre and research activities.	Medium to long term	35	3,000,000		
	S1-7	Develop visitor centre style attractions (e.g., a handicraft centre, cultural centre) in Simanggang Town, not in small towns where use and visitation will be limited.	Medium to long term	5			
Community-based Tourism	S2-1	Pioneer a CBT kampung stay with 'stand-alone' accommodation at the base of the current summit trek at Gunung Lesong (Kpg Munggu Sawa)	Short to medium term	5	330,700		RM150/night for Homestay
	S2-2	Pioneer a community-managed 'homestay' camping site at the northern borders of G. Lesong (Kpg Menuang)	Short to medium term	5	330,700		RM150/night for Homestay
	S2-3	Develop a community-based tourism project, campsite and associated facilities at Wong Ajong, Engkilili.	Short to medium term	5	120,000		RM10/pax
	S2-4	Develop a 'kampung stay' project with 'stand-alone' accommodation at Banting when the village is accessible by road.	Medium term	5	219,000		RM150/night for Homestay
	S2-6	Develop a Cultural Heritage Centre at Gunung Lesong	Short to medium term	12	450,000		
Conserving Natural Tourism Assets	S3-1	Gazette Ulu Sungai Menyang landscape as a national park (or other forms of a protected forest) to protect the orangutan population.	Medium term		1,007,549	14,000	Area - 49562 Ha
	S3-2	Establish a wildlife corridor between Gunung Lesong and Sebuyau National Parks.	Medium to long term		107951.	1500	
	S3-4	Gazette the proposed extensions to Batang Ai National Park	Medium term		359,839	5,000	Area - 2338 Ha
Marketing and Promotion	S4-7	Promote an adventure race in Sri Aman Division (e.g., the Sarawak Adventure Challenge). Potential locations include Gunung Lesong and Batang Ai.	Short term		363,200	200	1816/pax average tourist spending
	S4-8	Promote a Road Cycling Race in Sri Aman when the Borneo Highway is completed. A potential route is Lingga--Simanggang-Engkilili.	Medium term		363,200	200	1816/pax average tourist spending
	S4-9	Develop a water-based event or festival at Batang Ai Lake (e.g., jet ski regatta, kayaking races, longboat races, etc.).	Short to medium term		702,000	1,300	Tourists – 180 pax*RM250*2 days Locals – 1120 pax*RM50*2 days Sponsorship – RM 500,000

4.1.1.4 Soft Infrastructure Projects

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Development of Business Incubation Centre	SEDC	Temudok	2,209,166	368,194	552,291	1,288,681
Development of Training Centre	SADA, Government Stakeholders, Private Sector, Universities	Temudok	2,099,309	1,399,539	699,770	0
Small trader's e-Commerce market access point (Public-Private Partnership)	SADA, SDEC, Private Sector, Universities	Temudok	1,264,644	843,096	421,548	0
Establish an outsource business services sector in Sarawak with the first rural delivery centre in Sri Aman	SADA, MDEC, SEDC, Private Sector, Universities	Temudok	5,788,350	0	815,100	4,973,250
Facilitate business matchmaking and promotion of opportunities in Sri Aman	SADA, Government Stakeholders, Private Sector	Temudok	4,798,662	3,199,108	1,599,554	0
Total			16,160,131	5,809,937	4,088,263	6,261,931

Year	Investment Cost	Employment Salary and Increase in Labour Productivity	Cumulative Employment	Cumulative Trainee	Net Annual Savings
2021	2,904,969		8	0	-2,904,969
2022	2,904,969		17	100	-2,904,969
2023	2,904,969	123,890	25	200	-2,781,079
2024	591,647	1,479,222	71	300	887,575
2025	591,647	2,912,511	116	400	2,320,864
2026	591,647	5,046,590	162	500	4,454,943
2027	1,417,571	7,307,238	279	600	5,889,666
2028	1,417,571	9,697,545	397	700	8,279,973
2029	1,417,571	13,528,804	514	800	12,111,233
2030	1,417,571	17,578,013	631	900	16,160,442
2031	0	21,848,620	631	1,000	21,848,620
2032	0	26,344,201	631	1,100	26,344,201
2033	0	28,655,727	631	1,200	28,655,727
2034	0	31,065,739	631	1,300	31,065,739
2035	0	33,578,225	631	1,400	33,578,225
				EIRR	43%

Data:

1. Employment (Development of Business Incubation Centre) by 2030	100
2. Trainees annually (Development of Training Centre)	100
3. Employment (Establish an outsource business services sector in Sarawak with a first rural delivery centre in Sri Aman) by 2030	531
4. Labour Productivity in SME 2019 Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	75,457
5. Labour Productivity Growth Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	1.028
6. Employment Rate Sarawak Source: Department of Statistics Malaysia, 2020.	0.953
7. Contribution of Entrepreneurship to SME Productivity Source: Suminar, T., Yusuf, A., & Utsman., (2020). The Influence of Entrepreneurship Training on the Productivity of SMEs in Semarang City, Indonesia. PEOPLE: <i>International Journal of Social Sciences</i> , 6(1), 169-178.	0.145

4.1.1.5 Industrial Park

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Establishment of an industrial park for micro, small, medium business with a primary focus on food processing and logistics	SADA, Government Stakeholders, Private Sector, Universities	Temudok	95,500,000	6,701,754	30,157,895	58,640,351
Total			95,500,000	6,701,754	30,157,895	58,640,351

Year	Investment Cost	Building Cost	Employment Salary	Value Added in Processing	Cumulative Employment	Net Annual Savings
2021	3,350,877	14,893,446	101,051	2,614,508	7	-15,528,764
2022	3,350,877	14,893,446	210,524	5,296,993	14	-12,736,807
2023	3,350,877	14,893,446	328,417	8,048,781	21	-9,867,126
2024	13,403,509	59,574,686	795,785	19,024,769	49	-53,157,642
2025	13,403,509	59,574,686	1,296,837	30,284,772	77	-41,396,586
2026	13,403,509	59,574,686	1,831,573	41,834,321	105	-29,312,301
2027	11,309,211	50,266,395	2,321,048	51,913,317	129	-7,341,240
2028	11,309,211	50,266,395	2,838,944	62,247,298	153	3,510,636
2029	11,309,211	50,266,395	3,385,262	72,841,188	176	14,650,844
2030	11,309,211	50,266,395	3,960,000	83,700,000	200	26,084,394
2031	0		4,080,000	84,788,100	200	88,868,100
2032	0		4,200,000	85,890,345	200	90,090,345
2033	0		4,320,000	87,006,920	200	91,326,920
2034	0		4,440,000	88,138,010	200	92,578,010
2035	0		4,560,000	89,283,804	200	93,843,804
					EIRR	14%

Data:

1. Value-added Margin Source: Salin, V., Atkins, J. A., Salame, O. Value added in food manufacturing and retailing: ratio analysis of major US states.	0.5
2. Total Employment by 2030	200
3. Agriculture Production by 2030	167,400,000

4.1.1.6 Transportation and Logistics

4.1.1.6.1 Strategic Focus Area: Jetties

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Proposed New Jetties	JKR, SADA	Banting, Pantu, Engkeranji	15,000,000	0	5,625,000	9,375,000
Feasibility Study for Water Taxi service at Batang Ai	SRB, SEB	Batang Ai	400,000	400,000	0	0
Total			15,400,000	400,000	5,625,000	9,375,000

Year	Cost		Benefit		Net Annual Savings
	Investment	Maintenance	Revenue on Riverine Cargo	Jobs Created and Salary	
2021	200,000		0	0	-200,000
2022	200,000		0	0	-200,000
2023	1,875,000		0	0	-1,875,000
2024	1,875,000		0	0	-1,875,000
2025	1,875,000	100,004	208,851	1,320,000	-485,864
2026	1,875,000	202,609	432,740	2,700,000	973,761
2027	1,875,000	307,864	672,477	4,140,000	2,504,614
2028	1,875,000	415,821	928,915	5,640,000	4,107,473
2029	1,875,000	526,534	1,202,945	7,200,000	5,783,153
2030	1,875,000	640,055	1,495,502	8,820,000	7,532,512
2031		756,438	1,807,563	10,500,000	11,231,448
2032		875,739	2,140,154	12,240,000	13,504,416
2033		887,123	2,217,200	12,480,000	13,810,076
2034		898,656	2,297,019	12,720,000	14,118,363
2035		910,339	2,379,712	12,960,000	14,429,373
2036		922,173	2,465,381	13,200,000	14,743,208
2037		934,161	2,554,135	13,440,000	15,059,974
2038		946,305	2,646,084	13,680,000	15,379,779
2039		958,607	2,741,343	13,920,000	15,702,736
2040		971,069	2,840,031	14,160,000	16,028,962
			EIRR		48%

Data:

1. Maintenance Cost of Total Investment	0.05
2. Job Created - Wharf	400
3. Channel Fee - RM 2.80 per tonne	2.80
Source: Kuching Port Authority. Port's tariff, rates & charges. Retrieved from https://www.kpa.gov.my/ .	
4. Sri Aman GDP Growth	1.036
5. Tonnage Handled per Year (Assumption)	500,000

