

GOVERNMENT OF MALAYSIA

**FEASIBILITY STUDY
ON
RATIONALIZATION AND
CROP DIVERSIFICATION
IN
NON-GRANARY IRRIGATED AREAS
IN MALAYSIA**

Volume 5-10

State Report - Trengganu

October 1990

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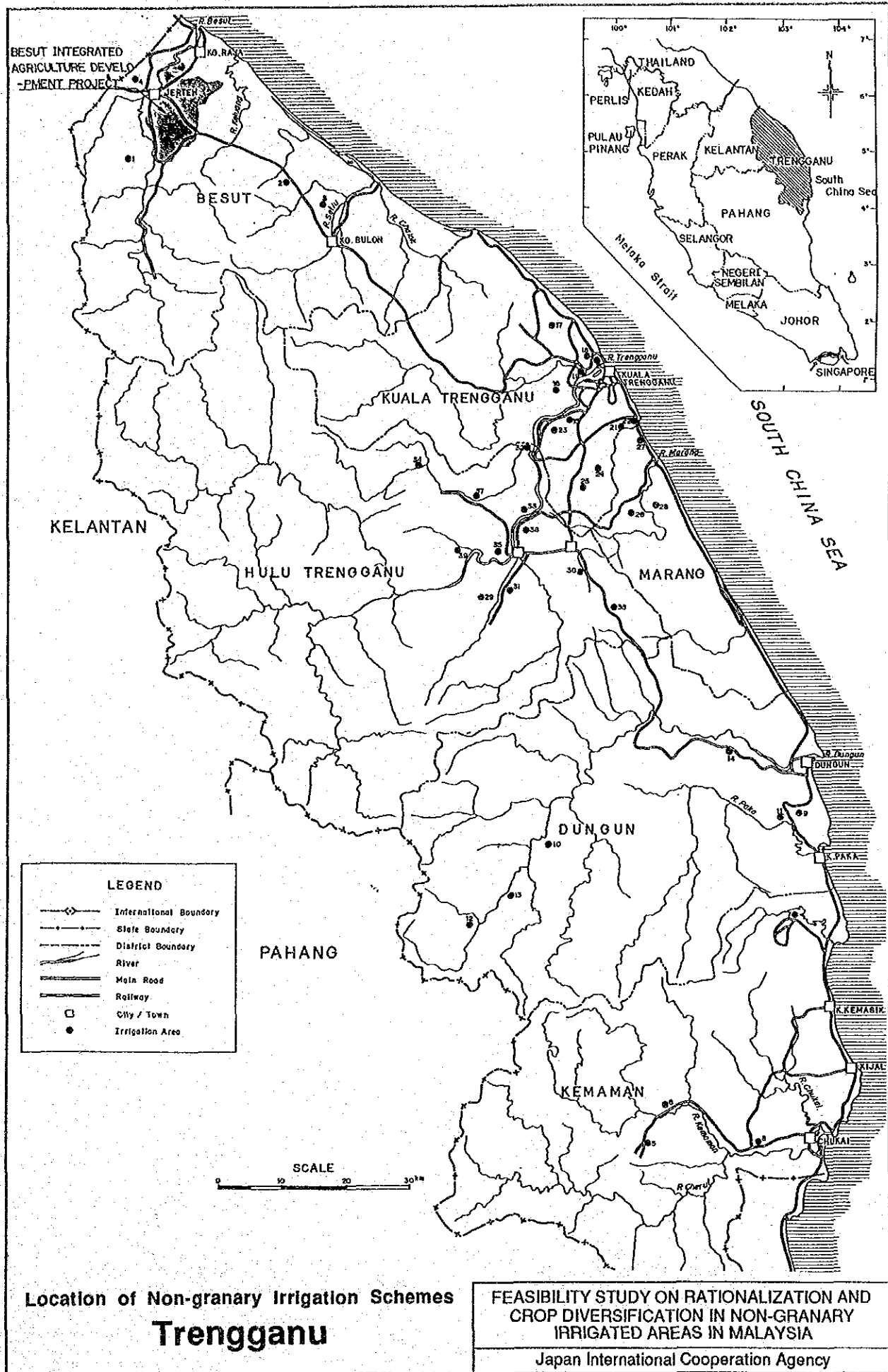
*Feasibility Study on Rationalization and Crop Diversification
in Non-granary Irrigated Areas in Malaysia*

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Volume 5-10

State Report - Trengganu

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RESULTS OF EVALUATION FOR CROP DIVERSIFICATION POTENTIAL

1. INTRODUCTION

This is the State Report - Trengganu, Volume 5-10, of the Final Report for Feasibility Study on Rationalization and Crop Diversification in Non-granary Irrigated Areas in Malaysia. This report includes the criteria, procedure and results of evaluation of crop diversification potential of non-granary irrigation schemes in the State of Trengganu.

Detailed information on the criteria and procedure for evaluation is presented in Volume 2 of the Final Report, and the results of evaluation of crop diversification potential for each scheme are given in the Appendix attached to this Volume.

2. GENERAL CONDITIONS

2.1 Socio-economic Situation

Terengganu lies between Kelantan to the north and northwest and Pahang to the south and southwest, facing the South China Sea to the east. The physical area is 12,955 km² in total and divided into seven administrative districts. The population estimated was 639,000 persons in 1985 and 708,900 persons in 1988. The population density in 1988 was 55 person/km². Rural population ratio was 53% in 1985 and 56% in 1988. The proportion of population by ethnic group in 1987 was 95% for Bumiputera, 4% for Chinese and less than 1% each for Indians and others.

In Terengganu, GDP in 1988 amounted to M\$4,240 million at 1978 constant prices of which 61% was derived from the mining sector. The agriculture sector contributed to 11%. Per capita GDP increased from M\$5,741 in 1986 to M\$5,952 in 1988, both being next to the Federal Territory and exceeding over the country's average by M\$2,190 in 1986 and M\$2,094 in 1987. Despite such high per capita GDP based on the contribution of oil and natural gas industries, the incidence of poverty in the State sharply rose from 37,800 in poor household number and 28.9% of 130,100 total households in proportion for 1984 to 49,600 in poor household number and 36.1% of 137,400 total households in proportion for 1987. During the same period, the mean monthly income also went down from M\$756 in 1984 to M\$694 in 1987, being far below Peninsular Malaysia's average of M\$1,095 in 1984 and M\$1,074 in 1987.

With regard to the social infrastructure service conditions as of 1985, the coverage was 70.6% by electricity, 85.0% by urban piped water supply and 40.0% by rural piped water supply. The total length of road network system was 2,130 km with a road density of 160 m/km² and per capita road length of 3,190 m every 1,000 population. The number of registered motor vehicles was 147 every 1,000 population. The State kept 1.7 doctors and 2.0 acute care hospital beds per 1,000

population. Each health center took care of 12,200 rural people on an average. The infant mortality rate was 2.7 per 1,000 population.

To the State, the development expenditure of M\$2,429 million was allocated by the Federal Government and NFPEs under the revised 5MP, accounting for 7.8% of the total development expenditure to all States. Main agencies responsible for promoting the economic development in the State are the Terengganu State Development Corporation (TSEDC) and the Central Terengganu Development Board (KETENGAH). The participation of TSEDC in the development of agriculture sector is concentrated on the development of rubber, oil palm, cocoa and mulberry estates and the processing of agriculture produce. The total planted area under estates is about 20,000 ha. Within the region of Terengganu Tengah, KETENGAH is empowered to plan, promote, supervise, participate and implement socio-economic development aiming at the rising of income levels and provision of employment. Agriculture development is carried out in three ways such as joint venture, public sector and private sector projects. The main crop in all projects is oil palm with planting area of 87,500 ha followed by rubber of 8,800 ha and cocoa of 4,700 ha.

2.2 Present Agriculture

In Terengganu, agricultural land occupies about 267,900 ha as a whole and 21% of the total area of the State. Of these, paddy field covers 35,480 ha, while tree crop areas amount to 196,500 ha. Oil palm is a predominant tree crop in Terengganu and its productive area covers 102,500 ha. Planted area of other tree crops are 7,200 ha for rubber, 6,250 ha for coconut and 1,330 ha for cocoa. There are 62 miscellaneous crops grown throughout the State with a total coverage of 19,030 ha. Of these, notable crops and those planted areas are cashewnuts of 3,090 ha, tobacco of 2,810 ha and durian of 2,120 ha. Main crop production in 1987 was paddy of 69,700 tons, oil palm of 1.20 million tons as FFB, rubber of 24,200 tons and dry cocoa bean of 640 tons.

The followings indicate the total demand for food crops, vegetables, fruits and freshwater fishes projected by FAMA for 1989.

Produce	Net Consumption (ton)	Outflow to Other States (ton)	Post-harvest Loss (ton)	Total Demand (ton)
Food crops	1,606	396	501	2,503
Vegetables	44,151	45	11,049	55,245
(Leafy)	(11,125)	(12)	(2,784)	(13,921)
(Fruit)	(20,628)	(33)	(5,165)	(25,826)
(Root)	(9,012)	(0)	(2,253)	(11,265)
(Other)	(3,386)	(0)	(847)	(4,233)
Fruits	44,277	1,444	11,430	57,151
Freshwater fishes	25	0	6	31

Among local produces in Terengganu, maize and watermelon have enough production to meet the local demand and those surplus can expect to be transported to other large consuming areas. The projected supply quantities of produces are 6,260 tons for food crops, 2,490 tons for vegetables, 26,293 tons for fruits and 10 tons for freshwater fishes. The market potential is projected as below.

Produce	Market Potential (ton)	Major Crops (ton)
Food crops	-3,757	Sweet potato (892)
Vegetables	52,755	
(Leafy)	(13,499)	Chinese kale (4,503), Cabbage (4,056)
(Fruit)	(24,792)	Cucumber (7,130), Yard long bean (4,197)
(Root)	(11,265)	Carrot (7,925)
(Other)	(4,233)	Ginger (2,820)
Fruits	30,858	Banana (11,157), Citrus (6,855)
Freshwater fishes	21	River catfish (12)

2.3 Present Situation of Non-granary Irrigation Schemes

In Terengganu, agricultural land occupies about 267,900 ha as a whole and 21% of the total area of the State. Of these, paddy fields cover 29,136 ha, while tree crop areas amount to 196,500 ha. Oil palm is a predominant tree crop and its productive area covers

102,500 ha. Planted area of other tree crops are 7,200 ha for rubber, 6,250 ha for coconut and 1,330 ha for cocoa. There are 62 miscellaneous crops grown throughout the State with a total coverage of 19,030 ha. Of these, notable crops and those planted areas are cashewnuts of 3,090 ha, tobacco of 2,810 ha and durian of 2,120 ha. Out of the irrigable paddy field of 14,183 ha in total, the Besut granary irrigated area covers 5,100 ha and non-granary irrigated areas amount to 9,083 ha.

- Number of schemes : 39
- Total irrigable area : - main season = 9,083 ha
- off season = 5,543 ha
- Type of schemes : gravity; 9 pump; 18
controlled drainage; 11
other type; 1
- Irrigation water resources availability by scheme
(except controlled drainage and other schemes)
: - sufficient for double cropping; 19
- insufficient for off season
presaturation; 2
- limited to only single cropping; 6
- Average cropping intensity (paddy + upland crops)
for previous three years
: - main season = 76%
- off season = 28%
- Average cropping intensity (paddy only)
for previous three years
: - main season = 71%
- off season = 23%
- Utilization of scheme : - main season paddy cropping
intensity of 100%; 7
- main season paddy cropping
intensity of more than 50%; 21
- main season paddy cropping
intensity of less than 50%; 6
- fully idle; 5

In the northern part of the State, farmers have strong intention towards double cropping of paddy by the influence of farm operation in the Besut granary area. However, some farmers are limited to only the off season cropping due to frequent occurrence of floods in the main season. Farm mechanization is commonly practiced in this area. A large-scale paddy cultivation is performed by the neighbouring Kelantan farmers borrowing paddy fields.

In the central part of Terengganu, single cropping is usual and recently idle paddy fields have occurred among 25 non-granary irrigation scheme areas. This is mainly blessed with job opportunities in industrialization and urbanization areas in relation to the off-shore oil and natural gas development.

In the southern part, non-granary irrigation schemes as well as land holdings are small in size. Water shortage remains as unsolved problem because catchments of water source rivers are usually small. Farmers in this area are conservative and have no willingness to increase their farm income through crop diversification.

3. EVALUATION OF CROP DIVERSIFICATION POTENTIAL FOR NON-GRANARY IRRIGATION SCHEMES

This section presents a general concept, criteria and procedure of evaluation in order to facilitate understanding of the results of the evaluation of potential for crop diversification by scheme attached in Appendix of this volume. A detailed explanation of the evaluation is given in Volume 2.

3.1 Basic Considerations for Evaluation

The intended shift from paddy cultivation to diversified crops in non-granary irrigated areas would invariably require investigations on a range of issues such as the selection of the appropriate crops based on agronomic and economic factors, institutional support systems, and additional investments for providing new or upgrading of facilities. Since the areas concerned are both extensive and widespread, it is only proper that a coordinated study be carried out in order to evaluate the prevailing scheme conditions and to prepare crop diversification strategies including the selection of the suitable crops.

To prepare crop diversification options for revitalization of the non-granary irrigation schemes with a wide range of constraints, the potential for crop diversification in each scheme area has to be evaluated and then indicated as the crop diversification patterns. Such procedure is to be defined as evaluation of resource potential for crop diversification. Its outcome will provide indications of the crop diversification patterns being a basis for formulating development plans and programs.

For non-paddy crops, irrigation has recently become an important input for crop production in Malaysia like irrigation for paddy. In order to accommodate crop diversification in the existing rice-based irrigation systems, special considerations are required for

the differences between paddy and non-paddy crops as well as paddy farmers behavior in addition to basic parameters such as soil-plant-water relations, water resources, climate, geographic, economic and social.

3.1.1 Differences between paddy and non-paddy crop

Paddy is very tolerant to fully saturated or flooded conditions, which is the main reason for it being planted in flood prone areas with heavy soils and poor drainage conditions. Non-paddy crops on the other hand need non-saturated and well aerated soils for healthy growth. Therefore poorly drained areas as found in most of the schemes can seriously affect growth and yields of non-paddy crops.

Sensitivity to water stress varies between their growth stages and also crop types. Cultural practices and production systems can be vastly different between types and varieties and the produce also tend to be more perishable than paddy.

These basic differences need some general criteria for the system design to be established. Irrigation for paddy is designed for continuous supply and drainage adequate for excess surface flow. Whereas for non-paddy, supply is intermittent since demand depends on available soil water storage and evapotranspiration rate. Besides irrigation, water is also required for fertilizer and pesticide application for non-paddy crops. Its drainage design will need to consider both surface and subsurface flows.

