

GOVERNMENT OF MALAYSIA

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

Volume 2

***Crop Diversification
Evaluation Methodology***

October 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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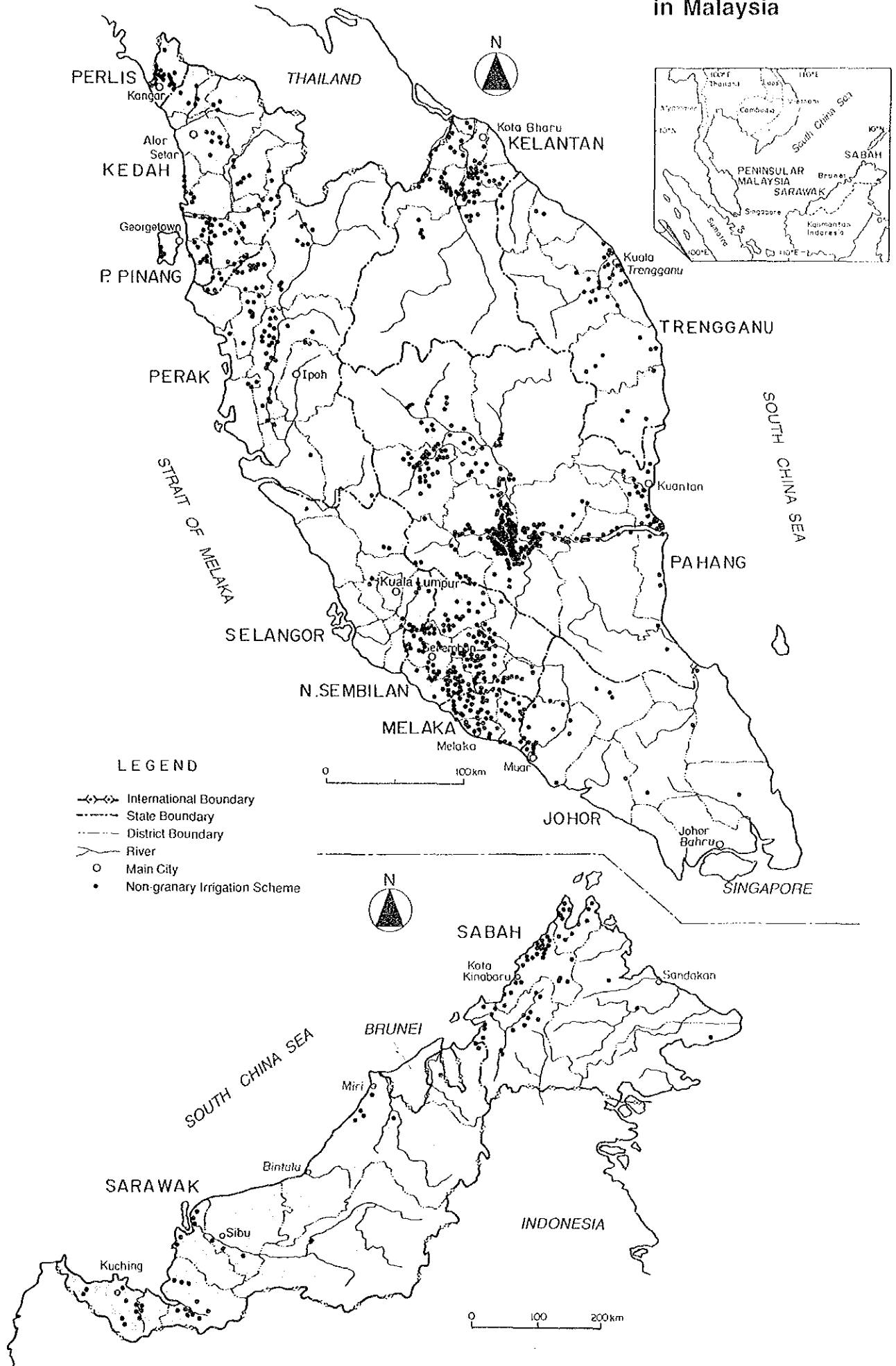
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Location of Non-granary Irrigation Schemes in Malaysia



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

Volume 2

Crop Diversification Evaluation Methodology

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1. INTRODUCTION

In Volume 2 the methodology, criteria, procedure and results of evaluation for crop diversification potential of non-granary irrigation schemes are presented with various supporting data that furnish with information required for carrying out the evaluation. The supporting data collected in 1989 and 1990 are compiled as the following six Appendices attached to this Volume 2:

- Appendix A Scheme Inventory Survey,
- Appendix B Socio-economic Sample Survey (1),
Farmers' Intention towards Crop Diversification,
- Appendix C Socio-economic Sample Survey (2),
Views of Opinion Leaders in Rural Communities,
- Appendix D Crop Suitability,
- Appendix E Crop Profitability, and
- Appendix F Crop Marketability.

2 APPROACH TO THE EVALUATION OF CROP DIVERSIFICATION POTENTIAL BY SCHEME

2.1 Scheme Inventory Survey

To reveal the present condition of non-granary irrigation schemes, the Scheme Inventory Survey was conducted to cover 924 non-granary irrigation schemes throughout the country. Data collected are present conditions of irrigation and drainage facilities, crop growing situations, marketing and farm management conditions. The results of the Survey are compiled in Appendix A and summarized below.

Of the 924 schemes, nearly half are less than 50 ha in scheme size. These however represent only about 8% of the total areas. Farm holding size is small averaging about 1 ha only.

Topographically, 70% of all the schemes are located in alluvial flats and 21% in narrow valleys as shown below. Many of schemes are interrelated by virtue of being located along and adjacent the same river and therefore share the water resources derived from the same catchment area.

<u>Type</u>	<u>No. of schemes</u>
Alluvial Flat	649
Valley Bottom	195
Terrace	12
Hilly	35
Not Confirmed	33

The soil textures in these schemes have been identified broadly as being either heavy clay, sandy clay, sandy clay loam or organic as shown below. More than 60% of the schemes have either heavy clay or clay soils. In some areas, acid sulphate problems prevail.

<u>Texture</u>	<u>No. of schemes</u>
Heavy Clay	158
Clay	411
Loam	75
Sandy, Sandy Clay,	
Sandy Clay Loam	92
Organic	71
Under Study	117

The type of scheme is either gravity, pumping, inundation, controlled drainage or a combination of these four types of system. Of the 924 non-granary irrigation schemes, 73% are either gravity or pumping or a combination of both as shown below.

<u>Type</u>	<u>No. of schemes</u>
Gravity	494
Pumping	154
Control Drainage	49
Inundation	187
Gravity/Pump	21
Gravity/Control Drainage	1
Pump/Inundation	2
Others	2
Converted	11
No record	3

For a gravity irrigation system, the main components usually comprise a headwork across the river, gated intake structure, lined canals with control structures and farm offtakes. Farm roads are located along and adjacent to main canals and drains. Due to the wide range of scheme size, canal densities vary greatly with the average between 20 to 60 m/ha. One farm offtake is provided for every 4 to 12 ha of farm. The canal design capacity ranges from 0.9 to 2.4 lit/sec/ha depending on presaturation and supplementary irrigation requirements. Canal dimensions are usually smaller in the downstream section because of the reduction in command area being served by the canal and the rotational supply system. The water level in the canal is designed for a minimum of 15 cm above the highest adjacent farm ground level. Freeboard of 15 to 22.5 cm is provided to allow for periodic and unusually high flows. For pumping schemes, one or more pumps are located at the main intake point and distribution is by

gravity canals. The pumping operation is usually over a period of 8 to 16 hours daily. In larger schemes water distribution is on a rotational basis. Water application on farm is by basin irrigation method and distribution between farms is from lot to lot.

The drainage system is designed mainly to remove excess flow and to remove flood within 72 hours for partial submergence and 48 hours for total submergence. A 3-day rainfall duration for the once in five years return period is used for section design; giving average flows of about 9.3 lit/sec. As for canals, the drain densities vary but average to between 10 to 20 m/ha and one drainage offtake serves between 4 to 12 ha farm land. A river often forms a major drainage channel for a scheme. Where necessary, flood protection bunds are constructed along river banks and perimeter of a scheme.

Inundation schemes are found mainly in the Temerloh District of the State of Pahang adjacent to the Pahang river. These are shallow basin-shaped depressions and often flooded due to river bank overflow during the main season. The systems comprise a low embankment across and at the lower part of the depression. Prior to planting, water is impounded in order to saturate the soil. By appropriate control of the gates, the water level is allowed to recede and selected paddy variety is planted in the saturated fringe of the water body. Nearly all of the inundation schemes are at present idle.

Controlled drainage schemes are constructed in a flat area with heavy soils where water resource is inadequate. Water inflows into an area and rainfall is conserved by means of control structures. Irrigation application is by backing-up water in channels and allowing it to overflow banks and into fields.

At present, 296 schemes are completely idle and another 252 schemes are not planted with paddy in more than 50% of those irrigable areas during the main season. Consequently, irrigation and drainage infrastructures for any idle area are maintained at a minimum level; basically to ensure drainage efficiency of surrounding areas. Thus, conditions of structures are in various conditions of disrepair and

any revitalization of a scheme will require certain degree of rehabilitation.

2.2 Needs for Evaluation of Crop Diversification Potential

The non-granary irrigated areas are traditionally paddy cultivation areas. Over the years, irrigation facilities were provided and have been operated and maintained to supply irrigation water to paddy farmers in these areas. Despite such structural improvement works and non-structural supports to paddy production on the subsidiary basis, many non-granary irrigation schemes are facing the problems of declining paddy production and increasing idle paddy fields.

The National Agricultural Policy (NAP) takes aim at maximizing income from agriculture through the efficient utilization of the country's resources and the revitalization of the sector's contribution to the overall economic development of the country. As envisaged in the NAP, agricultural diversification is a concrete measure to attain the above goal.

In Malaysia, agricultural diversification is defined as a widening of the range of agricultural activities with the objective of reducing a farm's dependences on one or extremely few commodities. Agricultural diversification can be classified into two types; horizontal and vertical. Horizontal diversification refers to commodity-oriented diversification and involves increasing the range of products within the agricultural farm. Vertical diversification includes the opportunities of generating added value from a given product by further processing, handling and marketing.

The diversification of agricultural production has the following four objectives:

- Widening the demand and production bases of agriculture and the economy for minimizing fluctuations in export earnings and income at national and farm levels,

- Generating new sources of growth and employment through horizontal diversification,
- Ensuring partly the attainment of food security objective through domestic production, and
- Attaining wider linkages intra-sectorally for securing balanced growth and greater employment elasticity between agriculture and industry through vertical diversification.

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. The outcome from such evaluation procedure will provide indications of the crop diversification patterns being a basis for formulating crop diversification promotion plans and programs.

2.3 Basic Considerations for Potential Evaluation

For non-paddy crops, irrigation has recently become an important input for crop production in Malaysia like irrigation for paddy. In order to accommodate for 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.

(1) Differences between paddy and non-paddy crop

Paddy is very tolerant to fully saturated or flooded condition, 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 non-granary irrigation 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.

(2) Paddy farmers' behavior

Paddy areas have a very long history of monocropping and traditions and culture have evolved around paddy. Most of paddy farmers are usually experienced and knowledgeable only in paddy cultivation. 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, the 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 Sample Survey are presented in Appendix B for farmers' intentions and Appendix C for leaders' opinions.

(3) Options for crop diversification

In deciding options for crop diversification, it is apparent that there exist 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 evaluated, and
- Category 8 : Schemes to be converted to housing/industrial and other uses.