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Proposed New Jetties at Batang Ai	SEB, SRB	Batang Ai	21,300,000	0	21,300,000	0
Total			21,300,000	0	21,300,000	0

4.1.1.6.2 Strategic Focus Area: Transport Terminal and Smart Centre

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Public Transport Terminals and Stations	MDSA, MOT	Lubok Antu, Lachau, Pantu	62,500,000	4,800,000	49,700,000	8,000,000
Smart Centre	District Council	Simanggang	5,000,000	0	5,000,000	0
Total			67,500,000	4,800,000	54,700,000	8,000,000

Year	Cost		Benefit		Net Annual Savings
	Investment	Maintenance	VOC + Revenue from Public Transport	Job Created and Salary	
2021	2,400,000				-2,400,000
2022	2,400,000				-2,400,000
2023	18,233,333	124,741			-18,358,074
2024	18,233,333	252,725			-18,486,059
2025	18,233,333	1,228,497	3,413,816	345,600	-15,702,414
2026	1,600,000	2,229,595	7,143,194	704,000	4,017,599
2027	1,600,000	3,256,515	40,014,981	3,837,867	34,446,102
2028	1,600,000	3,387,558	75,915,353	7,083,200	68,511,875
2029	1,600,000	3,521,458	115,058,200	10,440,000	105,502,881
2030	1,600,000	3,658,267	120,393,648	10,620,000	113,333,346
2031		3,798,038	125,981,117	10,800,000	123,256,422
2032		3,940,825	131,832,720	10,980,000	132,101,514
2033		3,992,055	137,961,159	11,160,000	141,594,380
2034		4,043,952	144,379,758	11,340,000	151,675,806
2035		4,096,524	151,102,493	11,520,000	158,525,969
2036		4,149,778	158,144,023	11,700,000	165,694,245
2037		4,203,725	165,519,726	11,880,000	173,196,001
2038		4,258,374	173,245,733	12,060,000	181,047,359
2039		4,313,733	181,338,966	12,240,000	189,265,233
2040		4,369,811	189,817,178	12,420,000	197,867,366
			EIRR		51%

Data:

1. Maintenance Cost of Total Investment	0.05
2. Population in Sri Aman 2020	111,400
3. Estimated Vehicles Registered (Motor Cars, Goods Vehicles, Others) in Sri Aman Source: Ministry of Transport Malaysia, various issues.	40,634
4. Estimated Vehicles Registered (Motorcycles) in Sri Aman Source: Ministry of Transport Malaysia, various issues.	33,216
5. Estimated Vehicles Registered (Public Vehicles) in Sri Aman Source: Ministry of Transport Malaysia, various issues.	297
6. Average VOC of Cars Source: Estimated Cost of Ownership. Retrieved from CarBase.my.	3,947.57
7. Average VOC of Motorcycle Source: Treeletrik. The Average Malaysian spending on Motorcycle Maintenance Costs.	2,561
8. Average VOC of Bus Source: Texas A&M Transportation Institute. (2014). Guidebook: Managing Operating Costs for Rural and Small Urban Public Transit Systems.	62,187.28
9. Job Created (Public Transport)	300
10. Average Cost Saving - 30% of Commuter turn to Public Transport	0.3
11. Estimated User per Year	1,000,000
12. Average Charges per User	3

4.1.1.6.3 Strategic Focus Area: CPPC

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
CPPC	SADA, DOA, DID	Lachau, Temudok	20,000,000	10,000,000	10,000,000	0
Total			20,000,000	10,000,000	10,000,000	0

Year	Cost			Benefit		Net Annual Savings
	Investment	CAPEX	OPEX	Revenue from CPPC Activity	Jobs Created and Salary	
2021	0					0
2022	10,000,000	40,000,000				-50,000,000
2023	0					0
2024	0		50,836,243	67,781,657	1,701,000	18,646,414
2025	10,000,000	40,000,000	61,906,392	82,541,855	1,764,000	-27,600,536
2026	0		72,524,069	96,698,758	1,827,000	26,001,690
2027	0		164,581,648	219,442,197	3,780,000	58,640,549
2028	0		184,598,516	246,131,355	3,906,000	65,438,839
2029	0		205,108,009	273,477,345	4,032,000	72,401,336
2030	0		226,119,551	301,492,735	4,158,000	79,531,184
2031			229,059,105	305,412,140	4,284,000	80,637,035
2032			232,036,874	309,382,498	4,410,000	81,755,625
2033			235,053,353	313,404,471	4,536,000	82,887,118
2034			238,109,047	317,478,729	4,662,000	84,031,682
2035			241,204,464	321,605,952	4,788,000	85,189,488
2036			244,340,122	325,786,830	4,914,000	86,360,707
2037			247,516,544	330,022,059	5,040,000	87,545,515
2038			250,734,259	334,312,345	5,166,000	88,744,086
2039			253,993,804	338,658,406	5,292,000	89,956,601
2040			257,295,724	343,060,965	5,418,000	91,183,241
					EIRR	41%

Data:

1. Job Created	210
2. Average Price of Paddy per Tan (CPPC)	3,000
3. Average Price of Pineapple per Tan (CPPC)	4,260
4. Average Price of Swiftlet per Tan (CPPC)	6,000,000
5. Average Price of Rambutan per Tan (CPPC)	3,000
6. Average Price of Sacha Inchi per Tan (CPPC)	150,000
7. Average Price of Vege & Fruits per Tan (CPPC)	4,000
8. Average Price of Apiculture per Tan (CPPC)	150
9. Average Price of Coffee per Tan (CPPC)	15,000
10. Average Price of Coconut per Nut (CPPC)	1.65
11. Average Price of Durian per Tan (CPPC)	7,000
12. Average Price of Banana per Tan (CPPC)	4,000
13. Average Price of Sweet Corn per cob (CPPC)	0.50
14. Profit from CPPC of Total Revenue	0.25
15. OPEX of Total Revenue of CPPC	0.75
16. CAPEX per CPPC	40,000,000

4.1.1.7 Infrastructure (Roads and Bridges)

4.1.1.7.1 Strategic Focus Area: Proposed Roads and Bridges Project

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Proposed Simanggang Link Road	JKR & SADA	Simanggang	45,500,000	27,300,000	18,200,000	0
Proposed Banting - Gunung Lesong - Engkeranji Road	JKR & SADA	Banting - Gunung Lesong - Engkeranji	54,000,000	32,400,000	21,600,000	0
Proposed Lingga - Banting Road	JKR & SADA	Lingga - Banting Road	75,500,000	45,300,000	30,200,000	0
Proposed Batu Besai/ Po Ai Shortcut Road	JKR & SADA	Batu Besai	29,000,000	0	17,400,000	11,600,000
Proposed Jalan Merebong - Bukit Tungku Road	JKR & SADA	Jalan Merebong - Bukit Tungku	26,000,000	0	15,600,000	10,400,000
Proposed Sebemban Gayau Road	JKR & SADA	Sebemban Gayau Road	32,500,000	0	19,500,000	13,000,000
Proposed New Access Road To New Aquaculture Site At Batang Ai	JKR & SADA	Batang Ai	18,000,000	10,800,000	7,200,000	0
Proposed upgrading of Jalan Menangkin to Engkeranji Road	JKR & SADA	Jalan Menangkin - Engkeranji	71,500,000	42,900,000	28,600,000	0
Proposed upgrading of Pantu - Keranggas - Engkeranji Road	JKR & SADA	Pantu - Keranggas - Engkeranji	169,000,000	101,400,000	67,600,000	0
Proposed upgrading of Ulu Skrang Road	JKR & SADA	Ulu Skrang	331,000,000	198,600,000	132,400,000	0
Proposed upgrading of Jalan Akses Sri Aman to dual carriageway	JKR & SADA	Sri Aman	82,500,000	0	16,500,000	66,000,000
Proposed upgrading of Merindun Merio - Engkilili Road	JKR & SADA	Merindun Merio - Engkilili	88,700,000	0	53,200,000	35,500,000
Proposed upgrading of Batang Strap, Sapak, Isu to Simpang Ubah Road	JKR & SADA	Isu, Simpang Ubah	168,000,000	0	33,600,000	134,400,000
Proposed Reinforced Concrete (R.C.) Bridge at Nanga Entalau, Ulu Skrang	JKR & SADA	Ulu Skrang	10,600,000	0	6,400,000	4,200,000
Proposed Reinforced Concrete (R.C.) Bridge Over Batang Ai River, Engkilili Bazaar	JKR & SADA	Engkilili	16,000,000	0	9,600,000	6,400,000
Proposed upgrading of Engkilili - Lubok Antu Road	JKR & SADA	Engkilili	160,000,000	96,000,000	64,000,000	0
Total			1,377,800,000	554,700,000	541,600,000	281,500,000