3.1.2 Paddy farmers' behavior

Paddy areas have a very long history of mono-cropping, and traditions and culture have evolved around paddy. Most paddy farmers are usually experienced and knowledgeable only in paddy production. Thus, diversification will require changes to deep-rooted life styles, values and technology of paddy farmers. On the other hand,

diversification will also require appropriate adjustments on its part to match with their behavior.

In this connection, a Socio-economic Sample Survey was performed in all non-granary irrigation scheme areas to identify paddy farmers' intentions and local community opinion leaders' view towards crop diversification. The results of the Socio-economic Sample Survey are presented in Appendix B for farmers' intentions and Appendix C for the leaders' opinions.

3.1.3 Determination of categories

In deciding options for crop diversification, it is apparent that there exists various possibilities for diversifying land utilization such as double cropping of paddy, combination of the main season paddy with short-term crops in the off-season, mix-farming, perennial tree crop cultivation, freshwater aquaculture, and cattle grazing ground. Any one of these taken singly or in combination with any other option can be a category. Taking into consideration the purpose of the evaluation under the Study, the following eight categories are to be made:

- Category 1 : Schemes to be converted to high value crop cultivation under irrigated condition,
- Category 2 : Schemes to be converted to tree crop cultivation;
- Category 3 : Schemes to introduce two-cropping system planting paddy during the main season and short-term annual crops during the off-season;
- Category 4 : Schemes to be converted to animal feeding crop cultivation or cattle raising fields;
- Category 5 : Schemes to be converted to freshwater fish culture ponds;
- Category 6 : Schemes to be positively maintained as mini-granary areas;
- Category 7 : Schemes to be maintained as paddy cultivation areas within a definite period of time for social welfare purposes and thereafter to be further categorized; and
- Category 8 : Schemes to be converted to housing/industrial and other uses.

3.2 Criteria for Evaluation

3.2.1 General

Inevitably, crop diversification involves the question of which crop or crops to be recommended based on a variety of factors. In the process to evaluate potential for crop diversification, each non-granary irrigation scheme is subjected to a screening process on a variety of factors. For this purpose, seven main factors are taken into account.

- Water resources availability,
- Farmers' intention towards continuation of paddy cultivation and introduction of crop diversification,
- Land suitability for carrying out direct seeding and mechanized plowing and harvesting for growing paddy,
- Soil and climatic suitability and limitations for the cultivation of specific crops,
- Crop profitability,
- Crop marketability, and
- Investment performance with regard to crop diversification.

3.2.2 Water resources availability

The evaluation of water resources in quantitative and qualitative terms is based on the information collected during the Scheme Inventory Survey. Reconfirmation of water resources availability is carried out through supplementary investigations on rainfall data, catchment characteristics, river discharges, reference on the existing hydrological procedures, and previous study reports on the availability of water resources on a specific catchment. The criteria for evaluating water availability of each non-granary irrigation scheme is expressed in the following four terms:

- A. Irrigation water is sufficient for double cropping of paddy;
- B. Sufficient for supplying irrigation water to the main season paddy cultivation but insufficient for meeting presaturation water requirement for the off season paddy cultivation;
- C. Limited to single cropping of the main season paddy and upland crop cultivation; and
- D. Insufficient for paddy cultivation but no limitation to grow upland crops for the main season.

The detailed information on water resources evaluation for the various non-irrigation schemes is compiled in Appendix A of Volume 2.

3.2.3 Farmers' intention towards continuation of paddy cultivation and introduction of crop diversification

This factor is important as the success of the crop diversification program is depended on farmers' willingness to participate and also their attitude and preference to move towards a more diversified cropping pattern. To evaluate this factor, the Socio-economic Sample Survey results are referred to in respect to paddy farmers' intention towards continuation of paddy cultivation and introduction of crop diversification.

The evaluation criteria established are based on the proportion of respondent farmers who strongly intend to continue the present paddy cultivation pattern among the total sample farmers and that of paddy planted area for the last three years (1985-1987) against the irrigable area of each scheme. The evaluation method is to identify the State in which more than half of the respondent farmers show intentions towards continuation of paddy cultivation and to screen out the scheme with paddy cropping intensity of more than 50%.

- Schemes possible for promoting double cropping of paddy in case that the proportion of intended farmers against the total samples in each State is over 50%. Also, possible for promoting double cropping of paddy if the scheme-by-scheme planted area for the last three years is more than 50% every year in case of the State with the above proportion of less than 50%.

- Schemes impossible for promoting intensive paddy cultivation when the above proportion on the State basis is less than 50% and the cropping intensity is below 50%.

3.2.4 Land suitability for mechanized farming practices

This factor is optionally evaluated to clarify suitability of undertaking modern farming practices of paddy cultivation in case of schemes where intensive double cropping of paddy can be promoted. To evaluate this factor, special attention is paid to soil physical characteristics, size of scheme, availability of mechanical service centers and distance between schemes and available service sources. The evaluation criteria is established taking into account soil physical characteristics among others as below.

- Schemes suitable for mechanized farming practices are expressed in terms of the existence of alluvial soils.
- Schemes not suitable for mechanized farming practices are indicated by inappropriate soil physical conditions derived from peat soils and organic mac soils which are featured by low bearing capacity for using tractors and harvesters commonly used in Malaysia.

The detailed information is presented in Appendix D of Volume 2.

3.2.5 Soil and agro-climatic suitability and limitations for the cultivation of specific diversified crop

These factors are the basis to identify crops suitable for each scheme from the agronomic viewpoints. In identifying suitable crops, soil criteria for optimum crop growth is prepared for the following 28 crop groups referring to documents such as "Soil-Crop Suitability Classification for Peninsular Malaysia" prepared by the Department of Agriculture (DOA), "The Land Capability Classification" collected from DOA, Sabah and "Sarawak Land Capability Classification and Evaluation for Agricultural Crops" issued by DOA, Sarawak.

Short-term food crops:

maize, sorghum, wet paddy and upland rice as food crops, and ginger, groundnut and vegetables as vegetable crops,

Fruits:

mango/durian, guava, banana, cashewnut, papaya, citrus, pineapple and watermelon,

Perennial industrial crops:

coconut, oil palm, cocoa, rubber, sago palm, coffee, tea, clove, tobacco, sugarcane and pepper,

Feeding crops:

fodder grasses and pasture.

As the basic information to evaluate soil suitability and limitations, soil services that distribute in each scheme are identified referring to the available reconnaissance soil maps and those limitations to growth of each of 28 crops are evaluated on the basis of the soil criteria. The evaluated limitations are expressed in the form of soil suitability classed with a symbol indicating the specific limitation such as acid sulphate layer, depth to compacted layer, drainage, nutrient imbalance, organic horizon, salinity, and texture and structure. The followings are the grade of limitations to crop growth.

- Class 1 soils with no limitation or only minor limitations to crop growth are suitable for the widest range of crops.
- Class 2 soils with moderate limitations to crops growth are suitable for a narrower range of crops than Class 1 soils. Minor management practices according to limitations are required.
- Class 3 soils with one serious limitation to crop growth are restricted to an even narrower range of crops. Necessary management practices involve moderate expenses.
- Class 4 soils with more than one serious limitation to crop growth are suitable for a very narrow range of crops with provision of major amelioration measures.
- Class 5 soils with at least one very serious limitation to crop growth are least suitable for crop growth.

Through the identification and grading of limitations to crop growth for soil series which is identified in each non-granary irrigation scheme, soil suitability of 28 crops is classified into four groups such as suitable, marginally suitable, very marginally suitable and not suitable for promoting crop diversification.

The correlation between suitability grades and soil classes as follows:

Suitable:

Class 1 soils,

Marginally suitable:

Class 2 soils and partly Class soils of which limitations can be physically improved,

Very marginally suitable:

Class 3 soils with limitations of which limitations can be hardly graded up by direct physical measurements, and

Not suitable:

Classes 4 and 5 soils.

After evaluating soil suitability in the above procedure, identified crops with suitable to very marginally suitable grades are to be succeedingly confirmed from the agro-climatic viewpoint. For this purpose, two basic references are utilized, being "Agro-ecological regions in Peninsular Malaysia" and "Climatic and Agricultural Planning in Peninsular Malaysia" both prepared by the Malaysian Agricultural Research and Development Institute (MARDI). Among the identified crops, those which are not suited to regional climatic conditions in the specific scheme are eliminated from a list of suitable crops identified on the basis of soil conditions.

The detailed information is presented in Appendix D of Volume 2.

3.2.6 Crop profitability

To confirm the net income difference between paddy cultivation and other diversified crops, crop budget is computed based on average crop yield under normal farming practices, production cost and selling price. For this, "Guideline on Economic Viability of Selected Crops" prepared by the Ministry of Agriculture (MOA) is used as the basic reference. This includes crop budget data on 25 food crops and vegetables, 14 fruits and one industrial crop. With regard to other industrial crops, data on crop budgets are supplemented from MOA, DOA and agencies concerned. All the information is presented in Appendix E of Volume 2. The evaluation criteria is set up as below.

- Crop suitable for promoting diversified cropping are more profitable as compared with net income derived from the single cropping of paddy.
- Crops not suitable for incorporating in diversified cropping are less profitable in comparison with the net income obtained from the single cropping of paddy.

3.2.7 Crop marketability

This factor is also very important when crop diversification is promoted in specific areas, because most paddy farmers are aware that success of diversified cropping especially for short-term upland crops demand largely on availability of markets where they can expect to sell their produce at profitable price levels.

In terms of export-oriented perennial crops, the respective responsible agencies provide smallholder farmers with easy access to the existing marketing channel actively maintained. As for short-term upland crops, the Federal Agricultural Marketing Authority (FAMA) is responsible for promotion of marketing activities to encourage growers. Every year, FAMA gives a guideline for market potential in each State for about 30 varieties of vegetables and cash crops, 20 varieties of fruits and 15 kinds of freshwater fishes and livestock products. The data on market potential is compiled in Annex F of

Volume 2. By referring to this guideline, the crop marketability is evaluated in terms of quantified market potential on the administrative district-by-district bases. The evaluation criteria is set up as below.

- Crops suitable for promoting crop diversification have less marketable volume as compared with the demand of a specific administrative district where one particular scheme is located major market situated nearby or easily accessed from the scheme.
- Crops not suitable for promoting crop diversification have marketable quantity exceeding over more than twice of the demand in the specific administration district.

3.2.8 Investment performance with regard to crop diversification

This factor is evaluated for the purpose of judging the priority among categories and crops of which suitability to promote crop diversification are both identified. The evaluation procedure is based on economic viability indicated by net present value and benefit-cost ratio.

3.3 Procedure of Evaluation

3.3.1 General procedure

The potential of crop diversification for each non-granary irrigation scheme is evaluated category by category based on the following seven stepwise procedure as illustrated in Fig. 1.

Step 1 : Evaluation water resources availability,

Step 2 : Evaluation of farmers' intention towards continuation of paddy cultivation and introduction of crop diversification,

Step 3 : Evaluation of land suitability for carrying out direct seeding and mechanized plowing and harvesting in growing paddy,

- Step 4 : Evaluation of soil and climatic suitability and limitations for the cultivation of specific crops,
- Step 5 : Evaluation of crop profitability,
- Step 6 : Evaluation of crop marketability, and
- Step 7 : Evaluation of investment performance with regard to crop diversification.

The flow chart of evaluation procedure is illustrated in Fig. 2. In general, evaluation of factors in each Category starts from Step 1 and ends Step 7 for the respective schemes. As Step 3 is the optional gate to evaluate land suitability for conducting mechanized paddy cultivation practices, all Categories other than Category 6 jumps evaluation in Step 3. Before entering Step 1, the following two items are preliminarily checked to understand the present condition on how a scheme is utilized by beneficially farmers:

- Type of irrigation water intake facilities, and
- Planted area for the last three years.

3.3.2 Evaluation procedure for Category 1

In Step 1, one scheme has potential for promoting intensive short-term upland crop cultivation under irrigated condition if available water resources are enough for double cropping of paddy and short during the presaturation period of the off season. Upland crops can be grown maximum twice a year under irrigated condition in case that available water resources can meet irrigation water demand only for the main season paddy. Irrigated cropping of upland crops are limited to the main season if available water resources are insufficient for paddy cultivation. Therefore, each scheme can pass Step 1 with the exceptions of control drainage and inundation schemes.

In Step 2, schemes are evaluated as possible for promoting crop diversification and then go to Step 4. To provide information on technical and economical choice of upland crops if requested, other schemes also move down to Step 4 additionally.

In Step 4 after skipping Step 3, suitable upland crops are firstly identified through soil-crop-suitability assessment. Further, suitable varieties of upland crops are selected among the above crops identified paying special attention agro-climatic condition in lowland areas. If there is an identified and selected crop, schemes enter into the next step.

In Step 5, net income data of the selected crops are compared with that earned from single cropping of paddy. In case of higher net income expected, schemes shift to the next step:

In Step 6, marketability of upland crops confirmed its profitability are evaluated through comparison with the local demand in the District where schemes are located and in the local marketing centers. Usually, mono-cropping of the specific upland crop is very risky from the viewpoints of crop management and marketing. In this connection, crop production is estimated based on such assumed figures as the national average yield and the maximum planted area equivalent to 50% of the scheme's irrigable area for each of profitable crops.

In Step 7, economic viability is evaluated in terms of benefit-cost ratio and net present value. For this, benefit and cost are estimated on the basis of the assumption as below. The result is used for determining the priority among marketable upland crops and in comparison with other categories.

- Cost and benefit are estimated on the unit area basis,
- Cost required for upgrading drainage and access conditions is assumed to be M\$8,000/ha and time required for constructing these on-farm service facilities is one year, and
- Benefit born before diversification depends on single cropping of paddy and after diversification comes from marketable upland crops in the same planted area of paddy. Crop budget figures refer to those used in evaluating crop profitability. Buildup period to reach the target yields of upland crops is also assumed to be five years.

3.3.3 Evaluation procedure for Category 2

In Step 1, consideration is given only to improve drainage and farm access conditions for evaluating potential for converting paddy fields to perennial crop fields. Thus, all the schemes except control drainage and inundation types go to the next step.

In Step 2, the same procedure taken for Category 1 is applied and therefore schemes jump Step 3 and enter to Step 4.

In Step 4, suitability of fruit and industrial tree crops is assessed from the viewpoint of soil-crop suitability relationship. Then, identified tree crops as suitable are evaluated on the basis of agro-climatic condition of each scheme. When a tree crop is identified and selected, schemes shift to the next step.

In Step 5, annualized net income is calculated according to the economic life of a tree crop and then compared with net income gained from single cropping of paddy. If the annualized income is higher, schemes enter into the next step.