(4) Technical requirements

In respect to the Categories 1 to 5, technical requirements are considered as follow:

Category 1 (High value crop cultivation under irrigated conditions):

Irrigation, drainage and farm road densities will invariably need to be increased for the Category 1 where high value crops such as leafy vegetables, asparagus and tobacco are recommended. This is because these crops are highly sensitive to water stresses and water logging conditions as well as being perishable. On-farm capital investment and production cost are also generally high.

The irrigation system design will need to be reviewed based on 80% rainfall probability. To cater for intermittent supply requirement, additional control structures along canals may be required. Since crop types and growth stages may differ between plots and farms, water demand at a particular time will be quite varied. To cater for this, more terminal facilities will be necessary. Tertiary canals may be constructed and complemented by field channels. Alternatively, rigid pipes or flexible hose connected to farm offtakes can be used. The available head in the canal must be checked so as to cater for hydraulic head losses in the pipes. Increase of canal water level may be accommodated by the freeboard. To a limited extent, the freeboard may be considered as a potential for additional water storage in the canal. Otherwise the bund levels will have to be increased. The use of on-farm or off-farm storage ponds will have to be considered to complement the existing system. Where possible, groundwater resources could be exploited by constructing shallow wells. Water can also be pumped from the nearest drains. Pumps are also required in order to achieve the required head and application rate for pressurized irrigation methods such as shower type sprayers, sprinklers and drips.

Drainage is an important aspect for non-paddy crops. The drainage system will need improving to minimize waterlogging conditions and flood occurrences. Drainage design criteria will have to be based on 24 hours or even less for excess water removal both for surface and subsurface water. This will mean higher density and deeper drains. Cut-off drains can be used to control inflow into the schemes and within schemes. Flood protection bunds designed for higher return intervals such as the once in 25 years or more may also be considered in the frequently inundated areas. Canal seepage flow need also be minimized to prevent waterlogging and water table rise. The drainage system as a whole will have to be also managed in such a manner so as to be able to maintain a high water table and channel storage during the off-season for improved water availability to the root zone. On-farm cultural practice such as the use of raised and broad beds can complement the drainage system.

Category 2 (Tree crops):

Basically, tree crops require relatively less intensive irrigation system. Irrigation will be necessary if yield response is directly related to water availability. The basin irrigation method can be maintained or field canals constructed along the tree rows. For fruit trees such as starfruit, drip irrigation method is becoming popular. In this case, storage and pumping requirements will need to be assessed. Water harvesting reservoirs could be considered especially for the inundation schemes where additional embankment could be constructed at the upper part of the basin.

More essential are drainage and water table control. Too high water table prevents deeper root growth causing lodging and root rot problems. Farm operations also require dry conditions for production efficiency and reduced harvesting losses. For oil palm, drains of 1 to 1.5 m sections and 10 to 20 m spacings at average have been practiced in paddy areas.

Category 3 (Paddy for the main season and non-paddy crop for the off-season):

The major concern is the choice of non-paddy crops during the off-season and available time before the on-set of the wet months for the next paddy planting season. In addition, the available period for the non-paddy crops may not be the best in terms of available water and climatic conditions such as sunshine hours, dry conditions during maturing and the on-set of wet conditions during ripening and harvesting.

Infrastructural adjustments based on specific non-paddy crops are not appropriate since paddy will still be grown. This can be achieved by maintaining water delivery rotation similar to that for rice and the flow rate based on water demand for the most common non-paddy crop being grown. Water resource reliability during the off-season is a major concern. This can be improved by incorporating storage reservoirs into the system or on farm ponds.

On-farm drainage improvement such as farm ditches and cut-off drains will be necessary. Beside solving waterlogged conditions, more efficient drainage will increase the opportunity time for the soil to dry after paddy harvesting and reduce the waiting time to start the off-season planting. The improved drainage system may also be more beneficial for paddy.

Category 4 (Livestock rearing and feeding crop):

Infrastructural adjustments for this category is minimum. Presently, the intensive livestock rearing system has not been practiced in the irrigated area, and more commonly observed in the idle schemes are the extensive livestock farming where buffaloes are left to graze freely in the open areas.

Irrigation facilities will be necessary mainly for meeting livestock water requirements but major adjustments will be necessary to convey water to common watering points for the livestock.

On farm drainage improvement will, as in the other categories, be necessary for growing crops for the use of feeding animals and providing firm and comfortable ground for animals. The required existing design capacity is to be based on the design criteria.

Category 5 (Aquaculture):

This category has not become popular in any of the non-granary irrigation schemes, but the potential still exists. The extensive system is well suited for inundation schemes with year-round available water resources since water retaining bunds and control structures are already in existence. The same system can be applied to other schemes as well by constructing low embankments across or around the scheme to retain water. Water source is the existing gravity canals which have to be operated for continuous supply in order to maintain the desired oxygen level and control toxic levels.

The most common intensive method is to breed fishes using a series of ponds at different levels. Separate canal and drain system functions to supply and remove water, respectively.

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

3.1 Selected Factors for Potential Evaluation

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 in 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.

3.1.1 Water resources availability

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

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

The detailed information on the reconfirmation of water resources availability for the respective non-irrigation schemes was presented in the Interim Report (Appendices 3 and 4) and summarized in Table 1.

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

This factor is important as the success of crop diversification plans is depended largely on farmers' willingness to participate and also their attitude and preference to move towards a more diversified cropping pattern. To judge 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 criteria established are based on the proportion of the 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 method of judgement is to identify the State in which more than half of the respondent farmers show intentions towards continuation of paddy cultivation. In addition, attention is paid to screen out the scheme with paddy cropping intensity of more than 50% as an indicator of farmers' intention on the scheme basis.

- 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 paddy 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%.

Table 2 shows State-by-State tendency on farmers' intention towards continuation of paddy cultivation. The scheme-by-scheme paddy planting condition for the last three years is shown in Table 1.

3.1.3 Land suitability for mechanized farming practices

This factor is optionally employed 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 judge 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 criteria are established taking into account soil physical characteristics among others as below.

- Schemes suitable for mechanized farming practices are expressed by 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 harvestors commonly used in Malaysia.

The detailed information is presented in Appendix D of Volume 2. The land suitability condition of each scheme is shown in Table 1.

3.1.4 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, papaya, citrus, pineapple and watermelon,

Perennial industrial crops:

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

Feeding crops:

fodder grasses and pasture.

As the basic information to judge soil suitability and limitations, soil series 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 classes 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 is as follows:

Suitable:

Class 1 soils,

Marginally suitable:

Class 2 soils and partly Class 3 soils of which limitations can be physically improved,

Very marginally suitable:

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

Not suitable:

Classes 4 and 5 soils.

After judging 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 each scheme are eliminated from a list of suitable crops identified on the basis of soil conditions. This screening is to be done as an adjustment work in the final stage of potential evaluation taking into consideration a wide range of regional climate variation.

The detailed information on soil and climate criteria, soil suitability classes of each scheme and potential crops selected from agro-climatic viewpoints is presented in Appendix D of Volume 2. The soil suitability class for each scheme is shown in Table 1.

3.1.5 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. The criteria is set up as below.

- Crops 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.

All the information is presented in Appendix E of Volume 2 and its summary is shown in Table 3.

3.1.6 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 depends 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. By referring to this guideline, the crop marketability is judged in terms of quantified market potential on the administrative district basis. The criteria are set up as below.

- Crops suitable for promoting crop diversification have less marketable volume below the local demand of a specific administrative district where one particular scheme is located as well as the demand of major markets 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 local demand in the specific administration district.

The data on market potential is compiled in Appendix F of Volume 2.

3.1.7 Investment performance with regard to crop diversification

This factor is taken into account for the purpose of judging the priority among categories and crops of which suitability to promote crop diversification are both identified. The criteria are based on economic viability which is indicated by benefit-cost ratio estimated

based on net present values with a discount rate of 10% as shown in Table E-27 of Appendix E, Volume 2.

Benefit and cost are estimated on the basis of the assumption as below.

- Cost and benefit are estimated on the unit area basis.
- Cost required for upgrading drainage and access conditions is assumed to be M\$4,300/ha for moderately well drained area with soil drainage class 1 and M\$8,600/ha for imperfect and poorly drained areas with soil drainage classes 2 and 3, respectively. Time required for constructing these on-farm service facilities is one year. These required costs are referred to the results of the Feasibility Study presented in Volume 3.
- 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. Build-up period to reach the target yields of upland crops is also assumed to be five years.

3.2 Procedure of Evaluation

3.2.1 General procedure

The potential of crop diversification for each non-granary irrigation scheme is evaluated by category based on judgements of the seven factors according to the criteria set up. The evaluation is made through the following seven stepwise procedure.

Step 1: Evaluation of 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 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 general flow of evaluation for crop diversification potential is illustrated in Fig. 1. In general, evaluation of potential for each Category starts from Step 1 and ends Step 7 scheme by scheme. As Step 3 is the optional gate to evaluate potential for the Category 6 by judging land suitability to conduct mechanized paddy cultivation, all Categories other than the Category 6 jump 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.

All the criteria are established aiming to be applied to the whole schemes throughout the country. Therefore, some of outputs from the potential evaluation need to be adjusted to local conditions specified in each scheme. In this regard, adjustment of evaluation outputs is to be made scheme by scheme after Step 7 mainly focussing upon relationship between regional climatic conditions and suitability of perennial lowland crops, regional market demand for potential non-paddy crops and variable crop yields originated from regional climatic factors.

3.2.2 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 cultivation 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 judged as impossible for promoting intensive paddy cultivation go to Step 4. To provide information on technical and economical choice of upland crops, however, other schemes also move down to Step 4 additionally.

In Step 4 after skipping Step 3, potential upland crops are firstly identified through soil-crop-suitability assessment. If there is an identified potential 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 profitable upland crops are justified through comparison with the local demand in the District where schemes are located and also that in the local marketing centers. Usually, mono-cropping of the specific upland crop is very risky from the viewpoints of crop management and marketing so that multi-cropping is indispensable measures for practicing high value upland crop cultivation. In estimating marketable quantities, however, crop production is simply obtained through multiplying the national average yield by the scheme's irrigable area for each of profitable crops.

In Step 7, economic viability is evaluated in terms of benefit-cost ratio based on net present value. Required cost for upgrading drainage conditions of paddy fields is assumed to be M\$8,600/ha.

Through the above procedure, potential crops are screened out for each scheme. These selected crops with priority order are listed up in Table 4.

3.2.3 Evaluation procedure for Category 2

In Step 1, consideration is taken only to improvement of drainage and farm access conditions in order to evaluate potential for converting paddy fields to perennial crop fields.

In Step 2, the same procedure taken for the Category 1 is applied, then entering directly to Step 4.

In Step 4, suitability of fruits and industrial tree crops is assessed from the viewpoint of soil-crop suitability relationship. 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 the local demand on the administrative district basis firstly and that 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 the Category 1 is applied. Cost required for upgrading drainage and farm access conditions is assumed to be M\$4,300/ha for such crop groups as durian, mango, guava, banana and pineapple when these are grown in

moderately well drained areas. For other cases and crops, upgrading cost is required to be M\$8,600/ha.

Adjustment is made on the basis of regional agro-climatic suitability for perennial lowland crops as described in Appendix D of Volume 2. As the Peninsular Malaysia is divided into 26 agro-ecological regions which have different advantages and disadvantages in growing perennial lowland crops, marketable perennial crops are to be adjusted to these different climatic conditions. In some States, therefore, marketable crops are to be excluded from the list of selected crops for each scheme as shown in Table 4.

3.2.4 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. If there is an identified potential 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 the Category 1.