Year	Cost	Benefit	Net Annual Savings
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	Investment	Maintenance	Vehicle Operating Cost	Time Costs	
2021	277,350,000				-277,350,000
2022	277,350,000				-277,350,000
2023	180,533,333		221,851	245,052,374	64,740,892
2024	180,533,333	14,602,794	232,162	258,699,971	63,796,006
2025	180,533,333	29,585,260	242,959	272,747,153	62,871,518
2026	56,300,000	39,723,899	254,265	287,209,710	191,440,076
2027	56,300,000	50,121,141	266,104	303,937,622	197,782,585
2028	56,300,000	60,781,999	278,502	321,174,234	204,370,737
2029	56,300,000	64,734,177	291,486	339,887,326	219,144,635
2030	56,300,000	68,778,838	305,083	360,146,033	235,372,278
2031		72,917,721	319,324	380,371,417	307,773,020
2032		77,152,591	334,238	401,857,667	325,039,314
2033		81,485,245	349,859	424,685,267	343,549,881
2034		82,544,553	366,220	448,939,986	366,761,654
2035		83,617,632	383,358	474,713,229	391,478,954
2036		84,704,661	401,308	502,102,406	417,799,053
2037		85,805,822	420,111	531,211,338	445,825,627
2038		86,921,298	439,807	562,150,681	475,669,190
2039		88,051,275	460,439	595,038,378	507,447,542
2040		89,195,941	482,053	630,000,149	541,286,262
				EIRR	25%

Data:

1. Maintenance Cost of Total Investment	0.05
2. Population in Sri Aman 2020	111,400
3. Estimated Vehicles Registered (Motor Cars, Goods Vehicles, Others) in Sri Aman Source: Ministry of Transport Malaysia, various issues.	40,634
4. Estimated Vehicles Registered (Motorcycles) in Sri Aman Source: Ministry of Transport Malaysia, various issues.	33,216
5. Estimated Vehicles Registered (Public Vehicles) in Sri Aman Source: Ministry of Transport Malaysia, various issues.	297
6. Average Household Expenditure	28,624.2
7. Average VOC of Cars Source: Estimated Cost of Ownership. Retrieved from CarBase.my.	3,947.57
8. Average VOC of Motorcycle Source: Treeletrik. The Average Malaysian spending on Motorcycle Maintenance Costs.	2,561
9. Average VOC of Bus Source: Texas A&M Transportation Institute. (2014). Guidebook: Managing Operating Costs for Rural and Small Urban Public Transit Systems.	62,187.28
10. Distance Saved per Vehicle per Year Source: Asian Development Bank. India: Madhya Pradesh District Connectivity Sector Project. Project No. 47270.	0.000733578
11. Time Saved (WT) - Saved Time/Total Working Time Source: Asian Development Bank. India: Madhya Pradesh District Connectivity Sector Project. Project No. 47270.	0.15
12. Time Saved (Non-WT)* 16-hour Traffic - Saved Time during Non-WT/(Total Hour in a Year - WT - (8-hour Non-traffic *365)) Source: Asian Development Bank. India: Madhya Pradesh District Connectivity Sector Project. Project No. 47270.	0.013017443
13. Assumption - 50% daily traffic from total vehicles	0.5
14. Sri Aman's GDP - RM 3.4 billion	3,380,000,000
15. GDP Growth	1.036

4.1.1.8 Infrastructure (Drainage and Irrigation)

4.1.1.8.1 Strategic Focus Area: Drainage, Flood Mitigation & River Erosion

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Drainage Upgrades for High Priority Areas	DID, Council & SADA	Sri Aman	25,000,000	0	9,375,000	15,625,000
Road Culvert Upgrades	JKR, Council & SADA	Sri Aman	50,000,000	0	18,750,000	31,250,000
Infrastructure - Riverbank Erosion (Riverbank Protection Work for High Priority Areas)	DID, Council & SADA	Sri Aman	50,000,000	0	18,750,000	31,250,000
Total			125,000,000	0	46,875,000	78,125,000

Year	Cost	Benefit	Net Annual Savings
	Investment	Annual Flood Attenuation Benefits	
2021	0	0	0
2022	0	0	0
2023	15,625,000	0	-15,625,000
2024	15,625,000	3,685,580	-11,939,420
2025	15,625,000	7,466,985	-8,158,015
2026	15,625,000	11,346,083	-4,278,917
2027	15,625,000	15,324,777	-300,223
2028	15,625,000	19,404,998	3,779,998
2029	15,625,000	23,588,716	7,963,716
2030	15,625,000	27,877,931	12,252,931
2031		32,274,679	32,274,679
2032		32,694,250	32,694,250
2033		33,119,275	33,119,275
2034		33,549,826	33,549,826
2035		33,985,973	33,985,973
2036		34,427,791	34,427,791
2037		34,875,352	34,875,352
2038		35,328,732	35,328,732
2039		35,788,005	35,788,005
2040		36,253,249	36,253,249
		EIRR	24%

Data:

1. Annual Flood Attenuation Benefits per Hectare - USD 1750*4 7,000

Source: Making Water a Part of Economic Development, Stockholm International Water Institute (SIWI)

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Flood Irrigation for Paddy Projects	DID, MOA, LCDA/FELCRA & SADA	Batang Lupar, Pantu	150,000,000	0	56,250,000	93,750,000
Storage Pond and Feeder Mains for Non-paddy Projects and Agrotech Parks	DID, DOA & SADA	Pantu, Simanggang, Lachau, Temudok	6,000,000	0	2,250,000	3,750,000
Total			156,000,000	0	58,500,000	97,500,000

Year	Cost	Benefit	Net Annual Savings
	Investment	Increase in Productivity/Output	
2021	0		0
2022	0		0
2023	19,500,000		-19,500,000
2024	19,500,000		-19,500,000
2025	19,500,000	8,802,745	-10,697,255
2026	19,500,000	22,381,200	2,881,200
2027	19,500,000	40,559,575	21,059,575
2028	19,500,000	63,792,136	44,292,136
2029	19,500,000	85,254,279	65,754,279
2030	19,500,000	109,077,936	89,577,936
2031		128,911,941	128,911,941
2032		149,243,196	149,243,196
2033		151,183,357	151,183,357
2034		153,148,741	153,148,741
2035		155,139,674	155,139,674
2036		157,156,490	157,156,490
2037		159,199,525	159,199,525
2038		161,269,118	161,269,118
2039		163,365,617	163,365,617
2040		165,489,370	165,489,370
		EIRR	51%

Data:

1. Increase in Yield Source: Food and Agriculture Organization of United Nations. (2011). Country Profile - Malaysia. Rome, Italy.	0.35
2. Specialty Rice Yield per Hectare per Year	10
3. Specialty Rice Average Price per Tan	2,000
4. Pineapple Yield per Hectare per Year	35
5. Pineapple Average Price per Tan	2,000
6. Sweet Corn Yield per Hectare per Year	60,000
7. Sweet Corn Average Price per Cob	0.5
8. Agropark Yield per Hectare per Year	80
9. Agropark Produce Average Price per MT	7,000

Strategic Initiative (Program/Project) ¹	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Flood Mitigation Kejamut Area	DID	Kejamut	2,000,000	/	/	/
Flood Mitigation Works at SK Engkeranji, Lingga	DID	Lingga	3,500,000	/	/	/
Rancangan Tebatan Banjir (RTB) Di Bandar Simanggang, Bahagian Sri Aman, Sarawak	DID	Simanggang	15,000,000	/	/	/
Drainage Improvement Works At Taman Tiara, Kampung Teratai, Kampung Ningkan And Jalan Brayun, Sri Aman Division	DID	Sri Aman	10,000,000	/	/	/
Drainage Improvement Works At Kampung Resak, Jalan Batang Lupar, Jalan Tawi Sli and Jalan Berjaya, Sri Aman Division	DID	Sri Aman	10,000,000	/	/	/
Cadangan Bina Baru Sistem Saliran Utama Di Pekan Pantu, Bahagian Sri Aman, Sarawak	DID	Pantu	6,000,000	/	/	/
Drainage Improvement At Kampung Muhibbah dan RPR, Sri Aman, Sarawak	DID	Kampung Muhibbah, RPR	25,000,000	/	/	/
Drainage Improvement Works at RPR Engkilili	DID	Engkilili	5,000,000	/	/	/
Drainage Improvement Works at Taman Gamang	DID	Taman Gamang	3,500,000	/	/	/
Drainage Improvement At Pasir Panas, Sri Aman Division, Sarawak	DID	Pasir Panas	4,000,000	/	/	/
Drainage Improvement At Taman Siang / Jalan Bayu, Sri Aman, Sarawak	DID	Taman Siang / Jalan Bayu	3,000,000	/	/	/
Drainage Improvement Works At Jalan Kejatau	DID	Jalan Kejatau	10,000,000	/	/	/
Cadangan Bina Baru Sistem Saliran Utama Di Sinyor, Bahagian Sri Aman, Sarawak	DID	Sinyor	4,500,000	/	/	/
Drainage Improvement At Jalan Kejatau - Limu	DID	Jalan Kejatau - Limu	500,000	/	/	/
Riverbank Protection Works At Batang Lupar, Sri Aman Division, Sarawak	DID	Batang Lupar	60,000,000	/	/	/
Riverbank Protection at Bakong Area	DID	Bakong	90,000,000	/	/	/
Riverbank Protection Works at Batang Lingga, Bahagian Sri Aman, Sarawak	DID	Lingga	60,000,000	/	/	/
Riverbank Protection works at Pasir Panas	DID	Pasir Panas	30,000,000	/	/	/
Riverbank Protection Works at Banting, Sri Aman, Sarawak	DID	Banting	4,000,000	/	/	/
Riverbank Protection Works from Kpg Hulu Lingga to Tanjung Jaya	DID	Kpg Hulu Lingga - Tanjung Jaya	45,000,000	/	/	/
Riverbank Protection Works from Kampung Hilir Lingga to Sg. Pendam Batu	DID	Kampung Hilir Lingga - Sg. Pendam Batu	15,000,000	/	/	/

¹ Projects highlighted in grey are existing projects of the DID.