In Step 6, profitable tree crops are evaluated to confirm those marketability as compared with local demand on the administrative district basis firstly and in major markets secondly. Crop production amount is equal to the annualized yield used for estimate of crop profitability.

In Step 7, the same procedure as taken for Category 1 is applied. Cost required for upgrading drainage and farm access conditions is assumed to be M\$4,000/ha for scheme of which soils have marginally drainage limitation to crop growth and M\$8,000/ha for the case of very marginally drainage limitation.

3.3.4 Evaluation procedure for Category 3

In Step 1, schemes with sufficient water resources for the main season paddy cultivation are identified as possible schemes where two cropping system can be promoted. While, schemes with water shortage problems during the main season are deleted from further evaluation in Step 2 and onward.

In Step 2, schemes that are evaluated as possible for promoting crop diversification and intensive double cropping of paddy go to Step 4. In case of schemes with no possibility of improving the present paddy cultivation pattern, further evaluation in Step 4 and onward is made to get information on suitable crops with those profitability and marketability as reference data.

In Step 4 after skipping Step 3, short-term upland crops suitable for the off season cultivation are identified resulting from assessment of soil-crop-suitability. Then, crop selection is made after confirming crop adaptability to agro-ecological situation in each scheme. If there is identified and selected crop, schemes move to the next step.

In Step 5, net income of the main season paddy is estimated taking into account increase in average unit yield from 2.25 ton/ha to 3.5 ton/ha through improvement of farming practices. The off season upland crops have the same yield level of Category 1.

In Step 6, evaluation of marketability is made for the off season upland crops by applying the similar method to Category 1.

In Step 7, additional investment requirement is assumed to be M\$4,000/ha. Benefit estimate and economic viability confirmation are made following the same procedure employed for Category 7.

3.3.5 Evaluation procedure for Category 4

In Step 1, no attention is paid to availability of water resources so that all the schemes can pass this step.

In Steps 2 and 3, no evaluation of these two factors is made as possibility of introducing this Category is examined from the technical and economical viewpoints.

In Step 4, soils with excessively drained feature are evaluated as possible for converting paddy fields to animal grazing land. In case of growing animal feeding crops, those suitability is assessed from the soil-crop-suitability assessment. When both results indicate as suitable for conversion of paddy fields for the livestock purpose, schemes go to the next step.

In Step 5, profitability is evaluated focussing upon the contribution of both grazing and feeding practices to livestock outputs. For this purpose, the average annual income is estimated based on beef production value obtained from unit yield of animal feeding crops. If the profit is higher than that derived from single cropping of paddy, schemes enter into the next step.

In Step 6 and , marketability is evaluated with the same procedure of Category 1.

In Step 7, additional investment cost is assumed to be M\$500/ha for the use of paddy fields to rear animals and M\$4,000/ha for growing animal feeding crops. Benefit is estimated referring to the result of profit evaluation.

3.3.6 Evaluation procedure for Category 5

In Step 1, special attention is paid to availability of sufficient water resources to meet daily freshwater requirement. If the available water resources are enough to grow paddy twice a year, schemes enter into the next step. For the case of control drainage schemes located along the coast in Sarawak, intake of brackish water is evaluated according to topographic condition.

In Steps 2 and 3, all the schemes with sufficient water resources skip these two steps with the same reason of Category 4.

In Step 4, soils with heavy texture are prerequisite to convert paddy fields to fish ponds. From the agro-climatic viewpoints, schemes with no effect of flooding are recognized as possible for promoting freshwater fish pond culture. Schemes that can pass these two checking points move to the next step. In case of brackish water fish culture, flooding or excess inundation problem is only assessed.

In Step 5, profitability is evaluated on the basis of annualized net income earned from carp, freshwater shrimp and brackish water prawn cultures by in excavated fish pond with modern practices. If higher profit is expected as compared with single cropping of paddy, schemes shift to the next step.

In Step 6, the evaluation procedure of marketability is the same as Category 1.

In Step 7, required cost for excavating fish pond is assumed to be M\$10,000/ha. Benefit is estimated by referring to the profitability evaluation results.

3.3.7 Evaluation procedure for Category 6

In Step 1, supply of irrigation water for the off season is the most important key factor for this category. Schemes pass this step if available water resources can meet the normal irrigation water demand for the off season paddy.

In Step 2, schemes evaluated as possible for promoting double cropping of paddy enter into the next step.

In Step 3, land suitability for performing mechanized farming practices is evaluated. Schemes identified as suitable pass this step and go to the next step.

In Step 4, soil and agro-climatic suitabilities are reconfirmed and schemes with no limitation shift to the next step.

In Step 5, assumption is made in terms of increase in unit yield of paddy from 2.25 ton/ha to 3.5 ton/ha per one season. Schemes pass this step.

In Step 7 after skipping Step 6, cost is assumed to be M\$4,000/ha to improve on farm-service facilities matching with undertaking of mechanized farming practices. Benefit estimate is made referring the results of profitability evaluation.

3.3.8 Evaluation procedure for Category 7

Evaluation of potential for the Category 7 is to be made in case that a scheme is presently used for the paddy cultivation purpose and no potential use for the Categories 1 to 6 is identified.

In Step 1, schemes with available water resources for the main season paddy cultivation goes to the next step.

In Step 2, schemes shift the next step if identified as impossible for promoting crop diversification from the social viewpoint.

In Step 4 after skipping Step 3, soil limitations to growth of paddy are reconfirmed. If schemes have poorly drained soils caused by frequent flooding and stagnant water problems, these are deleted from further evaluation. In this connection, inundation and controlled drainage schemes can be taken into consideration only for the case that more than half of the irrigable area is grown with paddy for the last three years. All the schemes that pass this step are identified as Category 7 without further evaluation of factors in Step 5 and onward.

3.3.9 Evaluation procedure for Category 8

If no crop diversification potential is found through evaluation for the Categories 1 to 7, the following factors are to be evaluated. These are water availability and soil limitation to crop growth. Schemes with no available water resources and unsuitable soils for crop growth are defined as Category 8.

4. RESULTS OF EVALUATION

The evaluation results of crop diversification potential are adjusted to agro-climatic factors, regional market demand for diversified crops and investment performance. The State of Terengganu is divided into three agro-ecological zones, Regions 21, 22 and 26. These have the different advantages in growing perennial lowland crops as described in Appendix D of Volume 2. Taking into account these conditions, recommendable crops are selected with the priority order as shown in Table 1 and some of crops judged as suitable in each step of the potential evaluation are deleted.

With regard to the Category 6, such conditions are made to conduct adjustment that schemes are selected if these size is more than 100 ha and main season paddy planted area is over the half of irrigable area.

If marketable quantities of specific crops produced in one non-granary irrigated area is over the local demand within an administrative district, surplus amount is then compared with potential market demand in the major consumption center, Kuala Lumpur, in order to confirm the possibility of selling surplus to such market.

As a result of the above process, the crop diversification potential is adjusted to the present condition category by category for each scheme. Table 2 shows the summary of crop diversification potential evaluation. The process of evaluation is attached to this Volume 5 as Appendix in a form of scheme-by-scheme description sheet.

Out of 39 non-granary irrigation schemes, eight schemes are grouped into the Category 6 with the first priority. In general, these schemes have potential for crop diversification under the Category 1 to 3. For another five schemes, the first priority is put to the Category 3. The first priority is also given to the Category 2 for 12 schemes, while it is given to the Category 7 for 12 schemes due to no possibility of

introducing other crops, and the Category 8 for one scheme because of lack of potential for agricultural use.

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Tables & Figures

Table 1 Priority Order of Selected Crops for Each Scheme

State : Terengganu (1/2)

Code No.	Scheme	Annual Crops	Perennial Crops
TR001	Telabak	SP, VG*, GG*	DM, CN, SC, TB, CR*
TR002	Bintang	SP	DM*
TR003	Setiu	SP, VG*	CN, SC
TR004	Pelagat	DP, VG*, GG*	CN, SC, TB, DM*, CR*
TR005	Air Puteh	DP, VG	
TR006	Paya Dadong	DP, VG	
TR007	Batu Puteh	DP, VG	
TR008	Paya Paman	DP, VG*, GG*	CN, SC, DM*, CR*
TR009	Paya Dusun	SP	DM
TR010	Cheniah	DP, VG, GG*	DM, CN, SC, CR
TR011	Bukit Peroh	DP, VG*, GG*	CN, SC, DM*, CR*
TR012	Paya Kempian	DP, VG, GG*	PR, DM, CN, SC, GV*, CR*, PL*
TR013	Syukur	VG, SP, GG*	PR, DM, CN, SC
TR014	Keliyu	DP, VG, GG*	DM, CN, SC, CR
TR015	Pulau Musang	DP, VG*, GG*	CN, SC, TB, DM*, CR*
TR016	Nerus	DP, VG*, GG*	CN, SC, TB, DM*, CR*
TR017	Batu Rakit	SP	
TR018	Gelong Gabus	SP	
TR019	Bukit Tumbuh	VG, SP	DM, CN, SC, CR
TR020	Banggol Pauh	SP	
TR021	Sg. Ibai	SP	
TR022	Chenderig	SP	
TR023	Kepong	VG	DM, CN, SC
TR024	Sg. Serai	SP	DM, CN, SC, CR
TR025	Lubok Pandan	SP	DM, CN, SC, CR

Remarks: Priority order is shown from left to right for each crop group.

*; Needs for regional marketing promotion

DP; Double cropping of paddy

SP; Single cropping of paddy

VG; Vegetables

GG; Ginger

DM; Durian/mango

GV; Guava

CN; Cashewnut

CR; Citrus

PL; Pineapple

TB; Tobacco

SC; Sugarcane

PR; Pepper

NA; Non-agricultural land

Table 1 Priority Order of Selected Crops for Each Scheme

State : Terengganu (2/2)

Code No.	Scheme	Annual Crops	Perennial Crops
TR026	Bukit Jolong	SP	
TR027	Rusila		NA
TR028	Ban Batangan	SP	
TR029	Paya Kemat	SP	DM*
TR030	Paya Diman	SP, VG*, GG*	CN, SC, DM*, CR*
TR031	Padang Ipoh	VG*, GG*	CN, SC, DM*, CR*
TR032	Kuala Telemong	VG	DM, GV, CN, SC, CR
TR033	Kuala Akob	DP, VG*	CN, SC, DM*, GV*, CR*
TR034	Paya Rapat	DP, VG*, GG*	CN, SC, DM*, GV*, CR*
TR035	Gaung	DP, VG*, GG*	CN, SC, TB, DM*, GV*, CR*
TR036	Peroh	SP	DM*, GV*
TR037	Matang	SP	DM*, GV*
TR038	Langgar	DP, VG*, GG*	CN, SC, TB, DM*, GV*, CR*
TR039	Tapah	SP	DM*

Remarks:

- *; Needs for regional marketing promotion
- DP; Double cropping of paddy
- SP; Single cropping of paddy
- VG; Vegetables
- GG; Ginger
- DM; Durian/mango
- GV; Guava
- CN; Cashewnut
- CR; Citrus
- PL; Pineapple
- TB; Tobacco
- SC; Sugarcane
- PR; Pepper
- NA; Non-agricultural land

Table 2 Crop Diversification Potential for Each Scheme

State : Terengganu

Code	Scheme	Category							
		1	2	3	4	5	6	7	8
TR001	Telabak	*4	*1	*4	.	.	.	*2	.
TR002	Bintang	.	*4	.	.	.	.	*1	.
TR003	Setiu	*4	*1	*4	.	.	.	*2	.
TR004	Pelagat	*4	*2	*4	.	.	*1	.	.
TR005	Air Puteh	*2	.	*1	.	.	.	*3	.
TR006	Paya Dadong	*2	.	*1	.	.	.	*3	.
TR007	Batu Puteh	*2	.	*1	.	.	.	.	.
TR008	Paya Paman	*4	*2	*4	.	.	*1	.	.
TR009	Paya Dusun	.	*1	.	.	.	.	*2	.
TR010	Cheniah	*2	*3	*1	.	.	.	*3	.
TR011	Bukit Peroh	*4	*2	*4	.	.	*1	.	.
TR012	Paya Kempian	*2	*1	*2	.	.	.	*3	.
TR013	Syukur	*2	*1	*2	.	.	.	*3	.
TR014	Keliyu	*2	*3	*1	.	.	.	*3	.
TR015	Pulau Musang	*4	*2	*4	.	.	*1	.	.
TR016	Nerus	*4	*2	*4	.	.	*1	.	.
TR017	Batu Rakit	.	.	.	.	.	.	*1	.
TR018	Gelong Gabus	.	.	.	.	.	.	*1	.
TR019	Bukit Tumbuh	*2	*1	.	.	.	.	.	.
TR020	Banggol Pauh	.	.	.	.	.	.	*1	.
TR021	Sg. Ibai	.	.	.	.	.	.	*1	.
TR022	Chenderig	.	.	.	.	.	.	*1	.
TR023	Kepong	*2	*1	.	.	.	.	.	.
TR024	Sg. Serai	*2	*1	.	.	.	.	*3	.
TR025	Lubok Pandan	*2	*1	.	.	.	.	*3	.
TR026	Bukit Jolong	.	.	.	.	.	.	*1	.
TR027	Rusila	.	.	.	.	.	.	*1	.
TR028	Ban Batangan	.	.	.	.	.	.	.	*1
TR029	Paya Kemat	.	*4	.	.	.	.	*1	.
TR030	Paya Diman	*4	*1	*4	.	.	.	*2	.
TR031	Padang Ipoh	*4	*1	.	.	.	.	.	.
TR032	Kuala Telemong	*2	*1	.	.	.	.	.	.
TR033	Kuala Akob	*4	*1	*4	.	.	.	*2	.
TR034	Paya Rapat	*4	*2	*4	.	.	*1	.	.
TR035	Gaung	*4	*2	*4	.	.	*1	.	.
TR036	Matang	.	*4	.	.	.	.	*1	.
TR037	Matang	.	*4	.	.	.	.	*1	.
TR038	Langgar	*4	*2	*4	.	.	*1	.	.
TR039	Tapah	.	*4	.	.	.	.	*1	.
*1 Super category		.	12	5	.	.	8	12	1
*2 2nd priority category		12	9	2	.	.	.	5	.
*3 3rd priority category		.	2	.	.	.	.	8	.
*4 4th priority category with needs of regional marketing promotion		13	5	12	.	.	.	.	.