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

In Step 7, additional investment requirement is assumed to be M\$4,300/ha. Benefit estimate and economic viability confirmation are made following the same procedure employed for the Category 1.

3.2.5 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 the Category 1.

In Step 7, additional investment cost is assumed to be M\$4,300/ha for growing animal feeding crops.

3.2.6 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, possibility of withdrawing brackish water is examined 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 the 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 the Category 1.

In Step 7, required cost for excavating fish pond is assumed to be M\$15,000/ha taking into account the cases in the Melaka IADP area. Benefit is estimated by referring to the profitability evaluation results.

3.2.7 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 judged as possible for promoting double cropping of paddy enter into the next step.

In Step 3, land suitability for performing mechanized farming practices is assessed. 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\$4,300/ha to improve on farm-service facilities matching with undertaking of mechanized farming practices.

Adjustment is made taking into account the minimum scheme size of 100 ha and the cropping intensity of the main season paddy of more than 50%.

3.2.8 Evaluation procedure for Category 7

Before entering in Step 1, schemes under operation are taken up for evaluation.

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

In Step 2, schemes shift to the next step if these are presently utilized for paddy cultivation and have no possibility of promoting crop diversification from the social viewpoint. All the schemes that pass

this step are identified as the Category 7 without further evaluation of factors in Step 3 and onward.

Adjustment is made taking into consideration the minimum scheme size of 100 ha and undertaking of paddy cultivation. In case of inundation schemes in the State of Pahang, adjustment is done based on the special criteria as shown in Fig. 2.

3.2.9 Evaluation procedure for Category 8

Prior to evaluation of Step 1, idle schemes are selected.

In Step 1, schemes with insufficient water resources throughout the year is selected. If there is a scheme that passes these two points, evaluation in Step 4 is then made.

In Step 4, schemes for which no suitable crops are identified are defined as the Category 8.

4 RESULTS OF EVALUATION

4.1 Results of Evaluation

The crop diversification potential for the 924 non-granary irrigation schemes is evaluated category by category. As a result, one or more potential categories are identified. If one scheme has only one potential category, priority is automatically given to this identified category. In case that two or more potential categories are identified, comparison is made among identified categories taking into account economic viability of each category to put priority order. The scheme given the first priorities called as "super category". Tables 5 to 8 present the State-by-State distribution of non-granary irrigation schemes with the first to fourth priorities. Table 9 indicates the potential evaluation results for the respective schemes.

4.2 Focal Points of Evaluation Results

4.2.1 Super Category

(1) Perlis

In 22 non-granary irrigation schemes covering 4,215 ha, the main season paddy cropping is carried out in the whole area, while no paddy cropping is done during the off-season due to climatic limitations. In general, beneficial farmers rely their farm income sources on paddy cultivation to the maximum extent and have strong intentions towards continuation of paddy cultivation. The Category 6, mini-granary area, is put with the first priority to 11 schemes. Also crop diversification under the Categories 1 to 3 is possible for these schemes. The super category is also given to three schemes under the Category 1, two schemes under the Category 2, five schemes under the Category 3 and one scheme under the Category 7. Therefore, it is a prerequisite to develop the off-season irrigation water source and water saving irrigation practices aiming to the increase of farm income

in the future by encouraging the off-season cropping of either paddy or high-value upland crops.

(2) Kedah

Among 75 non-granary irrigation schemes, 44 schemes are blessed with irrigation water sources throughout the year. The overall paddy cropping intensity is maintained at the level of 50% in the State. The Category 6 with the first priority is put to 11 schemes. With respect to the Category 2 especially fruit tree cultivation, a total of 21 schemes has the possibility with the first priority. With respect to irrigated upland crop cultivation, the super category is given to four schemes under the Category 1 and nine schemes under the Category 3. Taking into account aged farmers' adherence to paddy cultivation, the super category is given to 30 schemes under the Category 7.

(3) Pulau Pinang

Out of 14 non-granary irrigation schemes with a total area of 3,541 ha, the first priority is put to the Category 1 for six schemes, Category 3 for five schemes and Category 7 for three schemes.

(4) Perak

In 63 non-granary irrigation schemes, irrigated double cropping of paddy is possible in 43 schemes and actually undertaken in 5,343 ha or 42% of the total irrigable area. On the contrary, 15 schemes are completely idle and another 15 schemes are grown with the main season paddy in less than half of each irrigable area, resulting in that 39% of the total irrigable area is fallow. The first priority is given to six schemes under the Category 1, 37 schemes under the Category 2 and six schemes under the Category 3. In formulating the future utilization plan of non-granary irrigation schemes in Perak, special attention needs to be paid to integrated approach to revitalization of these idle schemes.

(5) Selangor

For 17 non-granary irrigation schemes, it is very hard to justify the necessity of carrying out intensive crop cultivation from the socio-economic conditions. The super category is put to the Category 2 for 10 schemes, while to the Category 7 for seven schemes. It is desirable to examine the future land utilization plan by means of mini-estate or commercial enterprise for schemes which have the Category 2 with the first priority.

(6) Negeri Sembilan

In 156 non-granary irrigation schemes, 43 schemes are completely idle and another 83 schemes are partly, less than half, utilized for paddy cultivation. As 140 schemes are grouped into the Category 2 with the first priority, it is needed to study effective promotion of crop diversification with establishment of an independent organization specified to this issue. Another 14 schemes are identified as the highest crop diversification potential under the Category 1. The first priority is also given to one scheme each for the Categories 6 and 7.

(7) Melaka

The target in utilizing 54 non-granary irrigation schemes covering 7,149 ha has been set up to encourage high-value crop cultivation. At present, crop diversification in Melaka shows good progress. The first priority is given to nine schemes under the Category 1, 38 schemes under the Category 2, two schemes under the Category 3 and five schemes under the Category 7.

(8) Johor

Out of 23 non-granary irrigation schemes, five schemes are idle and eight schemes are grown with paddy in less than 50% of the total irrigable areas. The first priority is put to the Category 1 for nine schemes. It is also given to five schemes under the Category 2, three

schemes under the Category 3, four schemes under the Category 6 and two schemes under the Category 7.

(9) Pahang

Among 290 non-granary irrigation schemes including 189 inundation schemes, no paddy cropping has been performed in 195 schemes for the last three years. Despite this high incidence of idle schemes and low cropping intensity of 12% for the main season, supervisory staff with annual recurrent budgets for operation and management are continuously allocated to the whole schemes. The first priority is put to the Category 1 for 77 schemes, Category 2 for 45 schemes, Category 6 for two schemes and Category 7 for 18 schemes. While, a total of 148 schemes is grouped into the Category 8 due mainly to no farm operation in 146 inundation schemes poorly maintained.

(10) Trengganu

Beneficial paddy farmers of schemes located in the northern part of the State adhere to continue paddy cultivation. Out of 39 non-granary irrigation schemes, eight schemes are grouped into the Category 6 with the first priority. Another 12 schemes are grouped into the Category 7. With regard to crop diversification, 13 schemes are grouped into the Category 2 and five schemes are recommended to be promote two-cropping system under the Category 7. There is one scheme with no possibility of utilizing paddy fields for the agricultural use.

(11) Kelantan

Out of 77 non-granary irrigation schemes, 64 schemes are grown with paddy in more than 50% of those irrigable areas. The Category 6 is put to 11 schemes with the first priority, while the Category 7 to 12 schemes. Under specific climatic features of the east coast area, high crop diversification potential can be expected by extending two-cropping system under the Category 3.

(12) Sabah

Out of 56 non-granary irrigation schemes, the off-season irrigation water is available in 45 schemes. Actual cultivation area of the off-season paddy shares only 15%. A total of 16 schemes is grouped into the Category 6 and 32 schemes into the Category 7. Another three schemes are grouped into the Category 2 and five schemes into the Category 8.

(13) Sarawak

Out of 38 non-granary irrigation schemes, 26 schemes are located in coastal swamps. It is therefore very hard to convert to other crops than paddy. The Category 7 is thus given to 37 schemes and the Category 2 to one scheme. Taking into consideration the location and topography of 26 scheme in the coastal swamps, there exist another possibility of converting paddy fields to brackish water fish ponds. A very preliminary assessment indicates that these schemes have aquaculture potential to some extent.

4.2.2 Potential Category

A total of 263 schemes is grouped into either the Category 3, the Category 6 or the Category 7 with the first priority, all being paddy-oriented farming. In order to get information on possibility of promoting crop diversification, the potential evaluation for the Categories 1 to 5 is made in each of the 216 schemes. As shown in Table 9, 179 schemes have the second priority for the Category 2, while 72 schemes under the Category 1. With provision of improved marketing services, crop diversification under the Category 1 can be expected in 128 schemes.

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in Non-granary Irrigated Areas in Malaysia*

*Vol. 2
Crop Diversification Evaluation Methodology*

Tables

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (1/42)

State : Perlis

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PR001	Ban Seberang Ramai	*	W	E	2dt
PR002	Ban Bukit Tok Poh	*s	W	E	3d(t)
PR003	Ban Wang Bintong	*	W	E	2dt/3d(t)
PR004	Tali Air Bt. Pahat Kanan	*s	A	E	2d
PR005	Sg. Siran	*	B	E	2t
PR006	Alur Baroh	*	C	E	2d/2t
PR007	Pdg. Melangit	*	B	E	1d/3c(dt)
PR008	Alor Sena	*	A	E	2d/2t
PR009	Bukit Tau	*s	B	E	2t
PR010	Kubang Badak	*s	A	E	2d/2t
PR011	Kg. Belukar	*s	A	E	3d(t)/2Dt
PR012	Kg. Darat/Tok Daboi	*	B	E	2DnT/2dt
PR013	Sg. Repoh	*	B	E	2t
PR014	Titi Tinggi	*	B	E	2dt
PR015	Pdg. Siding	*	B	E	2d/2t
PR016	Kok Klang	*s	B	E	2dt
PR017	Kuala Tunggang	*	A	E	2d/2t
PR018	Alor Melaka	*	B	E	2d/2t
PR019	Sg. Santan	*	B	E	2d/2t
PR020	Pdg. Telela	*	B	E	2d/2t
PR021	Kg. Parit	*	C	E	2DnT/2dt
PR022	Sg.Siran/Jln.Abi/Kurong Batang	*	B	E	2d/2t

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (2/42)

State : Kedah (1/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
KH001	Bandar Baharu	*	A	E	2dt
KH002	Serdang Bt. 16	*s	A	E	2Dt
KH003	Kilang Bt/Kg. Ulu	*s	B	E	2Dt
KH004	Serdang Batu 18	Xs	A	E	2Dt
KH005	Sg. Tengah	*s	A	E	2Dt
KH006	Sg. Taka	*s	A	E	2Dt
KH007	Kg. Berjaya	X	A	E	2dt
KH008	Sidam Kanan	*	A	E	2DnT/2dt
KH009	Sg. Seluang	Y	Y	E	2DnT/2dt
KH010	Ulu Mahang	*s	A	E	2Dt
KH011	Bendang Sena	*s	A	E	2DT
KH012	Jemerli	Y	Y	E	2dt/2Dt
KH013	Otak Kerbau	X	B	E	2dt
KH014	Kulim	*q	C	E	2DT
KH015	Terat Batu	*s	A	E	2Dt
KH016	Selarung Panjang	Xs	B	E	2dt/2Dt
KH017	Merbau Pulas	*s	A	E	2DT
KH018	Padang Mcha/Pagar Musch	*q	A	E	2Dt
KH019	Kg. Lobak	*s	A	E	2dt
KH020	Titi Karangan	*s	A	E	2dt/2Dt
KH021	Pulai	*q	A	E	2dt
KH022	Kg. Iboi	*q	B	E	2Dt
KH023	Kg. Tawar	*s	A	E	2Dt
KH024	Simpang Empat	*qs	A	E	2DT
KH025	Ulu Bakai	Xs	B	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *: Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (3/42)