4.1.1.9 Infrastructure (Communications)

4.1.1.9.1 Strategic Focus Area: Telecommunication

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Installation of 1 new tower for proposed Research Centre at Batang Ai NP	SACOFA	Batang Ai	1,200,000	0	1,200,000	0
Installation of 1 new tower for proposed Aquaculture Complex at Batang Ai Lake	SACOFA	Batang Ai	1,000,000	1,000,000	0	0
Total			2,200,000	1,000,000	1,200,000	0

Year	Cost		Benefit	Net Annual Savings
	Investment	Maintenance	Improved Productivity	
2021	1,000,000			-1,000,000
2022	0	51,308	405,109	353,801
2023	1,200,000	51,975	421,314	-830,662
2024	0	115,833	809,409	693,576
2025	0	117,338	839,387	722,049
2026	0	118,864	869,365	750,501
2027	0	120,409	899,343	778,934
2028	0	121,974	929,321	807,347
2029	0	123,560	959,299	835,739
2030	0	125,166	989,277	864,111
2031		126,793	1,019,255	892,462
2032		128,442	1,049,234	920,792
2033		130,111	1,079,212	949,100
2034		131,803	1,109,190	977,387
2035		133,516	1,139,168	1,005,652
2036		135,252	1,169,146	1,033,894
2037		137,010	1,199,124	1,062,114
2038		138,791	1,229,102	1,090,311
2039		140,596	1,259,080	1,118,485
2040		142,423	1,289,058	1,146,635
			EIRR	35%

Data:

1. Maintenance Cost per Year	0.05
2. Persons Benefitted in Research Centre at Batang Ai NP	85
3. Persons Benefitted in Aquaculture Complex at Batang Ai Lake	100
4. Increase in Productivity	
Source: Bertschek, I., Briglauer, W., Huschelrath, K., Kauf, B., and Nlebel, T. (2016). The economic impacts of telecommunications networks and broadband internet: a survey. Centre for European Economic Research, Discussion Paper No. 16-056.	0.37

4.1.1.9.2 Telecommunication Projects under State Government

Strategic Initiative (Program/Project) ²	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Installation of 86 new towers across Sri Aman Division under SMART 300 Rollout	SACOFA	Sri Aman	78,000,000	/	/	/
Installation of 45 Towers under JENDELA Rollout	SACOFA / TMB	Sri Aman	50,000,000	/	/	/
Installation of 20 VSAT units across Sri Aman Division	TMB	Simanggang, Temudok	15,000,000	/	/	/
Upgrade Telecom exchanges in Simanggang and Temudok	-	Sri Aman	30,000,000	/	/	/

4.1.1.10 Utilities (Electricity)

Strategic Initiative (Program/Project) ³	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Serudit to Sri Aman 132kV Transmission Line	SEB	Sri Aman	90,000,000	/	/	/
33kV overhead line from Lachau EHV Substation to Temudok 33/11kV transformer station	SEB	Lachau, Temudok	6,000,000	/	/	/
Simanggang 132/33kV Substation	SEB	Simanggang	100,000,000	/	/	/
Simanggang B 33/11kV Substation	SEB	Simanggang	25,000,000	/	/	/
Ng Kesit Substation	SEB	Ng Kesit	15,000,000	/	/	/
Second EHV 275/33kV transformer at Lachau	SEB	Lachau	20,000,000	/	/	/
Upgrading of Simanggang Sub transformer	SEB	Simanggang	3,800,000	/	/	/
Double circuit from Simanggang EHV to Simanggang Sub station	SEB	Simanggang	25,000,000	/	/	/
33kV Covered Conductor line to Banting and new 33kV Substation at Banting	SEB	Banting	40,000,000	/	/	/

² Projects highlighted in green are existing projects of the State.

³ Projects highlighted in yellow are existing projects of SEB.

4.1.1.11 Utilities (Water Supply)

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Water Grid Extension from Pantu - Lingga	JBALB	Sri Aman	65,000,000	0	0	65,000,000
Total			65,000,000	0	0	65,000,000

Year	Cost		Benefit	Net Annual Savings
	Investment	Maintenance	Economic Benefit	
2021	0	0	0	0
2022	0	0	0	0
2023	0	0	0	0
2024	0	0	0	0
2025	0	0	0	0
2026	0	0	0	0
2027	32,500,000	0	0	-32,500,000
2028	32,500,000	44,354	23,322,497	-9,221,857
2029	0	89,862	24,013,151	23,923,289
2030	0	91,030	24,724,257	24,633,227
2031		92,213	25,456,422	25,364,208
2032		93,412	26,210,268	26,116,856
2033		94,626	26,986,438	26,891,811
2034		95,857	27,785,593	27,689,736
2035		97,103	28,608,413	28,511,310
2036		98,365	29,455,600	29,357,234
2037		99,644	30,327,874	30,228,230
2038		100,939	31,225,979	31,125,040
2039		102,251	32,150,681	32,048,429
2040		103,581	33,102,765	32,999,184
			EIRR	45%

Data:

1. Maintenance Cost per Year	80000
2. Household Benefitted	2000
3. Economic Benefit per Year	2308.3
4. Population Growth	0.0164
5. Average Household	4

Strategic Initiative (Program/Project) ⁴	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Bayai WTP upgrade and water transfer pipeline (currently under implementation)	JBALB	Sg Undup	161,500,000	-	-	-
New 75 MLD Engkilili Water Treatment Plant	JBALB	Engkilili	220,000,000	-	-	-
Treated Water Storage System SMK Simanggang, and Simpang Kiassan	JBALB	Simanggang, Simpang Kiassan	30,000,000	-	-	-
Sri Aman Regional Water Supply Grid	JBALB	Sri Aman	500,000,000	-	-	-
Water Supply System in Bukit Begunan	JBALB	Bukit Begunan	50,000,000	-	-	-
Water Supply System in Engkilili	JBALB	Engkilili	70,000,000	-	-	-
Rural Water Supply Project for Pantu Area (Phase III)	JBALB	Pantu	120,000,000	-	-	-
SAWAS) for rural/remote parts of Lubok Antu, Skrang, Lingga and Pantu	JBALB	Lubok Antu, Skrang, Lingga, Pantu	152,000,000	-	-	-

4.1.1.12 Waste Management (Solid and Liquid Waste)

4.1.1.12.1 Strategic Focus Area: Solid Waste Recycling

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Solid Waste Recycling	Sri Aman Town Council	Sri Aman	12,350,000	12,350,000	0.0	0
Upgrading of existing dumpsites/landfills in Sri Aman	Sri Aman Town Council	Sri Aman	16,500,000	0	4,000,000	12,500,000
Expand and upgrade the Lubok Antu site to a Level 4 Sanitary Landfill	Sri Aman Town Council	Lubok Antu	12,500,000	0	0	12,500,000
Waste Transfer Stations to be established	Sri Aman Town Council	Entulang, Pantu, Lingga, Engkilili, and Lubok Antu	12,500,000	0	0	12,500,000
Extend solid waste collection services to more rural areas within the Sri Aman Division	Sri Aman Town Council	Sri Aman	15,000,000	3,000,000	4,500,000	7,500,000
Waste segregation and Scheduled collection for household bulky, green and recyclables waste	-	Sri Aman	750,000	0	750,000	0
Composting plant/Green centres for food waste at commercial premises	Sri Aman Town Council	Sri Aman	5,000,000	0	0	5,000,000
Waste management in Remote communities	MDLA	Sri Aman	4,140,000	1,380,000	1,035,000	1,725,000
Establish downstream treatment for remote communities	MoH, JKKK, MoT, DOA	Sri Aman	5,230,000	2,030,000	1,200,000	2,000,000
Total			83,970,000	18,760,000	11,485,000	53,725,000

⁴ Projects highlighted in orange are existing projects of JBALB.