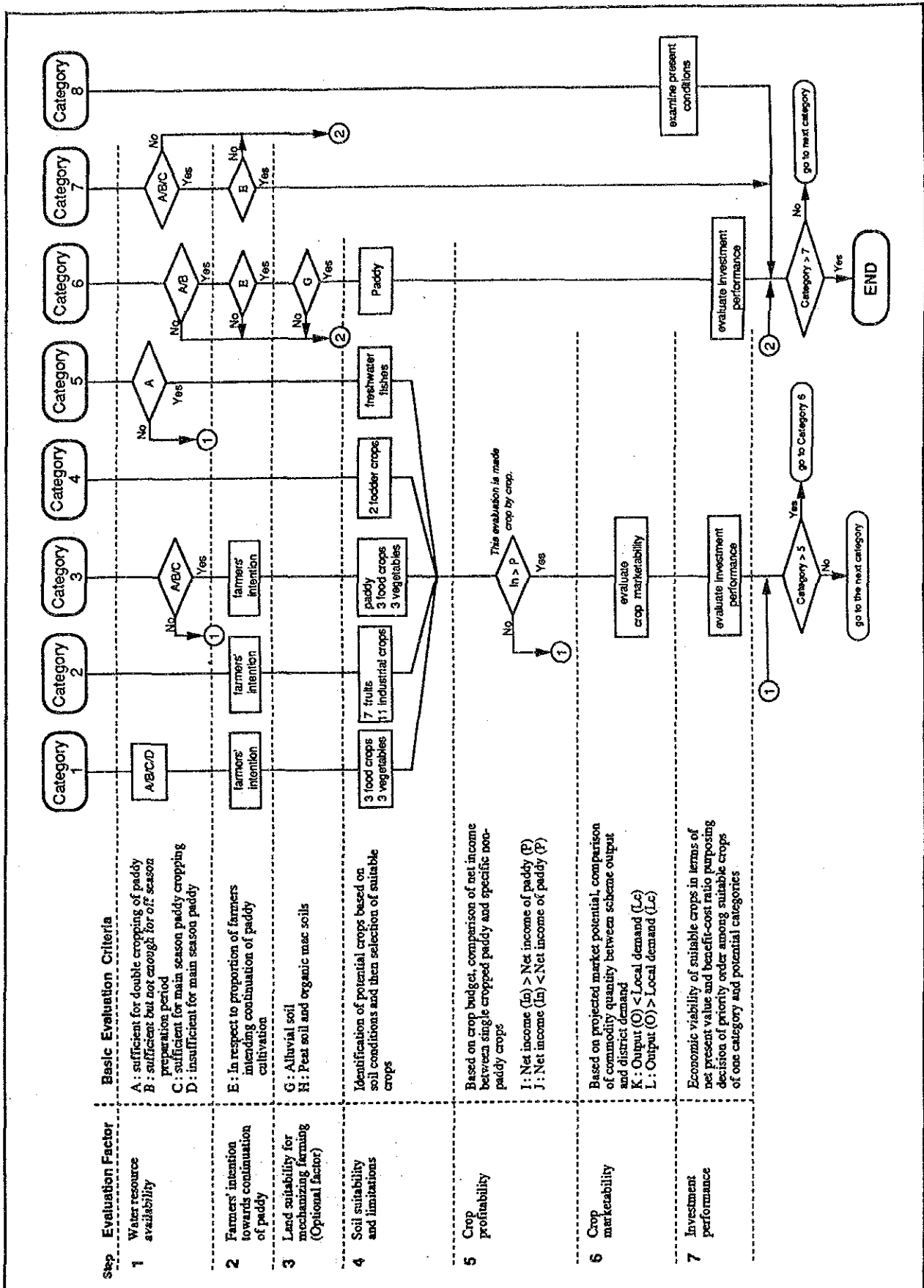


Fig. 1
Criteria and Procedure of Evaluation
for Crop Diversification Potential

FEASIBILITY STUDY ON RATIONALIZATION AND
 CROP DIVERSIFICATION IN NON-GRANARY
 IRRIGATED AREAS IN MALAYSIA

Japan International Cooperation Agency

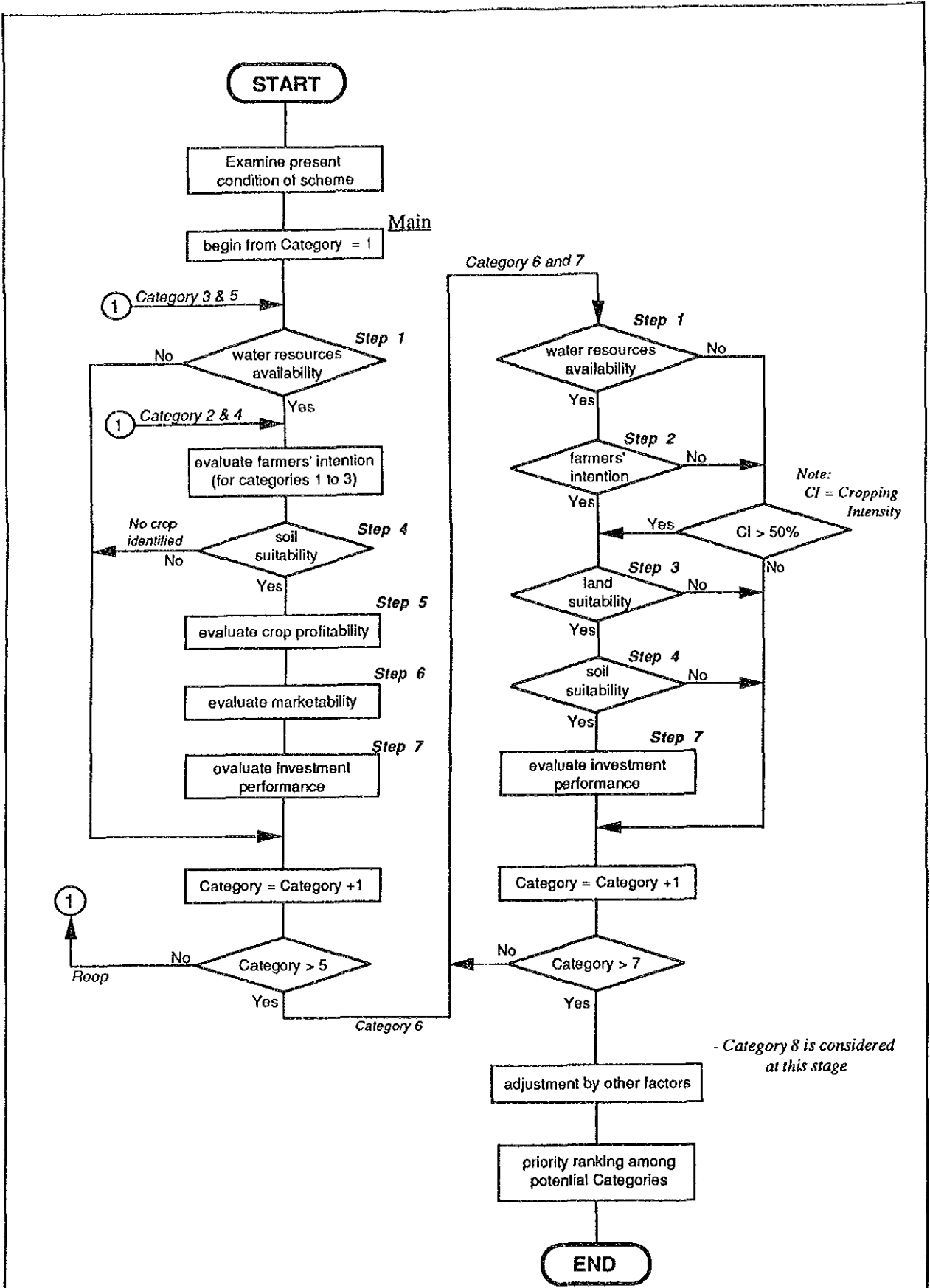


Fig. 2
General Flow of Evaluation
for Crop Diversification Potential

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Appendix

Results of Evaluation for Crop Diversification Potential

Remarks

Category

Category 1	<i>Schemes to be converted to high value crop cultivation under irrigated condition</i>
Category 2	<i>Schemes to be converted to tree crop cultivation</i>
Category 3	<i>Schemes to introduce two-cropping system planting paddy during the main season and short-term annual crops during the off-season</i>
Category 4	<i>Schemes to be converted to animal feeding crop cultivation or cattle raising fields</i>
Category 5	<i>Schemes to be converted to freshwater fish culture ponds</i>
Category 6	<i>Schemes to be positively maintained as mini-granary areas</i>
Category 7	<i>Schemes to be maintained as paddy cultivation areas within a definite period of time for social welfare purposes and thereafter to be further categorized</i>
Category 8	<i>Schemes to be converted to housing/industrial and other uses</i>

Evaluation Item in Each Step

Step 1	<i>Available irrigation water quantity</i>
Step 2	<i>Farmers' intention towards paddy cultivation</i>
Step 3	<i>Land suitability for mechanized farming practices</i>
Step 4	<i>Soil suitability and limitations to diversify crops</i>
Step 5	<i>Crop profitability</i>
Step 6	<i>Crop marketability</i>
Step 7	<i>Investment performance</i>

- Note:
- If any item is examined, steps for the respective categories are indicated with a star mark "*".*
 - In step 7, B/C ratio at the interest rate of 10% is described.*

Evaluation Results of Each Scheme

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TR002 Bintang	2
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TR009 Paya Dusun	9
TR010 Cheniah	10
TR011 Bukit Peroh	11
TR012 Paya Kempian	12
TR013 Syukur	13
TR014 Keliyu	14
TR015 Pulau Musang	15
TR016 Nerus	16
TR017 Batu Rakit	17
TR018 Gelong Gabus	18
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TR034 Paya Rapat	34
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TR036 Peroh	36
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Crop Diversification Potential for TR001

Code Number : TR001 Name of Scheme : Telabak
 State : Terengganu District : Besut
 Type of Scheme : Gravity
 Water source : Limited to single cropping
 Soil series : 1d

Irrigable area (ha) Main : 120 Off : 60
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	1,800
				Groundnut	A	A	A	0.9	313
				Vegetable	A	A	-	13.8	2,124
2	*	*	*	<u>Durian/Mango</u>	A	A	A	<u>43.6</u>	<u>816</u>
				Guava	A	A	-	12.2	2,880
				<u>Banana</u>	A	A	A	<u>2.7</u>	<u>1,260</u>
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>211</u>
				Papaya	B	A	-	0.6	3,000
				Citrus	A	A	-	5.7	1,260
				Pineapple	A	A	-	9.5	2,880
				Coconut	A	-	A		526
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>2,304</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>372</u>
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>164</u>
				Sago	C	-	A		1,080
				Coffee	A	A	A	0.7	106
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>156</u>
				<u>Clove</u>	A	A	A	<u>2.3</u>	<u>37</u>
<u>Tabacco</u>	A	A	A	<u>1.4</u>	<u>1,080</u>				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>2,400</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>354</u>				
3	*	*	*	Maize	A	-	-		390
				Sorghum	A	-	A		450
				Ginger	B	A	-	2.5	1,800
				Groundnut	A	A	A	0.9	313
				Vegetable	A	A	-	13.8	2,124
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR002

Code Number : TR002 Name of Scheme : Bintang
 State : Terengganu District : Setiu
 Type of Scheme : Gravity
 Water source : Limited to single cropping
 Soil series : 2DT

Irrigable area (ha) Main : 51 Off : 45
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	C	A	-		765
				Groundnut	C	A	A		133
				Vegetable	C	A	-		903
2	*	*	*	Durian/Mango	C	A	-	11.0	347
				Guava	C	A	-	3.1	1,224
				Banana	C	A	-	0.7	536
				Cashewnut	C	A	A		90
				Papaya	C	A	-		1,275
				Citrus	C	A	-		536
				Pineapple	C	A	-	0.5	1,224
				Coconut	A	-	A		223
				Oilpalm	C	A	A	0.9	979
				Cocoa	C	A	A	0.6	158
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>70</u>
				Coffee	C	A	A		45
				Tea	C	A	A		66
				Clove	C	A	A		16
Tabacco	C	A	A		459				
Sugercane	C	A	A		1,020				
Pepper	C	A	A		150				
3	*	*	*	Maize	C	-	-		166
				Sorghum	C	-	A		191
				Ginger	C	A	-		765
				Groundnut	C	A	A		133
				Vegetable	C	A	-		903
4	*	*	*	Fodder grasses	C	-	A		
				Pasture	C	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR003

Code Number : TR003 Name of Scheme : Setiu
 State : Terengganu District : Setiu
 Type of Scheme : Gravity
 Water source : Limited to single cropping
 Soil series : 2d

Irrigable area (ha) Main : 647 Off : 728
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Groundnut	A	A	A	0.9	2,105
				Vegetable	A	A	-	13.8	14,276
2	*	*	*	Durian/Mango	A	A	-	43.6	5,484
				Guava	A	A	-	12.2	19,357
				Banana	A	A	-	2.7	8,469
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>1,419</u>
				Citrus	B	A	-	2.9	8,469
				Pineapple	A	A	-	9.5	19,357
				Coconut	A	-	A		3,533
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>15,486</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>2,500</u>
				Rubber	B	A	A	0.6	1,105
				Coffee	B	A	A	0.4	710
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>1,048</u>
				Clove	B	A	A	1.1	250
				Tabacco	B	A	A	0.7	7,259
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>16,130</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>2,380</u>				
3	*	*	*	Maize	A	-	-		2,621
				Sorghum	A	-	A		3,025
				Groundnut	A	A	A	0.9	2,105
				Vegetable	A	A	-	13.8	14,276
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR004

Code Number : TR004 Name of Scheme : Pelagat
 State : Terengganu District : Besut
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 1d

Irrigable area (ha) Main : 650 Off : 650
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	9,750
				Groundnut	A	A	A	0.9	1,697
				Vegetable	A	A	-	13.8	11,505
2	*	*	*	Durian/Mango	A	A	-	43.6	4,420
				Guava	A	A	-	12.2	15,600
				Banana	A	A	-	2.7	6,825
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>1,144</u>
				Papaya	B	A	-	0.6	16,250
				Citrus	A	A	-	5.7	6,825
				Pineapple	A	A	-	9.5	15,600
				Coconut	A	-	A		2,847
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>12,480</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>2,015</u>
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>891</u>
				Sago	C	-	A		5,850
				Coffee	A	A	A	0.7	572
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>845</u>
				<u>Clove</u>	A	A	A	<u>2.3</u>	<u>202</u>
<u>Tabacco</u>	A	A	A	<u>1.4</u>	<u>5,850</u>				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>13,000</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>1,918</u>				
3	*	*	*	Maize	A	-	-		2,113
				Sorghum	A	-	A		2,438
				Ginger	B	A	-	2.5	9,750
				Groundnut	A	A	A	0.9	1,697
				Vegetable	A	A	-	13.8	11,505
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR005