State : Kedah (2/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
KH026	Kg. Badang	*s	A	E	3d(t)
KH027	Kg. Luar	*	B	E	2DT
KH028	Ulu Sedim/Si Puteh	*q	B	E	2Dt
KH029	Landak	*s	A	E	2Dt
KH030	Kg. Mempelam	*s	B	E	2dt
KH031	Sg. Tiak	*	B	E	2Dt
KH032	Tg. Pari	*s	B	E	2DT
KH033	Alor Sena	*s	A	E	3d(t)
KH034	Bukit Tau	Xs	B	E	2DT
KH035	Sidam Kiri	*	A	E	2Dt
KH036	Kg. Belukar	*	A	E	2dt
KH037	Sg. Gelam	*	B	E	2Dt
KH038	Sg. Repoh	*q	W	E	2d
KH039	Titi Tinggi	*q	A	E	2d
KH040	Tandop Pekan Merbok	*s	C	E	2Dt
KH041	Kota II	*	A	E	2dt
KH042	Pantai Prai/Serukam	*	A	E	2DT
KH043	Kemumbong	*s	A	E	2DT
KH044	Lubok Kiab	Xs	A	E	2DT
KH045	Kg. Parit	*	B	E	3d(T)
KH046	Tg. Sik	*s	A	E	3d(T)
KH047	Tg. Besar	*	A	E	3d(T)
KH048	Sg. Teloi	*s	A	E	3d(T)
KH049	Padang Cicak	*s	A	E	3d(T)
KH050	Sg. Cepir	X	A	E	2DT

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (4/42)

State : Kedah (3/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
KH051	Gua Ginu	*s	A	E	2t
KH052	Nawa Gajah Mati	X	A	E	2t
KH053	Binjal	*	A	E	2Dt
KH054	Lembah Bata Phase I	*	A	E	2Dt
KH055	Sg. Pering	*	A	E	2t
KH056	Che Kedo/Putat	*	A	E	2d/2t
KH057	Sg. Gelong	*	A	E	2dt/2Dt
KH058	Lembah Bata II	*	A	E	2Dt
KH059	Bukit Tau	*	B	E	2DT
KH060	Kubang Badak	*s	B	E	3d(T)
KH061	Kurong Hitam	*	A	E	2DT
KH062	Kg. Darat/Tok Daboi	X	A	E	2t
KH063	Paya Rawa I	*	A	E	2t
KH064	Titi Tinggi	*	C	E	2Dt
KH065	Sg. Lampam/Rambai	*	B	E	2Dt
KH066	Kg. Ruat	*s	B	E	2dt
KH067	Sinkir, Sg. Pial	*	C	E	2d
KH068	Bakar Bata	*s	B	E	2dt
KH069	Bakong/Lubok Boi	*	A	E	2dt
KH070	Pdg. Gaung	*	C	E	2Dt
KH071	Bukit Kemboja	*	C	E	2Dt
KH072	Pdg. Matsirat, Limbong, Raggut	*	B	E	2Dt
KH073	Terusan Seimbang Sg. Tok Peteri	*	B	E	2Dt
KH074	Kg. Kok	*s	B	E	2Dt
KH075	Pdg. Kerbau III	*	C	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (5/42)

State : Pulau Pinang

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PP001	Pinang Tunggal	*	A	E	2dt
PP002	Sg. Jarak	*	B	E	2dt/3d(t)
PP003	Tasek Gelugor	*	B	E	2dt
PP004	Jarak Tengah	*q	A	E	2dt
PP005	Kuala Tasek	*qs	A	E	2dt
PP006	Sg. Kulim	*	B	E	2d
PP007	Sg. Kulim	*	B	E	2d
PP008	Sg. Renjau	*s	A	E	2dt
PP009	Juru	*qs	B	E	2dt
PP010	Machang Bubok	*q	C	E	2dt
PP011	Tasek Junjung	*	A	E	2dt
PP012	Alma	*s	W	E	
PP017	Fasa I & IIA/IIB, Sg. Burong	*		E	
PP018	Padang Kumunting	*q		E	

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (6/42)

State : Perak (1/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PK001	Batu Kurau	*	A	E	2dt
PK002	Air Kuning	*q	A	E	2dt
PK003	Jelai dan Tambahan	*q	A	E	2dt
PK004	Pantai Besar	*s	A	E	2dt
PK005	Jemerang Setar	*	A	E	2dt
PK006	Bukit Gantang	*q	A	E	2dt
PK007	Jebong	X	C	F	2dt
PK008	Bukit Bertam	*q	A	E	2dt
PK009	Beruas/Tambahan	*q	C	E	2Dt
PK010	Dendang A.	*qs	A	E	2Dt
PK011	Dendang B	*q	B	E	2Dt
PK012	Sg. Segar	*q	B	E	3d(t)
PK013	Sg. Chop	*qs	A	E	2dt
PK014	Sg. Simpoh Kiri	*s	A	E	2dt
PK015	Sg. Rambutan	*s	B	E	2dt
PK016	Sg. Damak	*s	A	E	2dt
PK017	Sg. Berdarah	*	A	E	2dt
PK018	Sg. Nor	*	B	E	2dt
PK019	Sg. Garok	*s	B	E	2dt
PK020	Batu 3, Kg. Medan	*qs	A	E	2dt
PK021	Gua Petai	*s	A	E	2dt
PK022	Bukit Torak/Lubuk Sengga	*s	A	E	2dt
PK023	Tapah Hulu	*s	B	E	2dt
PK024	Bukit Tunggal	*q	A	E	2dt/2Dt
PK025	Belukar Hantu	*s	B	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (7/42)

State : Perak (2/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PK026	Bdg. Jeliang	*s	A	E	2dt
PK027	Ujib	Xs	A	E	2dt
PK028	Padang Rengas	X	C	E	2dt
PK029	Bdg. Senggang	*s	B/C	E	2dt
PK030	Seterus	Xs	B/C	E	2dt
PK031	Bdg. Ketiou	*qs	B	E	2dt
PK032	Beluru	*	A	E	2dt
PK033	Bendang Lempar	*	A	E	2dt
PK034	Trosor	*s	A	E	2dt
PK035	Kg. Ngor	*s	A	E	2dt
PK036	Berala	*qs	A	E	2dt
PK037	Kroh Hulu	*s	A	E	2dt
PK038	Bendang Talang	*s	A	E	2dt
PK039	Bendang Ulu Kenas	*s	A	E	2Dt
PK040	Kota Lama Kiri	*	A	E	2dt
PK041	Saiong	*	A	E	2dt
PK042	Chepias	*s	A	E	2DT
PK043	Jalong	Xs	A	E	2dt
PK044	Bendang Kuala Dal	Xs	B	E	2dt
PK045	Sauk	Xs	A	E	2dt
PK046	Lenggong	*q	C	E	2dt
PK047	Sumpitan	*	A	E	2dt
PK048	Bendang Kg. Padang Gerik	Xs	A	E	2dt
PK049	Gelok	*s	C	E	2dt
PK050	Bendang Kg. Kerunai	Xs	B	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (8/42)

State : Perak (3/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PK051	Bendang Pdg. Setang Grik	*s	A	E	2dt
PK052	Bendang Kg.Padang Kunyit Gerik	Xs	A	E	2dt
PK053	Bendang Kg.Ulu Kenderong Gerik	Xs	A	E	2DT
PK054	Bendang Kg. Bonggor Gerik	Xs	B	E	2dt
PK055	Seberang Perak Peringkat1&Tam.	*	A	E	2dt/2DT
PK056	Bota/Lambor	*	A	E	2dt/2DT
PK057	Senin	*	A	E	2Dt
PK058	Lambor kiri	*	A	E	2dt/2Dt
PK059	Parit Bukit Cupak & Merua	*q	A	E	2Dt
PK060	Changkat Jong	*	A	E	3d(t)
PK061	Ulu Kuang	Xs	C	E	2dt
PK062	Ulu Chemor	Xs	A	E	2dt
PK063	Sg. Jernang	Xs	B	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (9/42)

State : Selangor

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
SG001	Sg. Buloh	*qs	A	E	2Dt
SG002	Sg. Air Hitam	Xs	A	E	2DT
SG003	Kg. Batu 30	*s	A	E	2Dt
SG004	Kg. Kalong Tengah	*s	A	E	2Dt
SG005	Kuang	*qs	W	E	2Dt
SG006	Jalan Enam Kaki	*s	A	E	2dt/2Dt
SG007	Batu 19 3/4	Xs	A	E	2Dt
SG008	Kuala Lui	Xs	A	E	2dt/2Dt
SG009	Sesapan Bt Minangkabau	*	A	E	2dt/2Dt
SG010	Beranang II	Xs	A	E	2Dt
SG011	Bukit Kepong	*s	A	E	2dt/2Dt
SG012	Paya Lebar	Xs	A	E	2Dt
SG013	Sg. Rinching Hilir	*qs	A	E	2dt/2Dt
SG014	Kuala Pajam	*s	A	E	2dt/2Dt
SG015	Sg. Merab	*qs	A	E	2Dt
SG016	Bt. 17, Dusun Tua	Xs	A	E	2Dt
SG017	Sg. Panjang	*q	A	F	3t(d)

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (10/42)

State : Negeri Sembilan (1/7)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
NS001	Sri Menanti	*q	A	E	2dt/2Dt
NS002	Terachi Batu 14	*	A	E	2dt/2Dt
NS003	Inas	*	A	E	2Dt
NS004	Ampang Jeram	*	A	E	2Dt
NS005	Sg. Muar I & II	*	A	E	2dt/2Dt
NS006	Kuala Nuri	*q	A	E	2Dt
NS007	Gunong Pasir	*qs	A	E	2dt/2Dt
NS008	Peraku	*qs	A	E	2dt/2Dt
NS009	Sg. Pilah	*qs	A	E	2dt/2Dt
NS010	Tanjong Ipoh	*q	A	E	2dt/2Dt
NS011	Padang Biawas	*q	A	E	2dt/2Dt
NS012	Terachi Batu 17	*	A	E	2dt/2Dt
NS013	Kuala Jempol I	*q	C	E	2DnT/2dt
NS014	Kg. Ulu Parit	*qs	B	E	2dt/2DT
NS015	Kuala Jempol II	*q	C	E	2DnT
NS016	Kg. Cegor	*qs	A	E	2dt/2Dt
NS017	Galau	*q	A	E	2Dt
NS018	Serting Ilir	*q	C	E	2dt/2Dt
NS019	Ulu Pilah/Gachong	*q	C	E	2dt/2Dt
NS020	Tanjong Juan	Xs	A	E	2dt/2Dt
NS021	Ulu Inas	*s	A	E	2Dt
NS022	Kg. Tanggai I & II	*q	C	E	2dt/2Dt
NS023	Kuala Juaseh	Ys	Y	E	2Dt
NS024	Cherian	Xs	A	E	2Dt
NS025	Ulu Jempol I-V	*q	C	E	2dt/2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (11/42)