Year	Cost		Benefit		Net Annual Savings
	Investment	Maintenance	Savings from Tipping Fees and Revenue from Sales of Recovered Materials	Jobs Created and Salary	
2021	9,380,000				-9,380,000
2022	9,380,000		2,286,156	2,250,000	-4,843,844
2023	6,245,000	487,530	4,407,821	2,340,000	15,292
2024	2,245,000	987,735	5,761,088	2,430,000	4,958,352
2025	2,995,000	1,333,657	6,494,933	2,520,000	4,686,276
2026	39,745,000	1,472,289	7,393,812	2,610,000	-31,213,478
2027	7,245,000	1,655,350	15,063,572	2,700,000	8,863,222
2028	2,245,000	3,880,445	17,044,807	2,790,000	13,709,362
2029	2,245,000	4,337,796	18,149,459	2,880,000	14,446,663
2030	2,245,000	4,521,914	19,294,257	2,970,000	15,497,343
2031		4,710,086	20,480,253	3,060,000	18,830,167
2032		4,902,386	21,234,123	3,150,000	19,481,737
2033		4,966,117	22,004,519	3,240,000	20,278,402
2034		5,030,677	22,791,759	3,330,000	21,091,083
2035		5,096,075	23,596,169	3,420,000	21,920,094
2036		5,162,324	24,212,466	3,510,000	22,560,142
2037		5,229,435	24,841,256	3,600,000	23,211,821
2038		5,297,417	25,482,778	3,690,000	23,875,361
2039		5,366,284	26,137,278	3,780,000	24,550,994
2040		5,436,045	26,805,005	3,870,000	25,238,960
			EIRR		26%

Data:

1. Maintenance Cost of Total Investment	5%
2. Population in Sri Aman 2020	111,400
3. Job Created	150
4. Tipping Fee per Tonne	50
Source: Free Malaysia Today. Some options for solid waste management.	
5. Average Waste per person per day in Sarawak - 0.85 kg	
Source: Ling, S. K. (2018). Study on municipal solid waste management in Malaysia: a case study in Kuching, Miri and Sib. Asian Journal of Environment, History and Heritage, 2(2), 111-118.	0.85
6. Population Growth	1.0162
7. GDP Growth	1.036
8. Recycling Rate - 10%	0.1
9. Percentage of Paper	19
Source: Dewan Bandaraya Kuching Utara Official Website.	
10. Percentage of Plastic	16
Source: Dewan Bandaraya Kuching Utara Official Website.	
11. Percentage of Glass	1.4
Source: Afroz, R., and Tudin, R. (2017). Economic feasibility of household waste minimisation in Dhaka, Bangladesh. Paper presented at Global Conference on Business and Economics Research (GCBER) 2017.	
12. Percentage of Metal	0.9
Source: Afroz, R., and Tudin, R. (2017). Economic feasibility of household waste minimisation in Dhaka, Bangladesh. Paper presented at Global Conference on Business and Economics Research (GCBER) 2017.	
13. Percentage of Others	22.7
Source: Afroz, R., and Tudin, R. (2017). Economic feasibility of household waste minimisation in Dhaka, Bangladesh. Paper presented at Global Conference on Business and Economics Research (GCBER) 2017.	
14. Percentage of Recovered Material	5
Source: Afroz, R., and Tudin, R. (2017). Economic feasibility of household waste minimisation in Dhaka, Bangladesh. Paper presented at Global Conference on Business and Economics Research (GCBER) 2017.	
15. Price of Recycled Paper per Tonne	550
Source: The Star. (2020). More recyclable waste at dumpsite during MCO.	
16. Price of Plastic per Tonne	600
Source: The Star. (2020). More recyclable waste at dumpsite during MCO.	
17. Price of Glass per Tonne	200
Source: The Star. (2020). More recyclable waste at dumpsite during MCO.	
18. Price of Metal per Tonne	700
Source: The Star. (2020). More recyclable waste at dumpsite during MCO.	
19. Price of Other Materials per Tonne	550
Source: The Star. (2020). More recyclable waste at dumpsite during MCO.	
20. Waste from Commercial Premises (%)	30
Source: Tang, K. H. D., (2020). Municipal Solid Waste Management in the Sarawak State of Malaysia and the Way Forward. Asian Journal of Environment & Ecology, 12(2), 38-55.	
21. Percentage of Organic Waste	40
Source: Dewan Bandaraya Kuching Utara Official Website.	
22. Price of Compost per Tonne	3,000
Source: The Star. (2013). Kampung Bako to produce compost from kitchen and green waste.	
23. Recyclable Materials from Kuching & Sib. by 2030 per Year (MT)	3,000

4.1.1.13 Infrastructure (Education and Health facilities)

4.1.1.13.1 Strategic Focus Area: Human Capital Development

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
ICATS Establishment	PPKS	Sri Aman	10,000,000	10,000,000	0	0
Total			10,000,000	10,000,000	0	0

Year	ICATS Facilities Setup Cost	Marketing & Promotion Cost	Internet Dedicated Line & Infrastructure Cost	Staff Salary	Increase in Labour Productivity	Cumulative Graduated Student
2021	5,000,000					0
2022	5,000,000	200,000	240,000	1,123,600		0
2023	0	200,000	240,000	1,191,016		75
2024	0	200,000	240,000	1,262,477	0	225
2025	0	200,000	240,000	1,338,226	0	450
2026	0	200,000	240,000	1,418,519	4,831,337	675
2027	0	200,000	240,000	1,503,630	14,877,027	975
2028	0	200,000	240,000	1,593,848	30,548,331	1,275
2029	0	200,000	240,000	1,689,479	47,057,466	1,575
2030	0	200,000	240,000	1,790,848	69,820,414	1,950
2031	0	200,000	240,000	1,898,299	93,807,851	2,325
2032	0	200,000	240,000	2,012,196	119,084,156	2,700
2033	0	200,000	240,000	2,132,928	151,544,741	3,075
2034	0	200,000	240,000	2,260,904	185,757,256	3,450
2035	0	200,000	240,000	2,396,558	221,810,641	3,825

Year	ICATS Facilities Setup Cost	Marketing & Promotion Cost	Internet Dedicated Line & Infrastructure Cost	Staff Salary	Increase in Labour Productivity	Net Annual Savings
2021	-5,000,000	0	0	0	0	-5,000,000
2022	-5,000,000	-200,000	-240,000	-1,123,600	0	-6,563,600
2023	0	-200,000	-240,000	-1,191,016	0	-1,631,016
2024	0	-200,000	-240,000	-1,262,477	0	-1,702,477
2025	0	-200,000	-240,000	-1,338,226	0	-1,778,226
2026	0	-200,000	-240,000	-1,418,519	4,831,337	2,972,818
2027	0	-200,000	-240,000	-1,503,630	14,877,027	12,933,397
2028	0	-200,000	-240,000	-1,593,848	30,548,331	28,514,483
2029	0	-200,000	-240,000	-1,689,479	47,057,466	44,927,987
2030	0	-200,000	-240,000	-1,790,848	69,820,414	67,589,566
2031	0	-200,000	-240,000	-1,898,299	93,807,851	91,469,553
2032	0	-200,000	-240,000	-2,012,196	119,084,156	116,631,960
2033	0	-200,000	-240,000	-2,132,928	151,544,741	148,971,813
2034	0	-200,000	-240,000	-2,260,904	185,757,256	183,056,352
2035	0	-200,000	-240,000	-2,396,558	221,810,641	218,974,083
					EIRR	52%

Data:	
1. Marketing & Promotion Cost per Year	200,000
2. Internet Dedicated Line & Infrastructure Cost per Year	240,000
3. Lecturer	18
4. Lab Assistant	3
5. Administrative Staff	3
6. Branch Campus Director	3
7. Annual Salary Increment	1.06
8. Lecturer (Salary)	3241
9. Lab Assistant (Salary)	2,222
10. Administrative Staff (Salary)	2,778
11. Branch Campus Director (Salary)	5,000
12. Labour Productivity in SME 2019 Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	75,457
13. Labour Productivity Growth Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	1.028
14. Youth Employment Rate Source: Borneo Today. Unemployment among Sarawak Youth at Worrying Levels.	0.899

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Sarawak Skills Establishment	PPKS	Sri Aman	13,000,000	13,000,000	0	0
Total			13,000,000	13,000,000	0	0

Year	Sarawak Skills Facilities Setup Cost	Marketing & Promotion Cost	Utilities, Internet Dedicated Line & Infrastructure Cost	Staff Salary	Increase in Labour Productivity	Cumulative Graduated Student
2021	6,500,000					0
2022	6,500,000	200,000	480,000	445,200		0
2023	0	200,000	480,000	471,912		190
2024	0	200,000	480,000	500,227	0	390
2025	0	200,000	480,000	530,240	0	590
2026	0	200,000	480,000	562,055	12,239,388	890
2027	0	200,000	480,000	595,778	25,786,847	1,190
2028	0	200,000	480,000	631,525	40,052,257	1,490
2029	0	200,000	480,000	669,416	62,046,141	1,790
2030	0	200,000	480,000	709,581	85,216,710	2,190
2031	0	200,000	480,000	752,156	109,626,430	2,590
2032	0	200,000	480,000	797,285	135,340,089	2,990
2033	0	200,000	480,000	845,123	170,196,402	3,390
2034	0	200,000	480,000	895,830	206,929,589	3,790
2035	0	200,000	480,000	949,580	245,634,747	4,190