Code Number : TR005 Name of Scheme : Air Puteh
 State : Terengganu District : Kemaman
 Type of Scheme : Gravity
 Water source : Sufficient for double cropping
 Soil series : 3d(T)

Irrigable area (ha) Main : 81 Off : 81
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Less than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	B	A	A	6.9	1,434
2	*	*	*	Coconut	B	-	A		355
				Sago	A	-	A		729
3	*	*	*	Vegetable	B	A	A	6.9	1,434
4	*	*	*	Fodder grasses	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR006

Code Number : TR006 Name of Scheme : Paya Dadong
 State : Terengganu District : Kemaman
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 3d(t)

Irrigable area (ha) Main : 48 Off : 48
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	B	A	A	6.9	850
2	*	*	*	Coconut	B	-	A		210
				Sago	A	-	A		432
3	*	*	*	Vegetable	B	A	A	6.9	850
4	*	*	*	Fodder grasses	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR007

Code Number : TR007 Name of Scheme : Batu Puteh
 State : Terengganu District : Kemaman
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 3d(t)

Irrigable area (ha) Main : 61 Off : 61
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Idle

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	B	A	A	6.9	1,080
2	*	*	*	Coconut	B	-	A		267
				Sago	A	-	A		549
3	*	*	*	Vegetable	B	A	A	6.9	1,080
4	*	*	*	Fodder grasses	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7									
8	*	*	*		*	*	*		

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR008

Code Number : TR008 Name of Scheme : Paya Paman
 State : Terengganu District : Kemaman
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2dt

Irrigable area (ha) Main : 202 Off : 32
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Less than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
2	*	*	*	Durian/Mango	C	A	-	11.0	1,374
				Guava	C	A	-	3.1	4,848
				Banana	C	A	-	0.7	2,121
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>356</u>
				Papaya	B	A	-	0.6	5,050
				Citrus	B	A	-	2.9	2,121
				Pineapple	A	A	-	9.5	4,848
				Coconut	A	-	A	-	885
				Oilpalm	C	A	A	0.9	3,878
				Cocoa	C	A	A	0.6	626
				Rubber	B	A	A	0.6	277
				Sago	C	-	A	-	1,818
				Coffee	A	A	A	0.7	178
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>263</u>
Clove	B	A	A	1.1	63				
Tabacco	B	A	A	0.7	1,818				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>4,040</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>596</u>				
3	*	*	*	Maize	A	-	-	-	657
				Sorghum	A	-	A	-	758
				Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
4	*	*	*	Fodder grasses	A	-	A	-	-
				Pasture	A	-	A	-	-
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).

- * : Potential categories
- A : Suitable
- B : Marginal suitable due to lack of drainage facilities
- C : Marginal suitable due to limited factors other than drainage conditions
- : Not suitable

Crop Diversification Potential for TR009

Code Number : TR009 Name of Scheme : Paya Dusun
 State : Terengganu District : Dungun
 Type of Scheme : Gravity
 Water source : Limited to single cropping
 Soil series : 2Dt

Irrigable area (ha) Main : 31 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	C	A	-		465
				Groundnut	C	A	A		81
				Vegetable	C	A	A		549
2	*	*	*	Durian/Mango	C	A	A	11.0	211
				Guava	C	A	-	3.1	744
				Banana	C	A	A	0.7	326
				Cashewnut	C	A	A		55
				Papaya	C	A	-		775
				Citrus	C	A	A		326
				Pineapple	C	A	-	0.5	744
				Coconut	A	-	A		136
				Oilpalm	C	A	A	0.9	595
				Cocoa	C	A	A	0.6	96
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>42</u>
				Coffee	C	A	A		27
				Tea	C	A	A		40
				Clove	C	A	A		10
Tabacco	C	A	A		279				
Sugarcane	C	A	A		620				
Pepper	C	A	A		91				
3	*	*	*	Maize	C	-	-		101
				Sorghum	C	-	A		116
				Ginger	C	A	-		465
				Groundnut	C	A	A		81
				Vegetable	C	A	A		549
4	*	*	*	Fodder grasses	C	-	A		
				Pasture	C	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR010

Code Number : TR010 Name of Scheme : Cheniah
 State : Terengganu District : Dungun
 Type of Scheme : Gravity
 Water source : Sufficient for double cropping
 Soil series : 2dt

Irrigable area (ha) Main : 62 Off : 62
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	930
				Groundnut	A	A	A	0.9	162
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>1,097</u>
2	*	*	*	Durian/Mango	C	A	A	11.0	422
				Guava	C	A	-	3.1	1,488
				Banana	C	A	A	0.7	651
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>109</u>
				Papaya	B	A	-	0.6	1,550
				Citrus	B	A	A	2.9	651
				Pineapple	A	A	-	9.5	1,488
				Coconut	A	-	A		272
				Oilpalm	C	A	A	0.9	1,190
				Cocoa	C	A	A	0.6	192
				Rubber	B	A	A	0.6	85
				Sago	C	-	A		558
				Coffee	A	A	A	0.7	55
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>81</u>
				Clove	B	A	A	1.1	19
Tabacco	B	A	A	0.7	558				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>1,240</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>183</u>				
3	*	*	*	Maize	A	-	-		202
				Sorghum	A	-	A		233
				Ginger	B	A	-	2.5	930
				Groundnut	A	A	A	0.9	162
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>1,097</u>
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR011

Code Number : TR011 Name of Scheme : Bukit Peroh
 State : Terengganu District : Dungun
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2dt

Irrigable area (ha) Main : 162 Off : 162
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Idle

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	2,430
				Groundnut	A	A	A	0.9	423
				Vegetable	A	A	-	13.8	2,867
2	*	*	*	Durian/Mango	C	A	-	11.0	1,102
				Guava	C	A	-	3.1	3,888
				Banana	C	A	-	0.7	1,701
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>285</u>
				Papaya	B	A	-	0.6	4,050
				Citrus	B	A	-	2.9	1,701
				Pineapple	A	A	-	9.5	3,888
				Coconut	A	-	A		710
				Oilpalm	C	A	A	0.9	3,110
				Cocoa	C	A	A	0.6	502
				Rubber	B	A	A	0.6	222
				Sago	C	-	A		1,458
				Coffee	A	A	A	0.7	143
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>211</u>
				Clove	B	A	A	1.1	50
Tabacco	B	A	A	0.7	1,458				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>3,240</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>478</u>				
3	*	*	*	Maize	A	-	-		527
				Sorghum	A	-	A		608
				Ginger	B	A	-	2.5	2,430
				Groundnut	A	A	A	0.9	423
				Vegetable	A	A	-	13.8	2,867
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7									
8	*	*	*		*	*	*		

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR012

Code Number : TR012 Name of Scheme : Paya Kempian
 State : Terengganu District : Dungun
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2dt

Irrigable area (ha) Main : 68 Off : 68
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	1,020
				Groundnut	A	A	A	0.9	177
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>1,204</u>
2	*	*	*	Durian/Mango	C	A	A	11.0	462
				Guava	C	A	-	3.1	1,632
				Banana	C	A	A	0.7	714
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>120</u>
				Papaya	B	A	-	0.6	1,700
				Citrus	B	A	-	2.9	714
				Pineapple	A	A	-	9.5	1,632
				Coconut	A	-	A		298
				Oilpalm	C	A	A	0.9	1,306
				Cocoa	C	A	A	0.6	211
				Rubber	B	A	A	0.6	93
				Sago	C	-	A		612
				Coffee	A	A	A	0.7	60
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>88</u>
Clove	B	A	A	1.1	21				
Tabacco	B	A	A	0.7	612				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>1,360</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>201</u>				
3	*	*	*	Maize	A	-	-		221
				Sorghum	A	-	A		255
				Ginger	B	A	-	2.5	1,020
				Groundnut	A	A	A	0.9	177
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>1,204</u>
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR013

Code Number : TR013 Name of Scheme : Syukur
 State : Terengganu District : Dungun
 Type of Scheme : Gravity
 Water source : Limited to single cropping
 Soil series : 2dt

Irrigable area (ha) Main : 17 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	255
				Groundnut	A	A	A	0.9	44
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>301</u>
2	*	*	*	Durian/Mango	C	A	A	11.0	116
				Guava	C	A	-	3.1	408
				Banana	C	A	A	0.7	179
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>30</u>
				Papaya	B	A	-	0.6	425
				Citrus	B	A	A	2.9	179
				<u>Pineapple</u>	A	A	A	<u>2.5</u>	<u>408</u>
				Coconut	A	-	A		74
				Oilpalm	C	A	A	0.9	326
				Cocoa	C	A	A	0.6	53
				Rubber	B	A	A	0.6	23
				Sago	C	-	A		153
				Coffee	A	A	A	0.7	15
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>22</u>
Clove	B	A	A	1.1	5				
Tabacco	B	A	A	0.7	153				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>340</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>50</u>				
3	*	*	*	Maize	A	-	-		55
				Sorghum	A	-	A		64
				Ginger	B	A	-	2.5	255
				Groundnut	A	A	A	0.9	44
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>301</u>
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE: Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR014

Code Number : TR014 Name of Scheme : Keliyu
 State : Terengganu District : Dungun
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2dt

Irrigable area (ha) Main : 40 Off : 32
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	600
				Groundnut	A	A	A	0.9	104
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>708</u>
2	*	*	*	Durian/Mango	C	A	A	11.0	272
				Guava	C	A	-	3.1	960
				Banana	C	A	A	0.7	420
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>70</u>
				Papaya	B	A	-	0.6	1,000
				Citrus	B	A	A	2.9	420
				Pineapple	A	A	-	9.5	960
				Coconut	A	-	A		175
				Oilpalm	C	A	A	0.9	768
				Cocoa	C	A	A	0.6	124
				Rubber	B	A	A	0.6	55
				Sago	C	-	A		360
				Coffee	A	A	A	0.7	35
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>52</u>
				Clove	B	A	A	1.1	12
Tabacco	B	A	A	0.7	360				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>800</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>118</u>				
3	*	*	*	Maize	A	-	-		130
				Sorghum	A	-	A		150
				Ginger	B	A	-	2.5	600
				Groundnut	A	A	A	0.9	104
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>708</u>
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR015

Code Number : TR015 Name of Scheme : Pulau Musang
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 1

Irrigable area (ha) Main : 1675 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	A	A	-	5.0	25,125
				Groundnut	A	A	A	0.9	4,372
				Vegetable	A	A	-	13.8	29,648
2	*	*	*	Durian/Mango	A	A	-	43.6	11,390
				Guava	A	A	-	12.2	40,200
				Banana	A	A	-	2.7	17,588
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>2,248</u>
				Papaya	A	A	-	1.2	41,875
				Citrus	A	A	-	5.7	17,588
				Pineapple	A	A	-	9.5	40,200
				Coconut	A	-	A		7,337
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>32,160</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>5,193</u>
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>2,295</u>
				Coffee	A	A	A	0.7	1,474
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>2,178</u>
				<u>Clove</u>	A	A	A	<u>2.3</u>	<u>519</u>
				<u>Tabacco</u>	A	A	A	<u>1.4</u>	<u>15,075</u>
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>33,500</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>4,941</u>				
3	*	*	*	Maize	A	-	-		5,444
				Sorghum	A	-	A		6,281
				Ginger	A	A	-	5.0	25,125
				Groundnut	A	A	A	0.9	4,372
				Vegetable	A	A	-	13.8	29,648
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR016

Code Number : TR016 Name of Scheme : Nerus
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 1d

Irrigable area (ha) Main : 2172 Off : 1822
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	32,580
				Groundnut	A	A	A	0.9	5,669
				Vegetable	A	A	-	13.8	38,445
2	*	*	*	Durian/Mango	A	A	-	43.6	14,769
				Guava	A	A	-	12.2	52,128
				Banana	A	A	-	2.7	22,806
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>3,822</u>
				Papaya	B	A	-	0.6	54,300
				Citrus	A	A	-	5.7	22,806
				Pineapple	A	A	-	9.5	52,128
				Coconut	A	-	A		9,513
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>41,703</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>6,733</u>
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>2,976</u>
				Sago	C	-	A		19,548
				Coffee	A	A	A	0.7	1,911
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>2,823</u>
				<u>Clove</u>	A	A	A	<u>2.3</u>	<u>673</u>
<u>Tabacco</u>	A	A	A	<u>1.4</u>	<u>19,545</u>				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>43,440</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>6,408</u>				
3	*	*	*	Maize	A	-	-		7,059
				Sorghum	A	-	A		8,145
				Ginger	B	A	-	2.5	32,580
				Groundnut	A	A	A	0.9	5,669
				Vegetable	A	A	-	13.8	38,445
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR017

Code Number : TR017 Name of Scheme : Batu Rakit
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 4dT

Irrigable area (ha) Main : 1000 Off : 1000
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	-		17,700
2	*	*	*	Coconut	C	-	A		4,380
				Sago	C	-	A		9,000
3									
4	*	*	*	Fodder grasses	C	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR018

Code Number : TR018 Name of Scheme : Gelong Gabus
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 4dT

Irrigable area (ha) Main : 100 Off : 26
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Less than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	A		1,770
2	*	*	*	Coconut	C	-	A		438
				Sago	C	-	A		900
3									
4	*	*	*	Fodder grasses	C	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR019

Code Number : TR019 Name of Scheme : Bukit Tumbuh
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 2d

Irrigable area (ha) Main : 50 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Less than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Groundnut	A	A	A	0.9	131
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>885</u>
2	*	*	*	<u>Durian/Mango</u>	A	A	A	<u>43.6</u>	<u>340</u>
				Guava	A	A	-	12.2	1,200
				Banana	A	A	A	<u>2.7</u>	<u>525</u>
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>88</u>
				Citrus	B	A	A	2.9	525
				<u>Pineapple</u>	A	A	A	<u>2.5</u>	<u>1,200</u>
				Coconut	A	-	A		219
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>960</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>155</u>
				Rubber	B	A	A	0.6	69
				Coffee	B	A	A	0.4	44
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>65</u>
				Clove	B	A	A	1.1	16
				Tabacco	B	A	A	0.7	450
				<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>1,000</u>
				<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>148</u>
3									
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).

* : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR020

Code Number : TR020 Name of Scheme : Banggol Pauh
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 4dT

Irrigable area (ha) Main : 20 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	A		354
2	*	*	*	Coconut	C	-	A		88
				Sago	C	-	A		180
3									
4	*	*	*	Fodder grasses	C	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR021

Code Number : TR021 Name of Scheme : Sg. Ibai
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 4dT

Irrigable area (ha) Main : 242 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	A		4,283
2	*	*	*	Coconut	C	-	A		1,060
				Sago	C	-	A		2,178
3									
4	*	*	*	Fodder grasses	C	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR022

Code Number : TR022 Name of Scheme : Chendering
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 4dT

Irrigable area (ha) Main : 29 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Less than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	A		513
2	*	*	*	Coconut	C	-	A		127
				Sago	C	-	A		261
3									
4	*	*	*	Fodder grasses	C	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR023

Code Number : TR023 Name of Scheme : Kepong
 State : Terengganu District : Kuala Terengganu
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 2d

Irrigable area (ha) Main : no data Off : no data
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : no data

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Groundnut	A	A	A	0.9	
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	
2	*	*	*	<u>Durian/Mango</u>	A	A	A	<u>43.6</u>	
				<u>Guava</u>	A	A	A	<u>12.2</u>	
				<u>Banana</u>	A	A	A	<u>2.7</u>	
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	
				Citrus	B	A	A	2.9	
				<u>Pineapple</u>	A	A	A	<u>9.5</u>	
				Coconut	A	-	A		
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	
				Rubber	B	A	A	0.6	
				Coffee	B	A	A	0.4	
				<u>Tea</u>	A	A	A	<u>10.4</u>	
				Clove	B	A	A	1.1	
				Tabacco	B	A	A	0.7	
				<u>Sugarcane</u>	A	A	A	<u>3.3</u>	
				<u>Pepper</u>	A	A	A	<u>16.4</u>	
3									
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR024

Code Number : TR024 Name of Scheme : Sg.Serai
 State : Terengganu District : Marang
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 2d

Irrigable area (ha) Main : 70 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Groundnut	A	A	A	0.9	183
				<u>Vegetable</u>	A	A	A	<u>13.8</u>	<u>1,239</u>
2	*	*	*	<u>Durian/Mango</u>	A	A	A	<u>43.6</u>	<u>476</u>
				Guava	A	A	-	12.2	1,680
				Banana	A	A	A	<u>2.7</u>	<u>735</u>
				Cashewnut	A	A	A	<u>8.7</u>	<u>122</u>
				Citrus	B	A	A	2.9	735
				Pineapple	A	A	-	9.5	1,680
				Coconut	A	-	A	-	307
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>1,344</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>218</u>
				Rubber	B	A	A	0.6	95
				Coffee	B	A	A	0.4	62
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>91</u>
				Clove	B	A	A	1.1	21
				Tabacco	B	A	A	0.7	630
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>1,400</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>206</u>				
3									
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR025

Code Number : TR025 Name of Scheme : Lubok Pandan
 State : Terengganu District : Marang
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 2d

Irrigable area (ha) Main : 46 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Groundnut	A	A	A	0.9	121
				<u>Vegetable</u>	A	A	A	13.8	814
2	*	*	*	<u>Durian/Mango</u>	A	A	A	43.6	313
				Guava	A	A	-	12.2	1,104
				Banana	A	A	A	2.7	483
				<u>Cashewnut</u>	A	A	A	8.7	81
				Citrus	B	A	A	2.9	483
				Pineapple	A	A	-	9.5	1,104
				Coconut	A	-	A		201
				<u>Oilpalm</u>	A	A	A	3.6	883
				<u>Cocoa</u>	A	A	A	2.2	142
				Rubber	B	A	A	0.6	63
				Coffee	B	A	A	0.4	40
				<u>Tea</u>	A	A	A	10.4	60
				Clove	B	A	A	1.1	14
				Tabacco	B	A	A	0.7	414
				<u>Sugarcane</u>	A	A	A	3.3	920
				<u>Pepper</u>	A	A	A	16.4	135
3									
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR026

Code Number : TR026 Name of Scheme : Bukit Jolong
 State : Terengganu District : Marang
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 3D(n)

Irrigable area (ha) Main : 24 Off : 0
 Trafficability of farm machinery : No good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	A		424
2	*	*	*	Cashewnut	C	A	A		43
				Coconut	C	-	A		105
3									
4	*	*	*						
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR027

Code Number : TR027 Name of Scheme : Rusila
 State : Terengganu District : Marang
 Type of Scheme : Controlled drainage
 Water source : Insufficient for main season paddy
 Soil series : 4dT

Irrigable area (ha) Main : 85 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Idle

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	-		1,505
2	*	*	*	Coconut	C	-	A		372
				Sago	C	-	A		765
3									
4	*	*	*	Fodder grasses	C	-	A		
5									
6									
7									
8	*	*	*		*	*	*		

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR028

Code Number : TR028 Name of Scheme : Ban Batangan
 State : Terengganu District : Marang
 Type of Scheme : Other
 Water source : Insufficient for main season paddy
 Soil series : 3D(n)

Irrigable area (ha) Main : 32 Off : 0
 Trafficability of farm machinery : No good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Vegetable	C	A	A		566
2	*	*	*	Cashewnut	C	A	A		56
				Coconut	C	-	A		140
3									
4	*	*	*						
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR029

Code Number : TR029 Name of Scheme : Paya Kemat
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2Dt

Irrigable area (ha) Main : 62 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	C	A	-		930
				Groundnut	C	A	A		162
				Vegetable	C	A	-		1,097
2	*	*	*	Durian/Mango	C	A	-	11.0	422
				Guava	C	A	-	3.1	1,488
				Banana	C	A	-	0.7	651
				Cashewnut	C	A	A		109
				Papaya	C	A	-		1,550
				Citrus	C	A	-		651
				Pineapple	C	A	-	0.5	1,488
				Coconut	A	-	A		272
				Oilpalm	C	A	A	0.9	1,190
				Cocoa	C	A	A	0.6	192
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>85</u>
				Coffee	C	A	A		55
				Tea	C	A	A		81
				Clove	C	A	A		19
				Tabacco	C	A	A		558
Sugarcane	C	A	A		1,240				
Pepper	C	A	A		183				
3	*	*	*	Maize	C	-	-		202
				Sorghum	C	-	A		233
				Ginger	C	A	-		930
				Groundnut	C	A	A		162
				Vegetable	C	A	-		1,097
4	*	*	*	Fodder grasses	C	-	A		
				Pasture	C	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*						
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR030

Code Number : TR030 Name of Scheme : Paya Diman
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Gravity
 Water source : Limited to single cropping
 Soil series : 2dt

Irrigable area (ha) Main : 122 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Less than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	1,830
				Groundnut	A	A	A	0.9	318
				Vegetable	A	A	-	13.8	2,159
2	*	*	*	Durian/Mango	C	A	-	11.0	830
				Guava	C	A	-	3.1	2,928
				Banana	C	A	-	0.7	1,281
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>215</u>
				Papaya	B	A	-	0.6	3,050
				Citrus	B	A	-	2.9	1,281
				Pineapple	A	A	-	9.5	2,928
				Coconut	A	-	A		534
				Oilpalm	C	A	A	0.9	2,342
				Cocoa	C	A	A	0.6	378
				Rubber	B	A	A	0.6	167
				Sago	C	-	A		1,098
				Coffee	A	A	A	0.7	107
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>159</u>
				Clove	B	A	A	1.1	38
Tabacco	B	A	A	0.7	1,098				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>2,440</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>360</u>				
3	*	*	*	Maize	A	-	-		397
				Sorghum	A	-	A		458
				Ginger	B	A	-	2.5	1,830
				Groundnut	A	A	A	0.9	318
				Vegetable	A	A	-	13.8	2,159
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5									
6									
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR031

Code Number : TR031 Name of Scheme : Padang Ipoh
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2dt

Irrigable area (ha) Main : 202 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Idle

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
2	*	*	*	Durian/Mango	C	A	-	11.0	1,374
				Guava	C	A	-	3.1	4,848
				Banana	C	A	-	0.7	2,121
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>356</u>
				Papaya	B	A	-	0.6	5,050
				Citrus	B	A	-	2.9	2,121
				Pineapple	A	A	-	9.5	4,848
				Coconut	A	-	A		885
				Oilpalm	C	A	A	0.9	3,878
				Cocoa	C	A	A	0.6	626
				Rubber	B	A	A	0.6	277
				Sago	C	-	A		1,818
				Coffee	A	A	A	0.7	178
				<u>Tea</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>10.4</u>	<u>263</u>
Clove	B	A	A	1.1	63				
Tabacco	B	A	A	0.7	1,818				
<u>Sugarcane</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>3.3</u>	<u>4,040</u>				
<u>Pepper</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>16.4</u>	<u>596</u>				
3	*	*	*	Maize	A	-	-		657
				Sorghum	A	-	A		758
				Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7									
8	*	*	*		*	*	*		

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR032

Code Number : TR032 Name of Scheme : Kuala Telemong
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2d

Irrigable area (ha) Main : 118 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : Idle

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Groundnut	A	A	A	0.9	309
				<u>Vegetable</u>	A	A	A	13.8	2,088
2	*	*	*	<u>Durian/Mango</u>	A	A	A	43.6	802
				<u>Guava</u>	A	A	A	12.2	2,832
				<u>Banana</u>	A	A	A	2.7	1,240
				<u>Cashewnut</u>	A	A	A	8.7	207
				Citrus	B	A	A	2.9	1,240
				<u>Pineapple</u>	A	A	A	9.5	2,832
				Coconut	A	-	A		517
				<u>Oilpalm</u>	A	A	A	3.6	2,266
				<u>Cocoa</u>	A	A	A	2.2	365
				Rubber	B	A	A	0.6	162
				Coffee	B	A	A	0.4	103
				<u>Tea</u>	A	A	A	10.4	154
				Clove	B	A	A	1.1	37
				Tabacco	B	A	A	0.7	1,062
<u>Sugarcane</u>	A	A	A	3.3	2,360				
<u>Pepper</u>	A	A	A	16.4	348				
3	*	*	*	Maize	A	-	A		383
				Sorghum	A	-	A		443
				Groundnut	A	A	A	0.9	309
				<u>Vegetable</u>	A	A	A	13.8	2,088
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	A	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR033

Code Number : TR033 Name of Scheme : Kuala Akob
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2d

Irrigable area (ha) Main : 73 Off : 40
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Groundnut	A	A	A	0.9	191
				Vegetable	A	A	-	13.8	1,292
2	*	*	*	Durian/Mango	A	A	-	43.6	496
				Guava	A	A	-	12.2	1,752
				Banana	A	A	-	2.7	767
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>128</u>
				Citrus	B	A	-	2.9	767
				Pineapple	A	A	-	9.5	1,752
				Coconut	A	-	A		320
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>1,402</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>226</u>
				Rubber	B	A	A	0.6	100
				Coffee	B	A	A	0.4	64
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>95</u>
				Clove	B	A	A	1.1	23
				Tabacco	B	A	A	0.7	657
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>1,460</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>215</u>				
3	*	*	*	Maize	A	-	-		237
				Sorghum	A	-	A		274
				Groundnut	A	A	A	0.9	191
				Vegetable	A	A	-	13.8	1,292
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR034

Code Number : TR034 Name of Scheme : Paya Rapat
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2dt

Irrigable area (ha) Main : 105 Off : 81
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	1,575
				Groundnut	A	A	A	0.9	274
				Vegetable	A	A	-	13.8	1,859
2	*	*	*	Durian/Mango	C	A	-	11.0	714
				Guava	C	A	-	3.1	2,520
				Banana	C	A	-	0.7	1,103
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>185</u>
				Papaya	B	A	-	0.6	2,625
				Citrus	B	A	-	2.9	1,103
				Pineapple	A	A	-	9.5	2,520
				Coconut	A	-	A		460
				Oilpalm	C	A	A	0.9	2,016
				Cocoa	C	A	A	0.6	326
				Rubber	B	A	A	0.6	144
				Sago	C	-	A		945
				Coffee	A	A	A	0.7	92
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>137</u>
				Clove	B	A	A	1.1	33
Tabacco	B	A	A	0.7	945				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>2,100</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>310</u>				
3	*	*	*	Maize	A	-	-		341
				Sorghum	A	-	A		394
				Ginger	B	A	-	2.5	1,575
				Groundnut	A	A	A	0.9	274
				Vegetable	A	A	-	13.8	1,859
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).

- * : Potential categories
- A : Suitable
- B : Marginal suitable due to lack of drainage facilities
- C : Marginal suitable due to limited factors other than drainage conditions
- : Not suitable

Crop Diversification Potential for TR035

Code Number : TR035 Name of Scheme : Gaung
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 1d

Irrigable area (ha) Main : 202 Off : 181
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
2	*	*	*	Durian/Mango	A	A	-	43.6	1,374
				Guava	A	A	-	12.2	4,848
				Banana	A	A	-	2.7	2,121
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>356</u>
				Papaya	B	A	-	0.6	5,050
				Citrus	A	A	-	5.7	2,121
				Pineapple	A	A	-	9.5	4,848
				Coconut	A	-	A		885
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>3,878</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>626</u>
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>277</u>
				Sago	C	-	A		1,818
				Coffee	A	A	A	0.7	178
				<u>Tea</u>	A	A	A	<u>10.4</u>	<u>263</u>
				<u>Clove</u>	A	A	A	<u>2.3</u>	<u>63</u>
<u>Tabacco</u>	A	A	A	<u>1.4</u>	<u>1,818</u>				
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>4,040</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>596</u>				
3	*	*	*	Maize	A	-	-		657
				Sorghum	A	-	A		758
				Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A		A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR036

Code Number : TR036 Name of Scheme : Peroh
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Gravity
 Water source : Sufficient for double cropping
 Soil series : 2Dt

Irrigable area (ha) Main : 50 Off : 0
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	C	A	-		750
				Groundnut	C	A	A		131
				Vegetable	C	A	-		885
2	*	*	*	Durian/Mango	C	A	-	11.0	340
				Guava	C	A	-	3.1	1,200
				Banana	C	A	-	0.7	525
				Cashewnut	C	A	A		88
				Papaya	C	A	-		1,250
				Citrus	C	A	-		525
				Pineapple	C	A	-	0.5	1,200
				Coconut	A	-	A		219
				Oilpalm	C	A	A	0.9	960
				Cocoa	C	A	A	0.6	155
				<u>Rubber</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>1.1</u>	<u>69</u>
				Coffee	C	A	A		44
				Tea	C	A	A		65
				Clove	C	A	A		16
Tabacco	C	A	A		450				
Sugarcane	C	A	A		1,000				
Pepper	C	A	A		148				
3	*	*	*	Maize	C	-	-		163
				Sorghum	C	-	A		188
				Ginger	C	A	-		750
				Groundnut	C	A	A		131
				Vegetable	C	A	-		885
4	*	*	*	Fodder grasses	C	-	A		
				Pasture	C	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*						
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).