State : Negeri Sembilan (2/7)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
NS026	Selaru	*qs	A	E	2dt/2Dt
NS027	Ulu Bendol	*qs	A	E	2dt/2Dt
NS028	Pelangai I-III	*qs	A	E	2dt/2Dt
NS029	Buyau	*qs	B	E	2dt/2Dt
NS030	Kg. Nuri	*qs	C	E	2Dt
NS031	Kg. Tumang	*qs	A	E	2dt/2Dt
NS032	Kg. Gamin	Xs	A	E	2DT
NS033	Ulu Ghalib	Xs	C/D	E	2dt
NS034	Sg. Lui	Ys	Y	E	2DT
NS035	Bayai	*qs	B	E	2Dt
NS036	Ulu Bemban	Xs	C	E	2DT
NS037	Ulu Melang	*qs	C	E	2dt/3d(t)/2Dt
NS038	Air Mawang	Xs	B	E	2dt/2Dt
NS039	Rembang Panas	*qs	Y	E	2Dt
NS040	Kepis	*s	C	E	2Dt
NS041	Sg. Talan Panjang	*qs	C	E	2dt
NS042	Juaseh Tengah	*qs	Y	E	2dt/2Dt
NS043	Kg. Yu I & II	*qs	B	E	2Dt
NS044	Kg. Birah	*qs	B	E	2Dt
NS045	Anak Air Kata	*qs	B	E	2dt/2Dt
NS046	Ulu Sungkak	*qs	Y	E	2Dt
NS047	Sri Jemapoh	*qs	Y	E	2Dt
NS048	Serting Ulu Batu 43	*qs	C	E	2Dt
NS049	Ulu Punggul	*qs	A	E	2dt/2Dt
NS050	Majau	*qs	Y	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (12/42)

State : Negeri Sembilan (3/7)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
NS051	Betong	*qs	B	E	2dt/3d(t)/2Dt
NS052	Merual Jerneh	Xs	C	E	2dt
NS053	Kuala Klawang	*	A	E	2dt/2DT
NS054	Sg. Klawang	*s	A	E	2dt/2DT
NS055	Durian Gasing	*s	A	E	2DT
NS056	Ulu Klawang	Xs	B	E	2DT
NS057	Peradong	*s	C	E	2DT
NS058	Ulu Jelebu	*s	B	E	2dt/2DT
NS059	Triang Hilir	*	A	E	2DT
NS060	Sg. Jerang	*q	A	E	2DT
NS061	Kg. Gagu	*qs	B	E	2DT
NS062	Sg. Relai	*qs	B	E	2DT
NS063	Kg. Renal	Xs	A	E	2DT
NS064	Kg. Seperi	Xs	Y	E	2DT
NS065	Kg. Geylang	*qs	Y	E	2DT
NS066	Kg. Petasseh	*qs	B	E	2DT
NS067	Kg. Puom	*s	B	E	2DT
NS068	Air Baning	*qs	Y	E	2DT
NS069	Kg. Lekai	Ys	Y	E	2DT
NS070	Kg. Kemin	*qs	B	E	2DT
NS071	Rantau Pening/Solok	Xs	A	E	2DT
NS072	Pantai	Xs	A	E	2Dt
NS073	Kg. Daching	*s	A	E	2DT
NS074	Labu Bt. 10	X	A	E	2DT
NS075	Kg. Kombok	Xs	Y	E	2DT

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area.

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (13/42)

State : Negeri Sembilan (4/7)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
NS076	Kg. Mantin Dalam	*s	A	E	2DT
NS077	Batang Benar	Xs	A	E	2dt/2DT
NS078	Labu Bt.9	*s	A	E	2DT
NS079	Sg. Tarun	*qs	B	E	2DT
NS080	Kg. Chelogeh	*qs	A	E	2Dt
NS081	Batang Penar	Xs	A	E	2DT
NS082	Kayu Ara	Xs	A	E	2DT
NS083	Ulu Beranang	Xs	A	E	2DT
NS084	Kg. Lenggeng	*q	A	E	2dt/2DT
NS085	Kg. Jijan	*qs	A	E	2DT
NS086	Kg. Siliau	Xs	A	E	2DT
NS087	Labu Hilir	Xs	A	E	2DT
NS088	Kg. Sogoh	Xs	A	E	2dt
NS089	Kg. Lambar	*qs	B	E	2DT
NS090	Kg. Kering I	*qs	A	E	2DT
NS091	Labu Bt. 7 1/2	Xs	A	E	2DT
NS092	Kg. Belangan	Xs	A	E	2DT
NS093	Kg. Bemban	Xs	A	E	2DT
NS094	Kg. Gebok	Xs	A	E	2Dt
NS095	Kg. Junjun	*qs	A	E	2DT
NS096	Kg. Kering II	*qs	A	E	2Dt
NS097	Lekong Karpal	*s	A	E	2Dt
NS098	Kg. Machang Hulu	Xs	A	E	2DT
NS099	Kg. Jelatok	*qs	A	E	2Dt
NS100	Kg. Kanchong	*qs	B	E	2dt/2DT

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (14/42)

State : Negeri Sembilan (5/7)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
NS101	Solok Bangkong	Xs	A	E	2dt/2Dt
NS102	Ulu Sepri	*qs	A	E	2Dt
NS103	Tiga Nenek	*qs	A	E	2dt/2Dt
NS104	Sg. Lalah/Sg. Batu	*qs	A	E	2Dt
NS105	Gadong	*qs	A	E	2Dt
NS106	Mampong	*s	B	E	2dt/2Dt
NS107	Penajis	*qs	A	E	2dt/2Dt
NS108	Kendong I-II	*qs	A	E	2dt/2Dt
NS109	Legong Hilir	*q	A	E	2dt/2Dt
NS110	Ampang Serong	*q	A	E	2dt/2Dt
NS111	Ampang Limau	*q	A	E	2Dt
NS112	Chembong	*q	A	E	2Dt
NS113	Ulu Gaing	*qs	A	E	2dt/2Dt
NS114	Air Panas	*qs	A	E	2dt/2Dt
NS115	Kg. Pilin	*qs	A	E	2dt
NS116	Sg. Layang	*q	A	E	2dt/2Dt
NS117	Miku	Xs	Y	E	2DT
NS118	Ulu Chembong	*qs	A	E	2Dt
NS119	Kundur	Xs	A	E	2dt/2Dt
NS120	Kg. Gating	Xs	A	E	2Dt
NS121	Chengkau Ulu	Xs	A	E	2dt
NS122	Kg. Lada	Xs	A	E	2dt/2Dt
NS123	Ulu Gadong	Xs	A	E	2Dt
NS124	Semberbok	Xs	B	E	2dt/2Dt
NS125	Anak Air Tontong	*s	A	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (15/42)

State : Negeri Sembilan (6/7)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
NS126	Sg. Ibor	Xs	A	E	2Dt
NS127	Senama	Xs	A	E	2dt/2Dt
NS128	Ulu Semin	Xs	A	E	2dt/2Dt
NS129	Pilin Tengah	Xs	A	E	2dt/2Dt
NS130	Ulu Padang Besar	Xs	A	E	2dt/2Dt
NS131	Sawah Raja	Xs	A	E	2dt/2Dt
NS132	Kg. Chuai	*qs	A	E	2DT
NS133	Batang Nyamor	*qs	A	E	2Dt
NS134	Bongek	*qs	C	E	2dt/2Dt
NS135	Kundur	Xs	A	E	2dt/2Dt
NS136	Kundur Hilir	*qs	A	E	2dt/2Dt
NS137	Pulau Mampat	*qs	B	E	2Dt
NS138	Repah	Ys	Y	E	2Dt
NS139	Tampin Tengah	*s	A	E	2Dt
NS140	Ulu Repah	Ys	Y	E	2Dt
NS141	Ulu Gemencheh	Xs	A	E	2Dt
NS142	Sg. Dua	*q	A	E	2dt
NS143	Kg. Londah	*q	A	E	2dt/2Dt
NS144	Kg. Jelawai	*s	A	E	2dt
NS145	Kg. Bangkahulu	*s	A	E	2dt/2Dt
NS146	Gemencheh Lama	*q	A	E	2Dt
NS147	Kg. Pondoi	Ys	Y	E	2Dt
NS148	Sg. Salah/Sg. Jernih	*qs	B	E	2Dt
NS149	Kg. Keru	*qs	B	E	2Dt
NS150	Batang Rokan	Ys	Y	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (16/42)

State : Negeri Sembilan (7/7)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
NS151	Ulu Tebong	*qs	Y	E	2Dt
NS152	Sg. Kelamah	Xs	A	E	2dt
NS153	Jimah	Xs	A	E	2Dt
NS154	Sg. Raya	*	A	F	2dn(o)/3D(n)
NS155	Linggi	*qs	A	E	2dt/3d(t)
NS156	Tampin Kanan	Xs	A	E	2DT

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (17/42)

State : Melaka (1/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
MA001	Air Paabas	*s	B	E	2Dt
MA002	Air Hitam Lendu	Ys	Y	E	2Dt
MA003	Cerana Puteh	*qs	B	E	2dt/2Dt
MA004	Durian Daun	*s	B	E	2Dt
MA005	Kemuning	Xs	B	E	2DT
MA006	Kuala Sungga	*qs	Y	E	2Dt
MA007	Kg. Lakok, Pekan Masjid Tanah	*s	B	E	2dt/2Dt
MA008	Melaka Pindah	*	A	E	2Dt
MA009	Melekek	*s	A	E	2Dt
MA010	Masjid Tanah	*q	B	E	2Dt
MA011	Parit Melana	Xs	B	E	2Dt
MA012	Padang Sebang 1 & 11	*q	B	E	2dt/2Dt
MA013	Rantau Panjang	*s	B	E	2Dt
MA014	Ramuan Cina Besar	*q	B	E	2dt
MA015	Ramuan Cina Kechil	*s	B	E	2dt
MA016	Rembia	Xs	B	E	2Dt
MA017	Solok Melaka Pindah	*qs	B	E	2Dt
MA018	Solok Jementeng	Xs	B	E	2Dt
MA019	Simpang Empat	*q	B	E	2dt/2Dt
MA020	Solok Kemus	Xs	B	E	2Dt
MA021	Solok Padang Keladi	Xs	B	E	2Dt
MA022	Solok Duku	*qs	B	F	2dt(a)
MA023	Sg. Baru Lilir	*q	C	F	2dt(a)
MA024	Sg. Siput	*q	A	E	2dt
MA025	Sg. Buloh	*s	B	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (18/42)

State : Melaka (2/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
MA026	Tanjung Bidara	*	C	E	2dt
MA027	Bachang	*	A	F	2dt(a)
MA028	Batu Berendam	Xs	A	E	2dt/3d(t)
MA029	Durian Tunggal	Xs	W	E	2dt/3d(t)
MA030	Duyong	*q	A	F	2dt(a)
MA031	Parit China	*q	C	F	2dt(a)
MA032	Paya Rumput Alor Gajah	*qs	B	F	2dt(a)
MA033	Paya Rumput, Sungai Udang	*s	B	F	2dt(a)
MA034	Sungai Putat	*qs	B	E/F	4dt(a)/2dt(a)
MA035	Sungai Udang	*s	B	F	2dt(a)
MA036	Tangga Batu	*q	B	F	2dt(a)
MA037	Tanjung Minyak	*q	D	F	2dt(a)
MA038	Air Panas	*s	B	E	2dt/3d(t)/2Dt
MA039	Bukit Senggeh	*s	B	E	2Dt
MA040	Chabau	*s	B	E	2dt/2Dt
MA041	Chohong	*q	A	E	2Dt
MA042	Jasin 1 & 2	*	B	E	2dt/2Dt
MA043	Kemenggang	Ys	Y	E	2Dt
MA044	Lembah Nyalas	*qs	B	E	2Dt
MA045	Lubok Buaya	*s	B	E	2dt/3d(t)/2Dt
MA046	Merlimau	*	C	F	2dt(a)
MA047	Nyalas Gapis	*qs	B	E	2Dt
MA048	Parit Keliling	*qs	Y	E	2Dt
MA049	Selandar 1 & 2	*q	B	E	3d(T)/2DT
MA050	Sempang Asahan	*s	B	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1. Summary of Evaluated Factors by Non-granary Irrigation Scheme (19/42)