Year	Sarawak Skills Facilities Setup Cost	Marketing & Promotion Cost	Utilities, Internet Dedicated Line & Infrastructure Cost	Staff Salary	Increase in Labour Productivity	Net Annual Savings
2021	-6,500,000	0	0	0	0	-6,500,000
2022	-6,500,000	-200,000	-480,000	-445,200	0	-7,625,200
2023	0	-200,000	-480,000	-471,912	0	-1,151,912
2024	0	-200,000	-480,000	-500,227	0	-1,180,227
2025	0	-200,000	-480,000	-530,240	0	-1,210,240
2026	0	-200,000	-480,000	-562,055	12,239,388	10,997,333
2027	0	-200,000	-480,000	-595,778	25,786,847	24,511,069
2028	0	-200,000	-480,000	-631,525	40,052,257	38,740,732
2029	0	-200,000	-480,000	-669,416	62,046,141	60,696,725
2030	0	-200,000	-480,000	-709,581	85,216,710	83,827,129
2031	0	-200,000	-480,000	-752,156	109,626,430	108,194,274
2032	0	-200,000	-480,000	-797,285	135,340,089	133,862,803
2033	0	-200,000	-480,000	-845,123	170,196,402	168,671,279
2034	0	-200,000	-480,000	-895,830	206,929,589	205,353,759
2035	0	-200,000	-480,000	-949,580	245,634,747	244,005,167
					EIRR	56%

Data:

1. Marketing & Promotion Cost per Year	200,000
2. Utilities, Internet Dedicated Line & Infrastructure Cost per Year	480,000
3. Annual Salary Increment	1.06
4. Staff Salary	420,000
5. Labour Productivity in SME 2019	75,457
Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	
6. Labour Productivity Growth	1.028
Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	
7. Youth Employment Rate	0.899
Source: Borneo Today. Unemployment among Sarawak Youth at Worrying Levels.	

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
CENTEXS Establishment	Yayasan Sarawak	Sri Aman	10,000,000	10,000,000	0	0
Total			10,000,000	10,000,000	0	0

Year	Investment Cost	Marketing & Promotion Cost	Internet Dedicated Line & Infrastructure Cost	Staff Salary	Increase in Labour Productivity	Cumulative Graduated Student
2021	5,000,000	0	0			0
2022	5,000,000	200,000	240,000	851,591		0
2023	0	200,000	240,000	902,687		300
2024	0	200,000	240,000	956,848	0	600
2025	0	200,000	240,000	1,014,259	0	1,000
2026	0	200,000	240,000	1,075,114	19,325,349	1,400
2027	0	200,000	240,000	1,139,621	39,672,073	1,800
2028	0	200,000	240,000	1,207,999	67,885,181	2,200
2029	0	200,000	240,000	1,280,478	97,600,671	2,600
2030	0	200,000	240,000	1,357,307	128,899,225	3,000
2031	0	200,000	240,000	1,438,746	161,864,528	3,400
2032	0	200,000	240,000	1,525,070	196,583,369	3,800
2033	0	200,000	240,000	1,616,574	233,145,756	4,200
2034	0	200,000	240,000	1,713,569	271,645,020	4,600
2035	0	200,000	240,000	1,816,383	312,177,939	5,000

Year	Investment Cost	Marketing & Promotion Cost	Internet Dedicated Line & Infrastructure Cost	Staff Salary	Increase in Labour Productivity	Net Annual Savings
2021	-5,000,000	0	0	0	0	-5,000,000
2022	-5,000,000	-200,000	-240,000	-851,591	0	-6,291,591
2023	0	-200,000	-240,000	-902,687	0	-1,342,687
2024	0	-200,000	-240,000	-956,848	0	-1,396,848
2025	0	-200,000	-240,000	-1,014,259	0	-1,454,259
2026	0	-200,000	-240,000	-1,075,114	19,325,349	17,810,234
2027	0	-200,000	-240,000	-1,139,621	39,672,073	38,092,452
2028	0	-200,000	-240,000	-1,207,999	67,885,181	66,237,182
2029	0	-200,000	-240,000	-1,280,478	97,600,671	95,880,192
2030	0	-200,000	-240,000	-1,357,307	128,899,225	127,101,918
2031	0	-200,000	-240,000	-1,438,746	161,864,528	159,985,782
2032	0	-200,000	-240,000	-1,525,070	196,583,369	194,618,299
2033	0	-200,000	-240,000	-1,616,574	233,145,756	231,089,181
2034	0	-200,000	-240,000	-1,713,569	271,645,020	269,491,451
2035	0	-200,000	-240,000	-1,816,383	312,177,939	309,921,556
					EIRR	69%

Data:

1. Lecturer	15
2. Lab Assistant	2
3. Administrative Staff	5
4. Annual Salary Increment	1.06
5. Lecturer (Salary)	3,241
6. Lab Assistant (Salary)	2,222
7. Administrative Staff (Salary)	2,778
8. Branch Campus Director (Salary)	5,000
9. Labour Productivity in SME 2019 Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	75,457
10. Labour Productivity Growth Source: Ministry of Entrepreneur Development and Cooperatives. (2020). The share of SMEs in the Malaysian economy expanded further in 2019.	1.028
11. Youth Employment Rate Source: Borneo Today. Unemployment among Sarawak Youth at Worrying Levels.	0.899

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
New Pre-school/ Tabika at SPS Batang Ai, Nanga Kumpang, Lubok Antu Town Area, Lubok Subong	KEMAS	Lubok Antu	40,000,000	-	40,000,000	-
New Child Care Centre to cater for Government Servants at Simanggang town	KWKPK/JKMS	Simanggang	300,000	60,000	90,000	150,000
Taska/Tabika in rural areas	KPLB/KEMAS	Bkt. Begunan, Lubok Antu, Balai Ringin	800,000	160,000	240,000	400,000
New Child Care Centre to cater for Government Servants at Simanggang town	KEMAS	Simanggang	300,000	60,000	90,000	150,000
Total			41,400,000	280,000	40,420,000	700,000

Year	Investment Cost	Staff Salary	Economic Benefit Gained
2021	140,000		
2022	140,000	249,185	68,322
2023	13,473,333	528,272	138,421
2024	13,473,333	839,952	195,307
2025	13,473,333	1,595,584	7,032,824
2026	140,000	2,451,988	14,048,084
2027	140,000	3,391,509	21,260,170
2028	140,000	3,948,473	21,610,380
2029	140,000	4,560,063	21,966,102
2030	140,000	5,230,830	22,327,421
2031	0	5,965,672	22,694,422
2032	0	6,323,612	22,989,449
2033	0	6,703,029	23,209,559
2034	0	7,105,211	23,591,060
2035	0	7,531,523	23,897,744

Year	Investment Cost	Staff Salary	Economic Benefit Gained	Net Annual Savings
2021	-140,000	0	0	-140,000
2022	-140,000	-249,185	68,322	-320,863
2023	-13,473,333	-528,272	138,421	-13,863,184
2024	-13,473,333	-839,952	195,307	-14,117,979
2025	-13,473,333	-1,595,584	7,032,824	-8,036,093
2026	-140,000	-2,451,988	14,048,084	11,456,097
2027	-140,000	-3,391,509	21,260,170	17,728,661
2028	-140,000	-3,948,473	21,610,380	17,521,907
2029	-140,000	-4,560,063	21,966,102	17,266,039
2030	-140,000	-5,230,830	22,327,421	16,956,591
2031	0	-5,965,672	22,694,422	16,728,750
2032	0	-6,323,612	22,989,449	16,665,837
2033	0	-6,703,029	23,209,559	16,506,530
2034	0	-7,105,211	23,591,060	16,485,849
2035	0	-7,531,523	23,897,744	16,366,221
			EIRR	29%

Data:

1. Average Life Expectancy Source: Department of Statistics Malaysia, 2019.	74.5
2. Economic Benefit Gained per RM invested (USD8.60*4.12) Source: Executive Office of the President of the United States. (2014). The Economics of Early Childhood Investment.	35.43
3. Annual Salary Increment	1.06
4. Head of Educator (Salary)	3,200
5. Educator (Salary)	2,000
6. Assistant Educator (Salary)	1,500
7. Chef (Salary)	1,800
8. Branch Campus Director (Salary)	6,500
9. Head of Educator (Project 1 & 4)	6
10. Educator (Project 1 & 4)	40
11. Assistant Educator (Project 1 & 4)	12
12. Chef (Project 1 & 4)	4
13. Campus Director (Project 1 & 4)	6
14. Head of Educator (Project 2 & 3)	2
15. Educator (Project 2 & 3)	22
16. Assistant Educator (Project 2 & 3)	14
17. Chef (Project 2 & 3)	4
18. Campus Director (Project 2 & 3)	8