- * : Potential categories
- A : Suitable
- B : Marginal suitable due to lack of drainage facilities
- C : Marginal suitable due to limited factors other than drainage conditions
- : Not suitable

Crop Diversification Potential for TR037

Code Number : TR037 Name of Scheme : Matang
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2Dt

Irrigable area (ha) Main : 81 Off : 81
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	C	A	-		1,215
				Groundnut	C	A	A		211
				Vegetable	C	A	-		1,434
2	*	*	*	Durian/Mango	C	A	-	11.0	551
				Guava	C	A	-	3.1	1,944
				Banana	C	A	-	0.7	851
				Cashewnut	C	A	A		143
				Papaya	C	A	-		2,025
				Citrus	C	A	-		851
				Pineapple	C	A	-	0.5	1,944
				Coconut	A	-	A		355
				Oilpalm	C	A	A	0.9	1,555
				Cocoa	C	A	A	0.6	251
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>111</u>
				Coffee	C	A	A		71
				Tea	C	A	A		105
				Clove	C	A	A		25
Tabacco	C	A	A		729				
Sugarcane	C	A	A		1,620				
Pepper	C	A	A		239				
3	*	*	*	Maize	C	-	-		263
				Sorghum	C	-	A		304
				Ginger	C	A	-		1,215
				Groundnut	C	A	A		211
				Vegetable	C	A	-		1,434
4	*	*	*	Fodder grasses	C	-	A		
				Pasture	C	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*						
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).

* : Potential categories

A : Suitable

B : Marginal suitable due to lack of drainage facilities

C : Marginal suitable due to limited factors other than drainage conditions

- : Not suitable

Crop Diversification Potential for TR038

Code Number : TR038 Name of Scheme : Langgar
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 1d

Irrigable area (ha) Main : 202 Off : 202
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
2	*	*	*	Durian/Mango	A	A	-	43.6	1,374
				Guava	A	A	-	12.2	4,848
				Banana	A	A	-	2.7	2,121
				<u>Cashewnut</u>	A	A	A	<u>8.7</u>	<u>356</u>
				Papaya	B	A	-	0.6	5,050
				Citrus	A	A	-	5.7	2,121
				Pineapple	A	A	-	9.5	4,848
				Coconut	A	-	A		885
				<u>Oilpalm</u>	A	A	A	<u>3.6</u>	<u>3,878</u>
				<u>Cocoa</u>	A	A	A	<u>2.2</u>	<u>626</u>
				<u>Rubber</u>	A	A	A	<u>1.1</u>	<u>277</u>
				Sago	C	-	A		1,818
				Coffee	A	A	A	0.7	178
				Tea	A	A	A	<u>10.4</u>	<u>263</u>
				<u>Clove</u>	A	A	A	<u>2.3</u>	<u>63</u>
				<u>Tabacco</u>	A	A	A	<u>1.4</u>	<u>1,818</u>
<u>Sugarcane</u>	A	A	A	<u>3.3</u>	<u>4,040</u>				
<u>Pepper</u>	A	A	A	<u>16.4</u>	<u>596</u>				
3	*	*	*	Maize	A	-	-		657
				Sorghum	A	-	A		758
				Ginger	B	A	-	2.5	3,030
				Groundnut	A	A	A	0.9	527
				Vegetable	A	A	-	13.8	3,575
4	*	*	*	Fodder grasses	A	-	A		
				Pasture	A	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*		A	A	A		
7	*	*	*		*	*	*		
8									

NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).
 * : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
 - : Not suitable

Crop Diversification Potential for TR039

Code Number : TR039 Name of Scheme : Tapah
 State : Terengganu District : Hulu Terengganu
 Type of Scheme : Pump
 Water source : Sufficient for double cropping
 Soil series : 2Dt

Irrigable area (ha) Main : 81 Off : 81
 Trafficability of farm machinery : Good
 Paddy planting for last 3 years : More than 50% of irrigable area

Category	Step 1	Step 2	Step 3		Step 4	Step 5	Step 6	Step 7 (B/C)	Production (ton)
1	*	*	*	Ginger	C	A	-		1,215
				Groundnut	C	A	A		211
				Vegetable	C	A	-		1,434
2	*	*	*	Durian/Mango	C	A	-	11.0	551
				Guava	C	A	-	3.1	1,944
				Banana	C	A	-	0.7	851
				Cashewnut	C	A	A		143
				Papaya	C	A	-		2,025
				Citrus	C	A	-		851
				Pineapple	C	A	-	0.5	1,944
				Coconut	A	-	A		355
				Oilpalm	C	A	A	0.9	1,555
				Cocoa	C	A	A	0.6	251
				<u>Rubber</u>	A	A	A	1.1	111
				Coffee	C	A	A		71
				Tea	C	A	A		105
Clove	C	A	A		25				
Tabacco	C	A	A		729				
Sugarcane	C	A	A		1,620				
Pepper	C	A	A		239				
3	*	*	*	Maize	C	-	-		263
				Sorghum	C	-	A		304
				Ginger	C	A	-		1,215
				Groundnut	C	A	A		211
				Vegetable	C	A	-		1,434
4	*	*	*	Fodder grasses	C	-	A		
				Pasture	C	-	A		
5	*	*	*			A	-	2.0	
6	*	*	*						
7	*	*	*		*	*	*		
8									

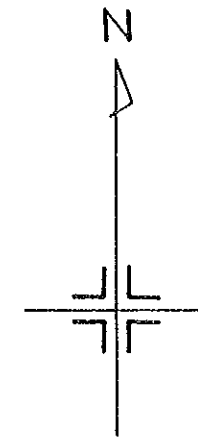
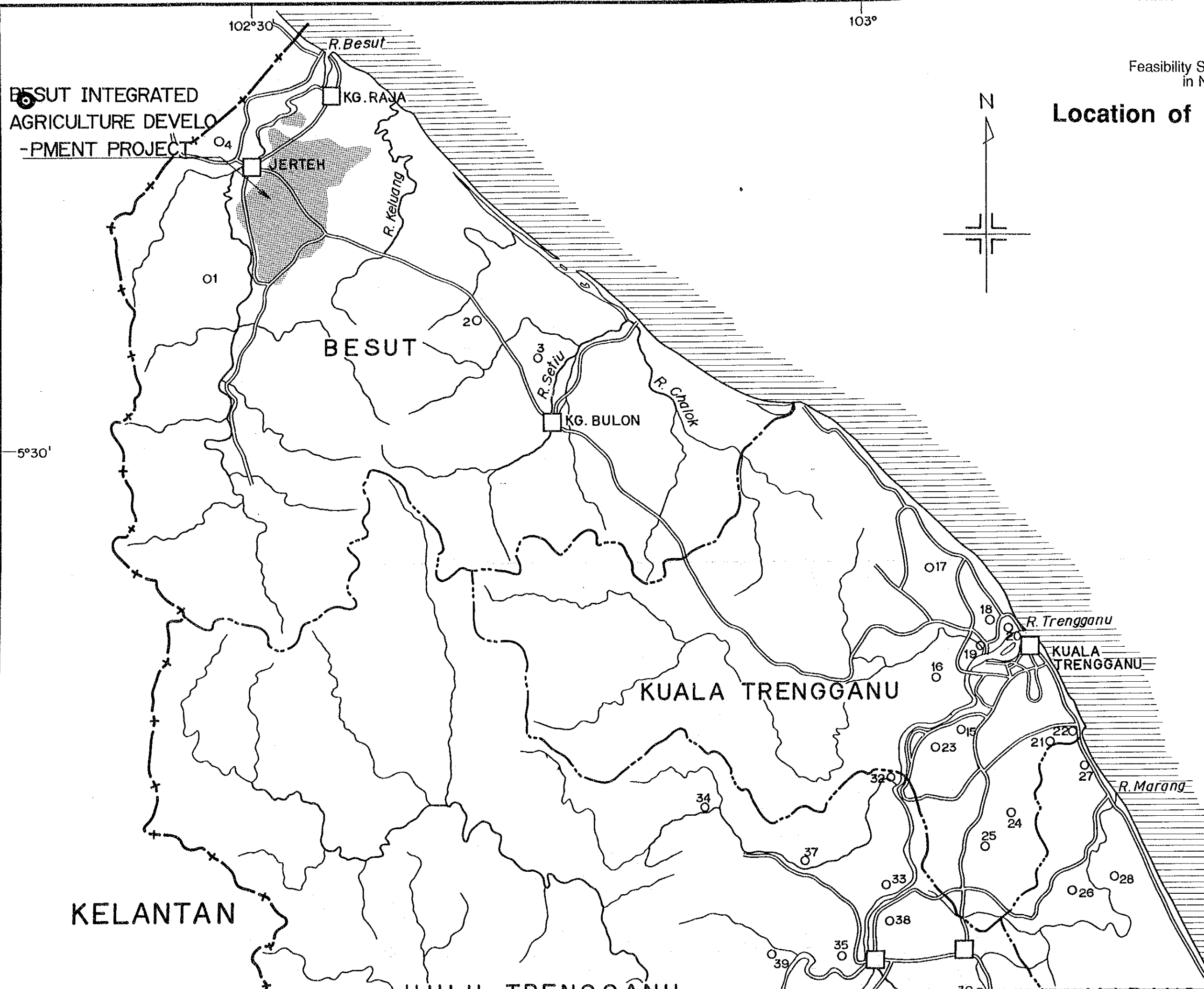
NOTE Underline : Crops with highest potential (Class A) in terms of crop suitability, profitability, marketability and invest performance (B/C > 1).

* : Potential categories
 A : Suitable
 B : Marginal suitable due to lack of drainage facilities
 C : Marginal suitable due to limited factors other than drainage conditions
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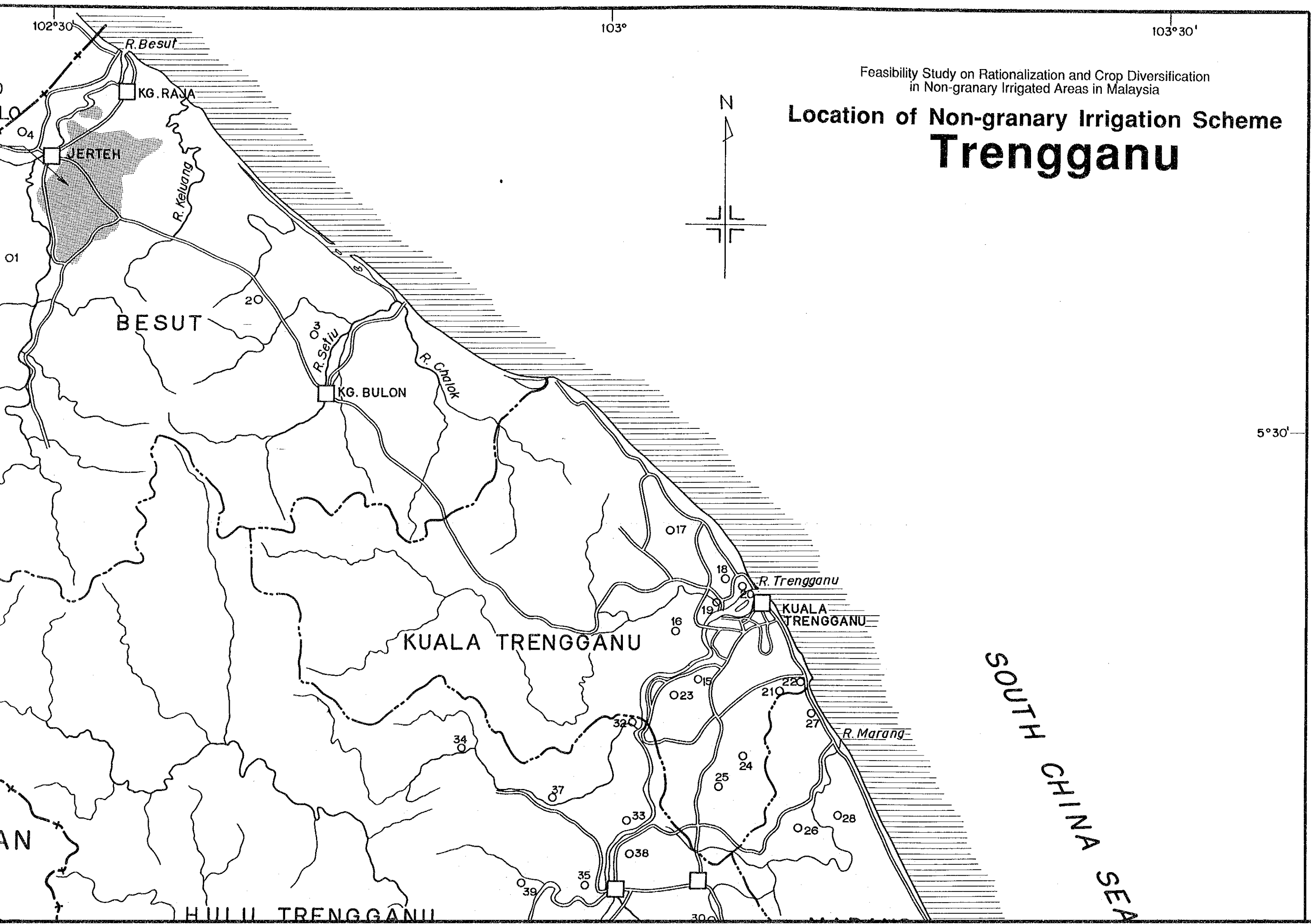
Feasibility Study on Rationalization and Crop Diversification
in Non-granary Irrigated Areas in Malaysia