State : Melaka (3/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
MA051	Sempang Rim	*s	A	E	3D(T)
MA052	Tambak Merlang	*s	B	E	2Dt
MA053	Telok Rimba	*	A	E	2Dt
MA054	Umbai Serkam	*q	W	E	2dt/3t(a)/4dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (20/42)

State : Johor		Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
Code No.	Scheme				
JR001	Sg. Balang	*	A	E	2dt
JR002	Ulu Benut	*	A	E	2dt
JR003	Kahang	*q	A	E	3d(t)
JR004	Padang Endau	*q	D	E/F	2dt/3t(a)
JR005	Lukut	*s	D	E	2Dt
JR006	Sagil	*q	A	F	3t(d)
JR007	Sawah Bahru	Xs	A	E	3d(t)
JR008	Juasseh	Xs	A	E	3d(t)
JR009	Tenang	*q	A	E	3d(t)
JR010	Jementah	*q	B	E	2dt
JR011	Kebun Bahru	*	B	E	2Dt
JR012	Kesang Gate	*s	A	E	3d(t)
JR013	Tangkak	*qs	B	E	2Dt
JR014	Kesang Tasik	*	A	E	2dt
JR015	Kurnia Sakti	*s	A	E	3d(t)
JR016	Pulau Penarik	*q	A	E	3d(t)
JR017	Sg. Ring	*	D	E	2DnT
JR018	Teluk Rimba	*	A	E	2dt
JR019	Dengku	*s	B	E	2dt
JR020	Liang Batu	*qs	B	E	2dt
JR021	Serom I	Xs	A	E	2dt
JR022	Sabak Sena	Xs	A	F	2dt
JR023	Telok Bakong	Xs	A	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (21/42)

State : Pahang (1/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH001	Ampang	Xs	C**	E	3d(t)
PH002	Paya Angut	X	B**	E	3d(t)
PH003	Ara, Kerdu	Xs	A**	E	3d(t)
PH004	Angut Ulu, Jenderak	Xs	C**	E	3d(t)
PH005	Alur Lintah	Xs	C**	E	3d(t)
PH006	Atok I and II	*qs	A	E	2Dt
PH007	Ajai	Xs	C	E	2dt
PH008	Aur Gading	*s	A	E	2Dt
PH009	Bungor	Xs	A	E	3d(t)
PH010	Paya Beruas	X	D**	E	4dt
PH011	Belimbing	X	D**	E	3d(t)
PH012	Beluru	Xs	A	E	2dt
PH013	Bintang	*q	C**	E	2dt
PH014	Bintang Hulu	Xs	A**	E	2dt
PH015	Besar Tualang	X	C**	E	2dt
PH016	Busut Jin	Xs	C**	E	3d(t)
PH017	Batu Bor	X	C**	E	2dt
PH018	Bangau Parit	Xs	C**	E	2dt
PH019	Berhala Kapas	Xs	C**	E	3d(t)
PH020	Biut, Jenderak	X	C**	E	3d(t)
PH021	Paya Besar, Lipat Kajang	Xs	C**	E	3d(t)
PH022	Banir	*qs	A**	E	2dt
PH023	Besar Mengkarak	Xs	B**	E	3d(t)
PH024	Bangau	Xs	C**	E	2dt
PH025	Besar Lebak	Xs	A**	E	3d(t)

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (22/42)

State : Pahang (2/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH026	Paya Batu	*s	B**	E	2dt
PH027	Besar Bohor	X	B**	F	3d(no)
PH028	Badok	X	C**	E	2dt
PH029	Baroh	Xs	C**	E	3d(t)
PH030	Kg. Belungu	*qs	B**	E	2dt
PH031	Bakoh, Kerdau	*s	C**	E	3d(t)
PH032	Beringin	Xs	C**	E	3d(t)
PH033	Batu Hampar	*qs	C**	E	3d(t)
PH034	Betong	*q	A**	E	3d(T)
PH035	Bkt. Dinding	Xs	C**	E	3d(T)
PH036	Belimbing	Xs	C**	E	3d(t)
PH037	Batu Gajah	Xs	C**	E	3d(t)
PH038	Bharu Lama	Xs	A	E	3d(t)
PH039	Paya Bharu Stg. 1	Xs	C	E	3d(t)
PH040	Batu Talam	*qs	B	E	2dt
PH041	Bukit Gambut	Xs	C	E	2dt
PH042	Paya Budu	*qs	A	E	2Dt
PH043	Bandar	*qs	A	E	2Dt
PH044	Bapong	*s	A	E	2Dt
PH045	Paya Besar	X	W	E	2Dt
PH046	Cik Ali	*s	C**	E	3d(t)
PH047	Chempaka	*qs	B**	E	3d(t)
PH048	Cendor	Xs	C**	E	3d(t)
PH049	Chukang Paku	Xs	A**	E	2dt
PH050	Chebong	Xs	A**	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (23/42)

State : Pahang (3/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH051	Caruk Murun	Xs	C**	E	3d(t)
PH052	Chenua	*qs	A	E	2dt
PH053	Cherlang	Xs	C	E	2Dt
PH054	Chin	X	A	E	2Dt
PH055	Chemato	*qs	A	E	2Dt
PH056	Cherba	Xs	A	E	2dt
PH057	Darat Sanggang	*q	C**	E	2dt
PH058	Darat Sir Kuala/Ulu	X	C**	E	3d(t)
PH059	Dehilir	*qs	C**	E	2dt
PH060	Dedalu	Xs	C**	E	2dt
PH061	Paya Dalam	Xs	C**	E	2dt
PH062	Paya Dong/Durian Sebatang	*q	A	E	2dt
PH063	Dusun	*s	A	E	2dt
PH064	Embun	X	C**	E	3d(t)
PH065	Gunting	Xs	B**	E	2dt
PH066	Gemayah	Xs	A**	E	3d(t)
PH067	Ganchong	*	A	E	3d(t)
PH068	Gantok	Xs	C**	E	3d(t)
PH069	Guai dan Merbau	*q	C**	E	3d(t)
PH070	Gunong, Jenderak	Xs	A**	E	2dt
PH071	Gertak Keladan	Xs	C**	E	2dt
PH072	Gajah Mati, Jenderak	Xs	B**	E	3d(t)
PH073	Geduai, Jenderak	Xs	C**	E	3d(t)
PH074	Gajah Mati	Xs	B**	E	3d(t)
PH075	Paya Gintong/Sokti	*q	A	E	3d(t)

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (24/42)

State : Pahang (4/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH076	Gumai	X	W**	E	3d(t)
PH077	Gali Tengah	*q	A	E	2dt/2Dt
PH078	Hilir	*qs	A	E	2dt
PH079	Iman Sulong	*s	C**	E	3d(t)
PH080	Jerangan	Xs	B	E	3d(t)
PH081	Jaapan Keladi, Jenderak	Xs	B**	E	3d(t)
PH082	Jerangsang	X	A**	E	3d(t)
PH083	Joor	Xs	A	E	2DT
PH084	Jelutung	X	D**	E	3d(t)
PH085	Janda Baik Hilir	*q	A	E	2Dt
PH086	Kubang Karah	*q	B	E	2dt
PH087	Kampung Melayu	Xs	C**	E	3d(t)
PH088	Kinchir	Xs	C**	E	2dt
PH089	Kilang	Xs	C**	E	3d(t)
PH090	Kenalau	YXs	C**	E	2dt
PH091	Ketam, Kerbau	X	C**	E	3d(t)
PH092	Kerayong	Xs	C**	E	2dt
PH093	Ketapi, Kerbau	Xs	C**	E	2dt
PH094	Kelibang, Kerbau	Xs	A**	E	2dt
PH095	Kuin	*qs	B**	E	2dt
PH096	Kuala Triang	*qs	C**	E	3d(t)
PH097	Kepong	X	A**	E	2dt
PH098	Keladan	Xs	C**	E	2dt
PH099	Kundang	*s	C**	E	3d(t)
PH100	Karai	Xs	C**	E	3d(t)

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for mechnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (25/42)

State : Pahang (5/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH101	Kubu	Xs	B**	E	2dt
PH102	Kenalan Kecil	Xs	C**	E	3d(t)
PH103	Kangsar	*q	A	E	2dt/2DT
PH104	Kampong Baharu	*qs	A	E	2DT
PH105	Kekura	Xs	A**	E	2dt
PH106	Kuala Retang	Xs	B**	E	2dt
PH107	Kool	Xs	B**	E	3d(t)
PH108	Kening	Xs	C**	E	3d(t)
PH109	Mertau	*s	A	E	3d(t)
PH110	Krot	X	C**	E	3d(t)
PH111	Kening Seberang	Xs	C**	E	3d(t)
PH112	Kemap	*q	C	E	3d(t)
PH113	Kertam	*q	C	E	3d(t)
PH114	Kuala Merang	Xs	A	E	2Dt
PH115	Kuala Atok	*qs	Y	E	2dt
PH116	Kenong	*qs	A	E	2Dt
PH117	Kuala Keloi	*qs	A	E	2dt
PH118	Kekabu	Xs	C	E	2Dt
PH119	Kasikin	Xs	A	E	2Dt
PH120	Kadok	*s	A	E	2Dt
PH121	Kong	*s	A	E	2Dt
PH122	Keruntung	Xs	B	E	2dt
PH123	Karak Setia	*qs	W**	E	2dt
PH124	Lubok	X	D**	E	4dt
PH125	Lebak	*qs	A**	E	3d(t)

Remarks: Present land use	X; Idle paddy fields	q; planted area below 50%
	Y; Converted tree crop area	s; scheme size below 100 ha
	*; Annual crop area	(inundation scheme size below 50 ha)
Water availability	A; Sufficient	
	B; Sufficient but not enough for off season presaturation	
	C; Sufficient only for main season	
	D; Insufficient	
	W; Controlled drainage scheme and data insufficient	
	Y; Converted scheme	**; Inundation scheme
Land suitability	E; Suitable for mechanized farming	
	F; Not suitable for meachnized farming	

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (26/42)

State : Pahang (6/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH126	Lipat Kajang	*q	C**	E	3d(t)
PH127	Luas, Jenderak	*	C**	E	2dt
PH128	Lompat	Xs	C**	E	2dt
PH129	Lanjut, Lipat Kajang	Xs	C**	E	3d(t)
PH130	Luas & Tg. Batu	Xs	D**	E	2dt
PH131	Lubuk Lian	Xs	C**	E	3d(t)
PH132	Lubuk Kawan	Xs	C**	E	2dt
PH133	Lang	X	B	F	3d(no)
PH134	Lata Kasah	*qs	A	E	2DT
PH135	Lubok Payong	*qs	A	E	2dt
PH136	Lanting	X	C**	E	2d(t)
PH137	Ladang	X	D**	E	3d(t)
PH138	Lubuh	Xs	C**	E	3d(t)
PH139	Lalloh/Salak	*s	B	E	2Dt
PH140	Lallang	Xs	A	E	2dt
PH141	Lanar	Xs	A	E	2dt
PH142	Lengkong	*qs	A	E	2Dt
PH143	Lurau	Xs	A	E	2dt
PH144	Mambang	X	B**	F	2dt
PH145	Mencali/Gading	X	C**	E	4dt
PH146	Mentakab	Xs	C**	E	3d(t)
PH147	Mengkuang	*q	C**	E	3d(t)
PH148	Machang Gelap	*q	A	E	3d(t)
PH149	Mentenang	Xs	A**	E	3d(t)
PH150	Meledu	*s	A	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (27/42)