4.1.1.14 Tr5Infrastructure (Community and Social Amenities)

4.1.1.14.1 Strategic Focus Area: Resilience Program

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Resilience Building Program	SADA	Sri Aman	4,950,000	990,000	1,485,000	2,475,000
Scoping and detailed risk assessment (Annual Budget)			25,000	/	/	/
Formulation of adaptation options and action plans (Annual Budget)			10,000	/	/	/
Community-based CCAR (Climate Change Adaptation and Resilience) training program for local actions (Annual Budget)			60,000	/	/	/
CCAR training program for local government units (Annual Budget)			60,000	/	/	/
CCAR for essential services and infrastructure (Annual Budget)			100,000	/	/	/
CCAR for urban resilience (Annual Budget)			240,000	/	/	/
Resilience Community Groups	SADA	Sri Aman	100,000,000	20,000,000	30,000,000	50,000,000
e-Smart and Connected Community (Annual Budget)			1,500,000	/	/	/
Sri Aman School Watching Workshop (Annual Budget)			1,500,000	/	/	/
Sri Aman Business Continuity Management (SABCM) (Annual Budget)			1,500,000	/	/	/
Community Resilience Excellence Centre (CREC) (Annual Budget)			2,000,000	/	/	/
Sri Aman Emergency Team (Annual Budget)			2,000,000	/	/	/
i-Care B40 Team (Annual Budget)			1,500,000	/	/	/
Total			104,950,000	20,990,000	31,485,000	52,475,000

Year	Cost		Benefit	Net Annual Savings
	Investment	Operation	Estimated Economic Losses Saved	
2021	10,495,000	50,650		-10,545,650
2022	10,495,000	51,308	81,156,389	70,610,080
2023	10,495,000	51,975	82,211,422	71,664,446
2024	10,495,000	52,651	83,280,170	72,732,519
2025	10,495,000	53,336	84,362,812	73,814,477
2026	10,495,000	54,029	85,459,529	74,910,500
2027	10,495,000	54,731	86,570,503	76,020,771
2028	10,495,000	55,443	87,695,919	77,145,476
2029	10,495,000	56,164	88,835,966	78,284,803
2030	10,495,000	56,894	89,990,834	79,438,940
			EIRR	671%

Data:

1. Operation Cost per Year	50,000
2. Annual Benefit (Resilience Building) Source: United Nations Development Programme, 2015.	408,7399
3. Annual Benefit (Resilience Community Group) Source: United Nations Development Programme, 2015.	74,999,368

Strategic Initiative (Program/Project)	Implementing Agency	Location	Budget Estimate (RM)	Implementation (RM)		
				Short Term	Mid Term	Long Term
				2021 – 2022	2023 – 2025	2026 – 2030
Proposed New Secondary Schools (3)	SADA	Engkilili, Lingga, Temudok	210,000,000		78,750,000	131,250,000
Proposed New Primary Schools (20)	SADA	Sri Aman	240,000,000	48,000,000	72,000,000	120,000,000
Proposed New Hospital	SADA	Engkilili	200,000,000	0	200,000,000	0
Proposed New Clinics (20)	SADA	Sri Aman	40,000,000	0	15,000,000	25,000,000
Proposed New Major Stadium	SADA	Simanggang	40,000,000	0	0	40,000,000
Proposed New Minor Stadium	SADA	Lubok Antu	15,000,000	0	15,000,000	0
Total			745,000,000	48,000,000	380,750,000	316,250,000

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AN	Ammoniacal Nitrogen
API	Air Pollutant Index
APIMS	Air Pollutant Index Management System
APM	Angkatan Pertahanan Awam
ASMC	ASEAN Specialised Meteorological Centre
BOD	Biochemical Oxygen Demand
CAGR	Compound Annual Growth Rate
CAN	Culture, Adventure and Nature
CAQM	Continuous Air Quality Monitoring
CBA	Cost-Benefit Analysis
CBET	Community Based Ecotourism
CGE	Computable General Equilibrium
CIQ	Customs, Immigration and Quarantine
CMCO	Conditional Movement Control Order
CMWQM	Continuous Marine Water Quality Monitoring
COD	Chemical Oxygen Demand
CPO	Crude Palm Oil
CPPC	Collection, Processing and Packaging Centres
CRWQM	Continuous River Water Quality Monitoring
DEI	Digital Economy Index
DELSA	Disaster Emergency Logistics System for Asean
DID	Department of Irrigation and Drainage
DO	Dissolved Oxygen
DOA	Department of Agriculture

DOE	Department of Environment
DOSM	Department of Statistics Malaysia
DPI	Dots per Inch
EDC	Environment Data Centre
EHV	Extra High Voltage
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
EPU	Economic Planning Unit
EQMP	Environment Quality Monitoring Program
ESA	Environmental Sensitive Area
ETP	Economic Transformation Programme
FAMA	Federal Agriculture Marketing Authority
FCC	Faecal Coliform Count
FDRS	Fire Danger Rating System
FDS	Forest Department Sarawak
FGD	Focus Group Discussions
FLR	Forest Landscape Restoration
FO's	Farmers Organisations
GDP	Gross Domestic Products
GEMS	Global Environment Monitoring System
GHG	Greenhouse Gasses
GIS	Geographic Information System
GLCBET	Gunung Lesong Community Based Ecotourism Committee
GVATI	Gross Value-Added Tourism Industry
HCVF	High Conservation Value Forest
HEP	Hydro-Electric Power
HOB	Heart of Borneo
HPD	Highway Planning Division
ICQS	Immigration, Customs, Quarantine and Security
ICT	Information and Communications Technology
IDI	In-depth Interview
IEA	International Energy Agency
I-O Model	Input-Output Model
IOT	Internet of Things
ITCZ	Inter Tropical Convergence Zone
IUCN	International Union for Conservation of Nature
JBALB	Jabatan Bekalan Air Luar Bandar
JKKK	Jawatankuasa Kemajuan dan Keselamatan Kampung
JKR	Jabatan Kerja Raya (Public Works Department)
JPAM	Jabatan Pertahanan Awam Malaysia
JPBN	JawantanKuasa Pengurusan Bencana Negeri

KPKT	Kementerian Perumahan dan Kerajaan Tempatan (Ministry of Housing and Local Government)
LCCF	Low Carbon City Framework
LFA	Livestock farming area
LOS	Level of Service
LPF	Licensed Planted Forest
MCAQM	Mobile Continuous Air Quality Monitoring
MCMC	Malaysian Communications and Multimedia Commission
MCO	Movement Control Order
MICE	Meetings, incentives, conferencing, exhibitions
MINTRED	Ministry of International Trade, Industry and Investment
MMWQM	Manual Marine Water Quality Monitoring
MNS	Malaysian Nature Society
MOH	Ministry of Health
MOHURD	Ministry of Housing and Urban-Rural Development
MOTAC	Ministry of Tourism, Arts and Culture
MTCP	Ministry of Tourism, Creative Industry and Performing Arts Sarawak
MoU	Memorandum of Understanding
MP	Malaysia Plan
MPOB	Malaysian Palm Oil Board
MPHLG	Ministry of Public Health, Housing and Local Government
MWA	Malaysian Water Association
My GAP	Malaysian Good Agriculture Practice
NADMA	National Disaster Management Agency
NCR	Native Customary Land
NFCP	National Fiberisation Connectivity Plan
NGO	Non-Governmental Agencies
NKRA	National Key Result Area
NP	National Park
NPP	National Physical Plan
NREB	Natural Resources and Environment Board
NRW	Non-Revenue Water
NWQS	National Water Quality Standards
O2O	Online-to-Offline
OPAL	Open Air Laboratory
OS	Operating System
P	Phosphorus
PEAA	Prime Existing Agriculture Areas
PFE	Permanent Forest Estate
PNG	Portable Network Graphics
POME	Palm Oil Mill Effluent
PPA	Prime Potential Agriculture Areas

PPACP	Public-Private-Academic Civil-Society
PPC	Pollution Prevention Control
PWD	Public Work Department
R&D	Research and Development
RECODA	Regional Corridors Development Authority
RELA	Jabatan Sukarelawan Malaysia
RES	Rural Electrification Scheme
RFT	Request for Tender
RGC	Rural Growth Centre
RMCO	Recovery Movement Control Order
RPSS	Rural Power Supply Scheme
RTVM	Road Traffic Volume Malaysia
RWQMP	River Quality Monitoring Programme
SADA	Sri Aman Development Agency
SALCRA	Sarawak Land Consolidation and Rehabilitation Authority
SARES	Sarawak Alternative Rural Electrification Scheme
SAVE	Scientific, Academic, Volunteerism and Education
SAWAS	Sarawak Alternative Water Supply
SCORE	Sarawak Corridor of Renewable Energy
SDG	Sustainable Development Goals
SEAC	Sarawak Economic Action Council
SEB	Sarawak Energy Berhad
SEDC	Sarawak Economic Development Cooperation
SES	Socio-Economic Survey
SETP	Socio-Economic Transformation Plan
SETP	Socio-Economic Transformation Plan
SFC	Sarawak Forestry Corporation
SIWRM	Sarawak Integrated Water Resources Management Resources Management
SMA	Sarawak Multimedia Authority
SME	Small and Medium Enterprises
SOM	Malaysian Organic Scheme
SOP	Standard Operating Procedure
SPV	Special Purpose Vehicle
STATO	Sarawak Trade and Tourism Office
STB	Sarawak Tourism Board
STOL	Short Take-off and Landing
STR	Second Trunk Road
TCC	Total Confirm Count
TOD	Transit-Oriented Development
TPA	Totally Protected Area
TSS	Total Suspended Solid
UAVs	Unmanned Aerial Vehicles