Location of Non-granary Irrigation Trengganu

BESUT INTEGRATED
AGRICULTURE DEVELOPMENT
PROJECT



SOUTH CHINA SEA

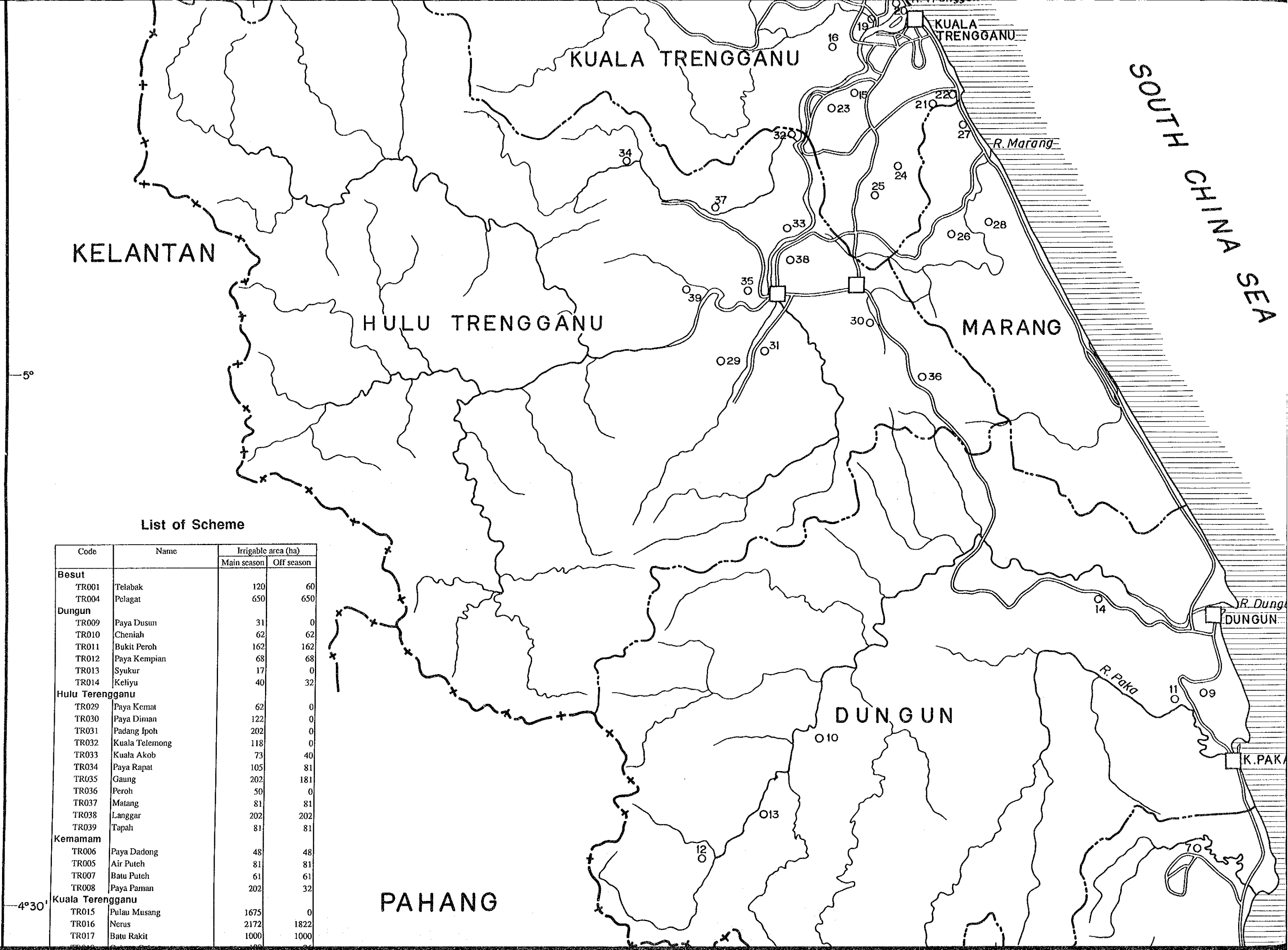


Feasibility Study on Rationalization and Crop Diversification
in Non-granary Irrigated Areas in Malaysia

Location of Non-granary Irrigation Scheme Trengganu

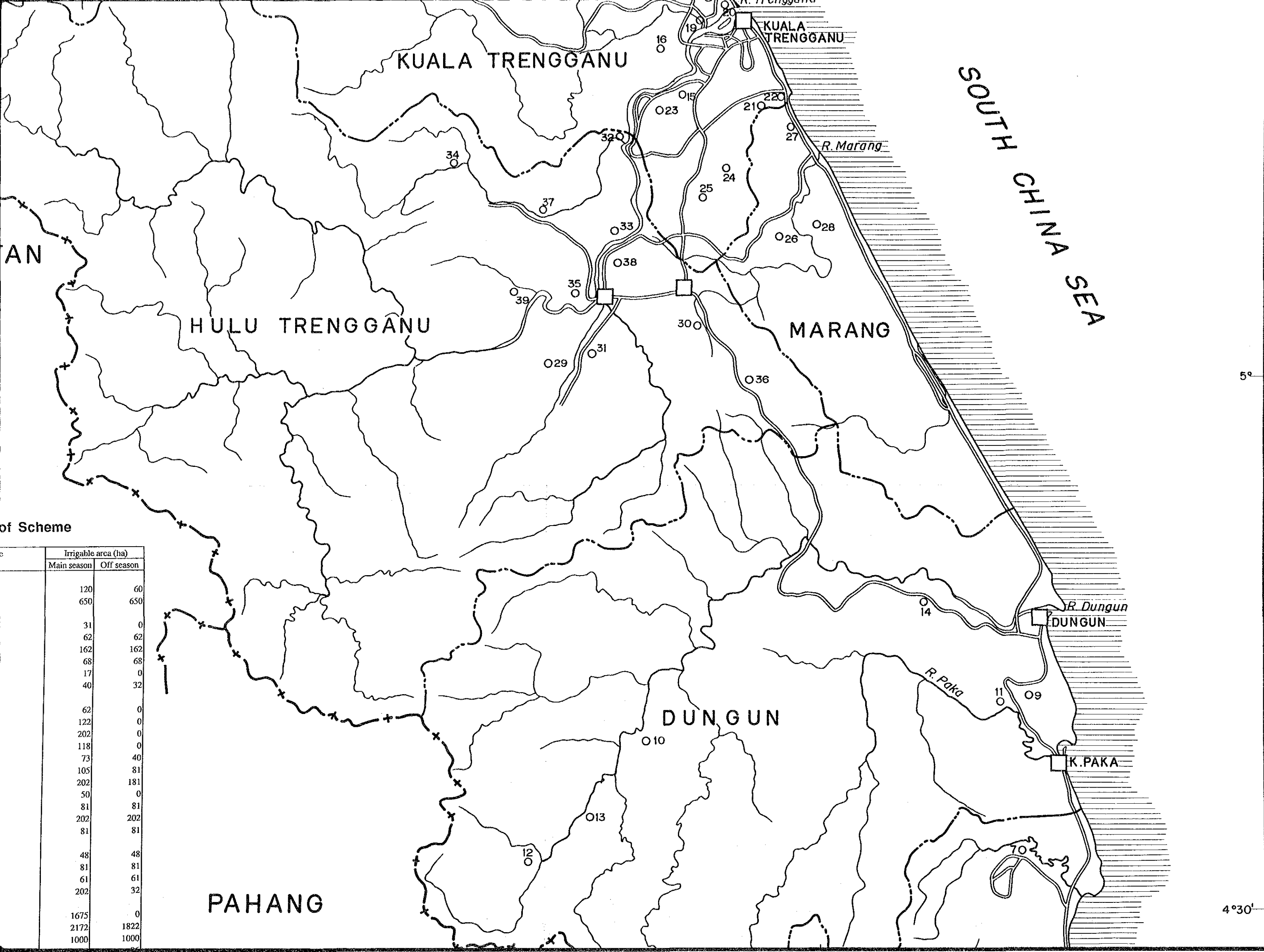
5°30'

SOUTH CHINA SEA



List of Scheme

Code	Name	Irrigable area (ha)	
		Main season	Off season
Besut			
TR001	Telabak	120	60
TR004	Pelagat	650	650
Dungun			
TR009	Paya Dusun	31	0
TR010	Cheniah	62	62
TR011	Bukit Peroh	162	162
TR012	Paya Kempian	68	68
TR013	Syukur	17	0
TR014	Keliyu	40	32
Hulu Terengganu			
TR029	Paya Kemat	62	0
TR030	Paya Diman	122	0
TR031	Padang Ipoh	202	0
TR032	Kuala Telemong	118	0
TR033	Kuala Akob	73	40
TR034	Paya Rapat	105	81
TR035	Gaung	202	181
TR036	Peroh	50	0
TR037	Matang	81	81
TR038	Langgar	202	202
TR039	Tapah	81	81
Kemamam			
TR006	Paya Dadong	48	48
TR005	Air Puteh	81	81
TR007	Batu Puteh	61	61
TR008	Paya Paman	202	32
Kuala Terengganu			
TR015	Pulau Musang	1675	0
TR016	Nerus	2172	1822
TR017	Batu Rakit	1000	1000



of Scheme

No.	Irrigable area (ha)	
	Main season	Off season
1	120	60
2	650	650
3	31	0
4	62	62
5	162	162
6	68	68
7	17	0
8	40	32
9	62	0
10	122	0
11	202	0
12	118	0
13	73	40
14	105	81
15	202	181
16	50	0
17	81	81
18	202	202
19	81	81
20	48	48
21	81	81
22	61	61
23	202	32
24	1675	0
25	2172	1822
26	1000	1000

5°

4°30'

TR011	Bukit Peroh	162	162
TR012	Paya Kempian	68	68
TR013	Syukur	17	0
TR014	Keliyu	40	32
Hulu Terengganu			
TR029	Paya Kemat	62	0
TR030	Paya Diman	122	0
TR031	Padang Ipoh	202	0
TR032	Kuala Telemong	118	0
TR033	Kuala Akob	73	40
TR034	Paya Rapat	105	81
TR035	Gaung	202	181
TR036	Peroh	50	0
TR037	Matang	81	81
TR038	Langgar	202	202
TR039	Tapah	81	81
Kemaman			
TR006	Paya Dadong	48	48
TR005	Air Puteh	81	81
TR007	Batu Puteh	61	61
TR008	Paya Paman	202	32
Kuala Terengganu			
TR015	Pulau Musang	1675	0
TR016	Nerus	2172	1822
TR017	Batu Rakit	1000	1000
TR018	Gelong Gabus	100	26
TR019	Bukit Tumbuh	50	0
TR020	Banggol Pauh	20	0
TR021	Sg. Ibai	242	0
TR022	Chenderig	29	0
TR023	Kepong	0	0
Marang			
TR024	Sg. Serai	70	0
TR025	Lubok Pandan	46	0
TR026	Bukit Jolong	24	0
TR027	Rusila	85	0
TR028	Ban Batangan	32	0
Setiu			
TR002	Bintang	51	45
TR003	Setiu	647	728

PAHANG

DUNGUN


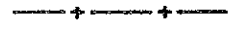
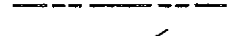
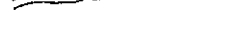




KEMAMAN

K. PAK

K. K

CHUKAI

LEGEND

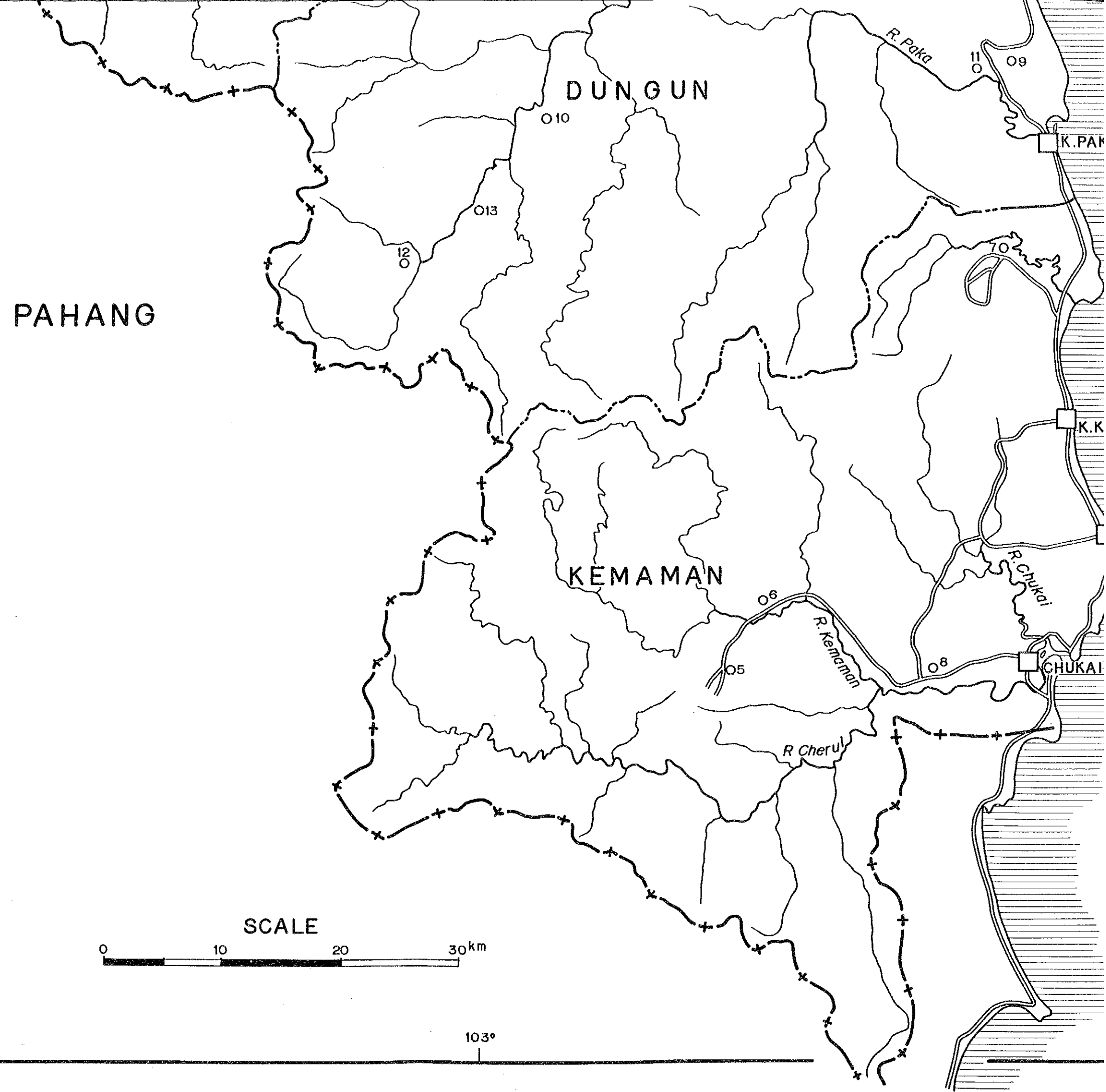
-  International Boundary
-  State Boundary
-  District Boundary
-  River
-  Main Road
-  Railway
-  City / Town
-  Irrigation Area



102°30'

103°

4°30'



162	162
68	68
17	0
40	32
62	0
122	0
202	0
118	0
73	40
105	81
202	181
50	0
81	81
202	202
81	81
48	48
81	81
61	61
202	32
1675	0
2172	1822
1000	1000
100	26
50	0
20	0
242	0
29	0
0	0
70	0
46	0
24	0
85	0
32	0
51	45
647	728

PAHANG

DUNGUN

KEMAMAN

K. PAKA

K. KEMASIK

KIJAL

CHUKAI

R. Paka

R. Kemaman

R. Cherul

R. Chukai

O10

O13

O12

O6

O5

O9

O8

4°30'

4°

102°30'

103°

103°30'

LEGEND

- International Boundary
- State Boundary
- District Boundary
- River
- Main Road
- Railway
- City / Town
- Irrigation Area

SCALE