State : Pahang (7/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH151	Melatengah	Xs	A**	E	2dt
PH152	Mentiue	*s	A	E	2dt
PH153	Melan	*qs	A	E	2dt
PH154	Nyonyak	Xs	C**	E	4dt
PH155	Nawan, Jenderak	Xs	B**	E	2dt
PH156	Nyong	Xs	C**	E	2dt
PH157	Nyak Besar	X	C**	F	3d(no)
PH158	Nyak Kecil	Xs	A**	F	3d(no)
PH159	Paya Ngewin	Xs	C**	E	3d(t)
PH160	Paya Nakoh	X	B**	E	3d(t)
PH161	Pinang	*s	A	E	3d(t)
PH162	Pakoh	Xs	A	E	3d(t)
PH163	Permatang Puah	Xs	A	E	2d(t)
PH164	Pahang Tua	*	A	E	2dt/3d(t)
PH165	Pulau Jawa	X	C**	E	4dt
PH166	Padang	X	C**	E	4dt
PH167	Pasir Panjang	X	C**	F	4dt
PH168	Pelak	*s	C**	E	3d(t)
PH169	Pulau Rumput	X	C**	E	2dt
PH170	Pulau Nawar	Xs	C**	E	3d(t)
PH171	Puyu	Xs	C**	E	2dt
PH172	Pamah Songsang	Xs	C**	E	3d(t)
PH173	Padang	Xs	A**	E	3d(t)
PH174	Penak	*s	A**	E	3d(t)
PH175	Perak, Lipat Kajang	Xs	A**	E	3d(t)

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (28/42)

State : Pahang (8/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH176	Puchong	X	C**	E	3d(t)
PH177	Pamun & Sebelah	*qs	C**	E	2Dt
PH178	Pelong, Jenderak	*s	A**	E	3d(t)
PH179	Pulau Chengai, Jenderak	Xs	C**	E	3d(t)
PH180	Paya Putat	Xs	C**	E	2Dt
PH181	Puah, Jenderak	Xs	B**	E	3d(t)
PH182	Pesagi	X	D**	E	3d(t)
PH183	Pejing	X	D**	E	3d(t)
PH184	Paku	Xs	C**	E	3d(t)
PH185	Padang Tenggara	Xs	C**	E	3d(t)
PH186	Pemah Bedu	*qs	A	E	2Dt
PH187	Perangkap	*qs	A	E	2Dt
PH188	Pagak Sasak	*s	A	E	2Dt
PH189	Peling Hilir	*s	A	E	2dt
PH190	Ponsoon	*s	A	E	2Dt
PH191	Pelantar	Xs	C**	E	2dt
PH192	Rhu	Xs	B**	E	4dt
PH193	Rambutan	*qs	A**	E	3d(t)
PH194	Rumput	Xs	A**	E	3d(t)
PH195	Rambai, Jenderak	Xs	C**	E	2dt
PH196	Rantau Panjang	Xs	B**	E	2dt
PH197	Rantau Panjang	Xs	D**	E	3d(t)
PH198	Renggul	*qs	A	E	2dt
PH199	Relai	*s	A	E	2Dt
PH200	Sepat	*	C**	E	4dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (29/42)

State : Pahang (9/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH201	Soi	X	C**	F	3d(no)
PH202	Sri Damai	X	C**	E	2dt
PH203	Scrandu	X	C**	E	4dt
PH204	Salong	X	C	E	2dt
PH205	Sejabun	Xs	C**	E	3d(t)
PH206	Sungai Duri	X	W**	E	2dt
PH207	Sepayang	*	C	F	4dt
PH208	Sg. Rabbit	X	C**	E	3d(t)
PH209	Siah	Xs	B**	E	2dt
PH210	Sebelah	Xs	C**	E	3d(t)
PH211	Sok, Jenderak	X	C**	E	2dt
PH212	Sekoh, Jenderak	Xs	C**	E	3d(t)
PH213	Sg. Tuang	X	C**	E	2dt
PH214	Selindang	X	C**	E	3d(t)
PH215	Songsang	Xs	C**	E	2dt
PH216	Sg. Buloh	Xs	C**	E	2dt
PH217	Songsang	Xs	C**	E	2dt
PH218	Sesap	Xs	A**	E	2dt
PH219	Serdang Atas and Bawah	Xs	B**	E	2dt
PH220	Sg. Chengal	Xs	D	E	3d(t)
PH221	Som	*qs	A	E	2Dt
PH222	Sultanate Land	Xs	C**	E	2dt
PH223	Sungai Leng	X	D**	E	3d(t)
PH224	Sentang	Xs	W**	F	3d(n)
PH225	Suungai Pasu	Xs	Y	E	3d(t)

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (30/42)

State : Pahang (10/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH226	Sungai Tikam	*qs	A	E	2Dt
PH227	Sain	Xs	Y	E	2dt
PH228	Sengkela	Xs	A**	E	2dt
PH229	Samak/Jani	Xs	A	E	2Dt
PH230	Sepan	*s	A	E	2Dt
PH231	Sungai Beluan	Xs	A	E	2Dt
PH232	Senipa	Xs	A**	E	3d(t)
PH233	Sum-Sum	Xs	A	E	2Dt
PH234	Simpang Pelangai	*qs	A	E	2dt
PH235	Seratus Tujuh	Xs	C	E	2Dt
PH236	Tebat	X	W**	E	2dt
PH237	Tanjung Pulai	X	C**	E	2dt
PH238	Temai Hilir	X	W**	E	2dt
PH239	Telok Era	Xs	C**	E	2dt
PH240	Telok Sentang	*q	C**	E	3d(t)
PH241	Tenggoh	Xs	C**	E	3d(t)
PH242	Teratai	Xs	C**	E	3d(t)
PH243	Taram, Kerdu	X	A**	E	3d(t)
PH244	Tok Apas	Xs	C**	E	2dt
PH245	Tok Langit	Xs	B**	E	3d(t)
PH246	Terlang	Xs	A**	E	3d(t)
PH247	Tedong	Xs	C**	E	2dt
PH248	Terjun	*qs	C**	E	3d(t)
PH249	Tenggang	Xs	C**	E	3d(t)
PH250	Tetapa	X	A**	E	3d(t)

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (31/42)

State : Pahang (11/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH251	Teringgi, Jenderak	Xs	A**	E	2dt
PH252	Paya Teris	*qs	B**	E	3d(t)
PH253	Tanjung, Keladan	*qs	C**	E	3d(t)
PH254	Tambang	Xs	A**	E	2dt
PH255	Tebing Tinggi	Xs	C**	E	3d(t)
PH256	Tebing Tinggi	*qs	C**	E	3d(t)
PH257	Terpai	X	A**	E	2dt
PH258	Tengah	*qs	A	E	2Dt
PH259	Tanjong Batu	Xs	C**	E	3d(t)
PH260	Ting & Besar Kertau	X	C**	E	3d(t)
PH261	Temalir	Xs	C	E	2dt
PH262	Tat/Tersan	*qs	C	E	2dt
PH263	Tersang	*qs	A	E	2dt
PH264	Temunga	Xs	A	E	2Dt
PH265	Tanjung Putus	*qs	A	E	2dt
PH266	Terpuai	Xs	C	E	2Dt
PH267	Tampin/Kuala Kemahang	*qs	A	E	2Dt
PH268	Teris	*s	A	E	2Dt
PH269	Teka	*s	A	E	2Dt
PH270	Triang Hilir	*q	C	E	2Dt
PH271	Ubai	Xs	C**	F	4do(n)
PH272	Ulu Cheka	*q	A**	E	2Dt
PH273	Ulu Retang	Xs	A	E	2dt
PH274	Ulu Temau	Xs	A	E	2Dt
PH275	Ulu Gali	*q	B	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (32/42)

State : Pahang (12/12)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
PH276	Ulu Lepar	X	D	E	2Dt
PH277	Ulu Atok	Xs	A	E	2Dt
PH278	Ulu Sempalit	Xs	C**	E	2dt
PH279	Ulu Lallang	*qs	A	E	2Dt
PH280	Ulu Semei	Xs	C	E	2Dt
PH281	Kuala Wau/Betong	Xs	A**	E	3d(t)
PH282	Wah	Xs	C**	E	3d(t)
PH283	Nangka	X	C**	E	4dt
PH284	Baru Batu Sawar, Jenderak	Xs	C**	E	3d(t)
PH285	Nabon	Xs	C**	E	2Dt
PH286	Cagar Hutang	Xs	B**	E	4dt
PH287	Kemahang	Xs	A	E	2Dt
PH85B	Ulu Cheringging	Xs	A	E	2Dt
PH85C	Chemperoh	*qs	A	E	2dt
PH85D	Cheringging	Xs	A	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area (inundation scheme size below 50 ha)

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme **; Inundation scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (33/42)

State : Terengganu (1/2)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
TR001	Telabak	*	C	E	1d
TR002	Bintang	*s	C	E	2DT
TR003	Setiu	*	C	E	2d
TR004	Pelagat	*	B	E	2d/1d
TR005	Air Puteh	*qs	A	E	3d(T)
TR006	Paya Dadong	*s	A	E	3d(t)
TR007	Batu Puteh	Xs	A	E	3d(t)
TR008	Paya Paman	*q	A	E	2dt
TR009	Paya Dusun	*s	C	E	2dt/2Dt
TR010	Cheniah	*s	B	E	2dt
TR011	Bukit Peroh	X	A	E	2dt
TR012	Paya Kempian	*s	A	E	2dt
TR013	Syukur	*s	C	E	2dt
TR014	Keliyu	*s	A	E	2dt/3d(t)
TR015	Pulau Musang	*	A	E	2d/1d/1
TR016	Nerus	*	A	E	2d/1d
TR017	Batu Rakit	*	W	E	4DnT(c)/4dT
TR018	Gelong Gabus	*q	W	E	4dT
TR019	Bukit Tumbuh	*qs	W	E	2d
TR020	Banggol Pauh	*s	W	E	4dT
TR021	Sg. Ibai	*	W	E	4dT
TR022	Chenderig	*qs	W	E	4dT
TR023	Kepong	no data	W	E	2d
TR024	Sg. Serai	*s	W	E	2d
TR025	Lubok Pandan	*s	W	E	2d

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (34/42)

State : Terengganu (2/2)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
TR026	Bukit Jolong	*s	W	F	3D(n)
TR027	Rusila	Xs	W	E	4dT
TR028	Ban Batangan	*s	W	F	3D(n)
TR029	Paya Kemat	*s	A	E	2Dt
TR030	Paya Diman	*q	C	E	2dt
TR031	Padang Ipoh	X	A	E	2dt
TR032	Kuala Telemong	no data	A	E	2d
TR033	Kuala Akob	*s	A	E	2d
TR034	Paya Rapat	*	A	E	2dt
TR035	Gaung	*	A	E	1d
TR036	Peroh	*s	A	E	2Dt
TR037	Matang	*s	A	E	2Dt
TR038	Langgar	*	A	E	1d
TR039	Tapah	*s	A	E	2Dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (35/42)