UKPN	Unit Keselamatan dan Penguatkuasaan Negeri
UNCTAD	United Nations Conference on Trade and Development
UNIMAS	Universiti Malaysia Sarawak
VSAT	Very Small Aperture Terminal
WCS	Wildlife Conservation Society
WHO	World Health Organisation
WMAM	Waste Management Association of Malaysia
WQI	Water Quality Index
WTP	Water Treatment Plants
WWTTC	World Travel and Tourism Council

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APPENDICES

Appendix 1 – List of Focus Group Discussion

No	Cluster	Stakeholder	Consultant	Date (Time)
1	<ul style="list-style-type: none"> Infrastructure and Public Utilities 	<ul style="list-style-type: none"> Sarawak Energy Berhad 	<ul style="list-style-type: none"> Khathijah Md Jaafar Michael Bain 	6 April 2021 (10:00 am)
2	<ul style="list-style-type: none"> Social Services, Human Resources and Demography 	<ul style="list-style-type: none"> Centre of Technical Excellence (CENTEX) 	<ul style="list-style-type: none"> AP Dr Kartinah Ayupp 	14 April 2021 (4:30 pm)
3	<ul style="list-style-type: none"> Infrastructure and Public Utilities Regional and Urban Planning 	<ul style="list-style-type: none"> Sarawak Rural Water Supply Department Economic Planning Unit 	<ul style="list-style-type: none"> Khathijah Md Jaafar Michael Bain Jaclyna Dr Md Nasrudin Md Salleh 	20 April 2021 (9:00 am)
4	<ul style="list-style-type: none"> Social Services, Human Resources and Demography 	<ul style="list-style-type: none"> Sarawak Department of Labour 	<ul style="list-style-type: none"> AP Dr Kartinah Ayupp 	22 April 2021 (10:00 am)
5	<ul style="list-style-type: none"> Social Services, Human Resources and Demography 	<ul style="list-style-type: none"> i-CATS University College 	<ul style="list-style-type: none"> AP Dr Kartinah Ayupp 	23 April 2021 (9:00 am)
6	<ul style="list-style-type: none"> Infrastructure and Public Utilities 	<ul style="list-style-type: none"> Sri Aman Drainage and Irrigation Department 	<ul style="list-style-type: none"> Michael Bain Khathijah Md Jaafar 	27 April 2021 (10:00 am)
7	<ul style="list-style-type: none"> Economic Planning and Development 	<ul style="list-style-type: none"> Ministry of Tourism, Creative Industry and Performing Arts Sarawak Sarawak Forestry Corporation Sarawak Tourism Board Sarawak Museum Department Sarawak Craft Council 	<ul style="list-style-type: none"> Prof Dato' Dr Morshidi Sirat Wayne Tarman Michael Bain Khathijah Md Jaafar 	28 April 2021 (2:30 pm)

8	<ul style="list-style-type: none"> Primary Industry/Sector Business Model 	<ul style="list-style-type: none"> Ministry of Modernisation of Agriculture and Regional Development Department of Agriculture Sarawak Department of Veterinary Services Sarawak HQ Sri Aman Divisional Agriculture Office Department of Veterinary Services Sri Aman Division IADA Batang Lupar Department of Irrigation and Drainage Sarawak (DID) HQ Sarawak Land Consolidation and Rehabilitation Authority (SALCRA) Land Custody and Development Authority (LCDA) 	<ul style="list-style-type: none"> Datu Dr Hatta Solhi Dato' Abdul Kadir Khathijah Md Jaafar Michael Bain 	29 April 2021 (9:00 am)
9	<ul style="list-style-type: none"> Regional and Urban Planning 	<ul style="list-style-type: none"> Land and Survey Sarawak 	<ul style="list-style-type: none"> Prof Dato' Dr Morshidi Sirat Dr Md Nasrudin Md Salleh Khathijah Md Jaafar Howard Trett Dato' Kamal Zaharin Harem Peri Prof Dr Shahren Ahmad Zaidi Aduce 	29 April 2021 (2:00 pm)
10	<ul style="list-style-type: none"> Infrastructure and Public Utilities 	<ul style="list-style-type: none"> SACOFA 	<ul style="list-style-type: none"> Khathijah Md Jaafar Michael Bain Prof Dr Shahren Ahmad Zaidi Aduce 	30 April 2021 (10:00 am)
11	<ul style="list-style-type: none"> Economic Planning and Development 	<ul style="list-style-type: none"> Sarawak Economic Development Corporation Ministry of International Trade and Industry 	<ul style="list-style-type: none"> Prof Dato' Dr Morshidi Sirat Prof Dr Shahren Ahmad Zaidi Aduce Khathijah Md Jaafar Michael Bain Chia Yi Han AP Dr M Affendy Arip Barry Lim 	3 May 2021 (10:00 am)
12	<ul style="list-style-type: none"> Regional and Urban Planning 	<ul style="list-style-type: none"> State Planning Authority Public Works Department (JKR) 	<ul style="list-style-type: none"> Prof Dato' Dr Morshidi Sirat Prof Dr Shahren Ahmad Zaidi Aduce Dr Md Nasrudin Md Salleh Khathijah Md Jaafar Howard Trett Dato' Kamal Zaharin Harem Peri Goh Bok Yen 	5 May 2021 (10:00 am)
13	<ul style="list-style-type: none"> Regional and Urban Planning Infrastructure and Public Utilities 	<ul style="list-style-type: none"> Sarawak Disaster Management Committee Fire and Rescue Department Sarawak Sarawak RELA Office Sarawak Malaysian Civil Defence Force Sri Aman District Council Sarawak Contingent Police Headquarters Sri Aman Resident Office 	<ul style="list-style-type: none"> Prof Dato' Dr Morshidi Sirat Prof Dr Shahren Ahmad Zaidi Aduce Khathijah Md Jaafar Dr Ting Siew King Nordin Abdullah Michael Bain 	6 May 2021 (10:00 am)
14	<ul style="list-style-type: none"> Regional and Urban Planning Infrastructure and Public Utilities 	<ul style="list-style-type: none"> Natural Resources and Environment Board Sarawak Department of Environment Sarawak 	<ul style="list-style-type: none"> Prof Dato' Dr Morshidi Sirat Prof Dr Shahren Ahmad Zaidi Aduce Khathijah Md Jaafar Michael Bain Jaclyna 	6 May 2021 (2:00 pm)

15	<ul style="list-style-type: none"> ● Economic Planning and Development ● Social Services, Human Resources and Demography 	<ul style="list-style-type: none"> ● Centre of Technical Excellence (CENTEX) ● i-CATS University College ● GIATMARA ● Institut Latihan Perindustrian (ILP) Miri ● Institut Kemahiran Belia Negara Miri ● Sarawak Education Department 	<ul style="list-style-type: none"> ● Prof Dato' Dr Morshidi Sirat ● Prof Dr Shahren Ahmad Zaidi Aduce ● Khathijah Md Jaafar ● Chia Yi Han ● AP Dr Kartinah Ayupp 	7 May 2021 (10:00 am)
16	<ul style="list-style-type: none"> ● Primary Industry/Sector Business Model 	<ul style="list-style-type: none"> ● Department of Marine Fisheries (Biosecurity Section) ● Inland Fisheries Branch, Department of Agriculture ● Batang Ai Ecofish Sdn. Bhd. ● Supreme Cold Storage 	<ul style="list-style-type: none"> ● Prof Dato' Dr Morshidi Sirat ● Prof Dr Shahren Ahmad Zaidi Aduce ● Khathijah Md Jaafar ● Gopinath Nagaraj 	7 May 2021 (2:30 pm)
17	<ul style="list-style-type: none"> ● Primary Industry/Sector Business Model 	<ul style="list-style-type: none"> ● Persatuan Nelayan Kawasan Sebuyau ● Persatuan Nelayan Kawasan Layar Rimbas / Pusak ● Jabatan Perikanan Laut Daerah Sebuyau ● Ibu Pejabat Jabatan Perikanan Laut 	<ul style="list-style-type: none"> ● Prof Dato' Dr Morshidi Sirat ● Prof Dr Shahren Ahmad Zaidi Aduce ● Khathijah Md Jaafar ● Gopinath Nagaraj 	10 May 2021 (10:00 am)
18	<ul style="list-style-type: none"> ● Economic Planning and Development 	<ul style="list-style-type: none"> ● Sarawak Multimedia Authority (SMA) ● Sarawak Digital Economy Corporation (SDEC) 	<ul style="list-style-type: none"> ● Prof Dato' Dr Morshidi Sirat ● Prof Dr Shahren Ahmad Zaidi Aduce ● Khathijah Md Jaafar ● Chia Yi Han ● Barry Lim ● Saranya Sundaram ● AP Dr M. Affendy Arip 	10 May 2021 (2:30 pm)