State : Kelantan (1/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
KN001	Jegor	Xs	C	E	2DnT
KN002	R.T. Bendang Muring	*s	B	E	2dt
KN003	Danan	*s	C(A)	E	3d(t)
KN004	Batu Balai	*s	B	E	3d(t)
KN005	Padang Lindung	*s	C	E	3d(t)
KN006	Telosan Rasau	*	C	E	3d(t)
KN007	R.T. Sg. Yong	*s	B	E/F	3d(at)/3d(t)
KN008	Pertok Lama	*s	C	E	2DnT/2dt
KN009	Hilir Sat I	*	C	E	2DnT/2dt
KN010	Galang	*s	B	E	2DnT/2dt
KN011	Ulu Sat	*	C(A)	E	2DnT/2dt
KN012	Putat Mak Sari	*s	B	E	2DnT/2dt
KN013	Bagan I	*s	C	E	2DnT/2dt
KN014	Sg. Dewan	*	C	E	2DnT/2dt
KN015	Bagan II	*	B	E	2DnT/2dt
KN016	Sg. Rusa	*	C	E	2DnT/2dt
KN017	Pak Yam	*s	A	E	2DnT
KN018	Meranti	*s	W	E	3d(t)
KN019	Repek	*q	A	E	3d(t)
KN020	Sg. Pinang	*qs	A	F	3d(t)
KN021	Kubang Sawa	*s	A	E	2dt
KN022	Pasir Hor	*s	A	E	2d
KN023	Bkt. Jering	*qs	A	E	2DnT
KN024	Jerimbong	*s	A	E	2DnT
KN025	Kuala Balah	*qs	A	E	2DnT

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (36/42)

State : Kelantan (2/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
KN026	Lubok Bongor	*s	A	E	2DnT
KN027	Rengas	*s	C	E	2DnT/2dt
KN028	R.T. Sg. Kenor	*s	A	E	2DnT/2dt
KN029	R.T. Keluat	*s	C	E	2DnT/2dt
KN030	Hilir Sat II	*	B	E	3d(t)
KN031	Sg. Labok	*	C	E	3d(t)
KN032	Bagan III	*	B	E	2d
KN033	Pulai Chondong	*	C	E	2dt
KN034	Lubok Awah	*s	A	E	2dt
KN035	R.T. Bedal	*qs	A	E	2dt
KN036	R.T. Enggong	*s	C	E	2dt
KN037	R.T. Lapan Agor	*s	C	E	2dt
KN038	Rantau Panjang I	*	C	E	3d(t)
KN039	Serdang	*	A	E	2d
KN040	Gual Ipoh	*qs	C	E	2dt
KN041	R.T. Air Cina Kelubi	*s	C	E	2DnT
KN042	Nibong	Xs	A	E	2DT
KN043	R.T. Blok Ulu Kusial	*s	B	E	2dt
KN044	R.T. Gelugor	*s	C	E	2dt
KN045	Lawang Air Batu & Kelisar	*	B	E	2Dt
KN046	R.T. Lubok Berangan	*	B	E	2dt
KN047	Ternang Ulu	*s	C	E	2dt
KN048	Panjang	*s	A	E	2dt
KN049	Gebok	*s	B	E	2dt
KN050	Jelakong	*s	C	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (37/42)

State : Kelantan (3/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
KN051	Banjar Parah	*	A	E	2dt
KN052	Rawa Bechah Laut	*s	A	E	2dt
KN053	Air Lanas	*q	B	E	2dt
KN054	Bdg. Paku	Xs	A	E	2dt
KN055	Bujung Gertak Serong	Xs	A	E	2dt
KN056	Rambai	*s	A	E	2dt
KN057	Permatang Sungkai	*s	C	E	3d(t)
KN058	Bdg. Kamal	*s	C	E	3d(t)
KN059	Bdg. Bukit Merbau	*s	C	E	3d(t)
KN060	Pertok I	*s	C	E	2dt
KN061	Pertok II	*s	A	E	2dt
KN062	Pertok III	*s	B	E	2dt
KN063	Mas Ulu	*s	C	E	2dt
KN064	Tualang Kelikir	*s	C	E	2dt
KN065	Suda	*	C	E	2dt
KN066	Gaung	*s	C	E	2dt
KN067	Che Wa	*s	C	E	2dt
KN068	Bechah Pauh	*	C	E	2dt
KN069	Batu Pahat	*s	C	E	3d(t)
KN070	Bdg. Ujit	*s	C	E	2dt
KN071	Bakat I	*	A	E	3d(t)
KN072	Bdg. Senor	*	A	E	3d(t)
KN073	Bdg. Pauh	*s	W	E	2d
KN074	Bdg. Bukit Cina	*q	C	E	2d/1d/1
KN075	Kok Keli	X	C	E	2dt
KN076	Joh	*	A	E	3d(t)
KN077	Panggong Dalu	*s	C	E	2dt

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (38/42)

State : Sabah (1/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
SA001	Tempasuk North	*	A		4fw
SA002	Tempasuk South	*	A		4fw
SA003	Kawang-Kawang/Pandasan	*s	A		4fw
SA004	Tamu Darat	*	A		4ws
SA005	Tambulian Laut	*	A		3wi
SA006	Jawi Jawi	*	A		4fw
SA007	Lubok Moyoh	*s	A		4fw
SA008	Gaur	*s	A		4ws
SA009	Tambulian Ulu	*s	A		3wi
SA010	Tambilaung	*s	A		4fw
SA011	Pekan Kota Belud	*s	A		3wi
SA012	Bingkor	*	A		3w
SA013	Tambunan	*q	A		3w
SA014	Lagut Sebrang	*q	A		3wi
SA015	Apin-Apin	*	A		3w
SA016	Transpegalan Phase I	*	A		3w
SA017	Kuala Tomani	*	A		3wi
SA018	Tulid	*s	A		3wi
SA019	Biah	*s	B		4fm
SA020	Nambayan	*s	A		3w
SA021	Marais	*s	A		3wi
SA022	Tandek	*q	A		3wi
SA023	Kota Marudu	*	A		3wi
SA024	Timbang Batu	*q	W		3wi
SA025	Membakut	*	A		3wi

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (39/42)

State : Sabah (2/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
SA026	Sindumin	*	A		4fw
SA027	Tunggul Tinggi	X	A		4fw
SA028	Bundu	X	W		5sa
SA029	Limbawang	Xs	A		3wi
SA030	Pulaimanang	*qs	A		4fw
SA031	Lingkungan	*s	W		4fw
SA032	Papar/Benoni	*	A		4fw
SA033	Bongawan	*	A		4fw
SA034	Tuaran I	*	A		3wi
SA035	Tuaran II	*	A		3wi
SA036	Bantayan	*	A		3wi
SA037	Penampang	*	A		4fw
SA038	Ramaya	*	B		4fw
SA039	Merungin	*	A		3wi
SA040	Kimolohing	*	A		3wi
SA041	Sinarul	*	A		3wi
SA042	Nalapak	Xs	A		3wi
SA043	Trusan Sapi	Xs	A		3w
SA044	Bukit Garam	Xs	A		4fw
SA045	Ulu Tungku	Xs	A		3wi
SA046	Pitas Hilir	*	A		3wi
SA047	Bawing	*q	W		5sa
SA048	Sikuati	*s	A		4fw
SA049	Liu	*qs	A		5sa
SA050	Torongkongan	Xs	W		5sa

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (40/42)

State : Sabah (3/3)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
SA051	Dampirit	*s	A		5sa
SA052	Rokom	*s	W		3wi
SA053	Buanog	*s	A		3wi
SA054	Suangpai	*s	W		4fw
SA055	Kawang Kawang/Bugaron	*qs			4fw
SA056	Sekoli	*s			4fw

Remarks: Present land use	X; Idle paddy fields Y; Converted tree crop area *; Annual crop area	q; planted area below 50% s; scheme size below 100 ha
Water availability	A; Sufficient B; Sufficient but not enough for off season presaturation C; Sufficient only for main season D; Insufficient W; Controlled drainage scheme and data insufficient Y; Converted scheme	
Land suitability	E; Suitable for mechanized farming F; Not suitable for meachnized farming	

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (41/42)

State : Sarawak (1/2)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
SK001	Bako	*q	W		4ws
SK002	Kali Kaba	*q	W		05go
SK003	Lubok Nibong	*	W		5sa
SK004	Sebubok Engkala	*	W		05go
SK005	Skrang	*s	W		05go
SK006	Tg. Bijat	*	W		05go
SK007	Tg. Saduru	*	W		05go
SK008	Tg. Sebuket	*	W		05go
SK009	Lebaan Bawang Assan	*q	W		05go
SK010	Bungai Mummon	*q	W		5sa
SK011	Pujut Lopeng	X	W		4fw
SK012	Daro Padi	*q	W		04gf
SK013	Paloh Bangau	*q	W		04gf
SK014	Loba Balu	*	W		4fw
SK015	Daro Pilot	*q	W		05go
SK016	Sadong/Krang	*q	W		05go
SK017	Mid-Sadong, Stage I	*	W		04gf/05go
SK018	Mid-Sadong, Stage II	*s	W		05go
SK019	Mid-Sadong, Stage III	*s	W		04gf/05go
SK020	Banting	*	W		05go
SK021	Benawa	*q	A		05go
SK022	Nanga Merit	*q	A		3wi
SK023	Pandaruan	*q	A		05go
SK024	Paya Selanyau I	*	A		04gf
SK025	Paya Selanyau II	*q	A		05go

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 1 Summary of Evaluated Factors by Non-granary Irrigation Scheme (42/42)

State : Sarawak (2/2)

Code No.	Scheme	Present Land Use	Water Availability	Land Suitability	Soil Suitability Class
SK026	Paya Payang	*qs	A		3wi
SK027	Sg. Renan	*q	A		3wi/05go
SK028	Tg. Purun	*	A		3wi
SK029	Entebu Kupang	*q	W		04gf
SK030	Lubuk Buntin	*q	W		05go
SK031	Merapok	*q	A		04ga
SK032	Sg. Entulang	*	W		05go
SK033	Sg. Gran	*q	W		3wi/04gf
SK034	Sg. Semalau	*q	W		4fw
SK035	Sg. Sunga	*q	A		3wi/05go
SK036	Lower Samarahan	*q	D		3wi
SK037	Sebandi	*s	W		3wi
SK038	Sekuduk/Chupak	*	W		3wi

Remarks: Present land use X; Idle paddy fields q; planted area below 50%
 Y; Converted tree crop area s; scheme size below 100 ha
 *; Annual crop area

Water availability A; Sufficient
 B; Sufficient but not enough for off season presaturation
 C; Sufficient only for main season
 D; Insufficient
 W; Controlled drainage scheme and data insufficient
 Y; Converted scheme

Land suitability E; Suitable for mechanized farming
 F; Not suitable for meachnized farming

Source: JICA, Scheme Inventory Survey, 1989

Table 2 State-by-State Tendency of Farmers Intention toward Continuation of Paddy Cultivation

State	No. of Respondents	Intention Continuation		Intention to Diversification		No Idea	
		No.	%	No.	%	No.	%
Perlis	235	180	76.6	53	22.6	2	0.8
Kedah	642	541	84.3	94	14.6	7	1.1
P. Pinang	60	34	56.7	11	18.3	15	25.0
Perak	309	228	73.8	66	21.4	15	4.8
Selangor	35	27	77.1	7	20.0	1	2.9
N. Sembilan	341	71	20.8	96	28.2	174	51.0
Melaka	157	48	30.6	90	57.3	19	12.1
Johor	26	9	34.6	5	19.2	12	46.2
Pahang	622	424	68.2	142	22.8	56	9.0
Trengganu	256	195	76.2	57	22.3	4	1.5
Kelantan	275	123	44.7	144	52.4	8	2.9
Sabah	259	239	92.3	9	3.5	11	4.2
Sarawak	54	11	20.4	12	22.2	31	57.4
Total	3,271	2,130	65.1	786	24.0	355	10.9

Source: JICA Socio-economic Sample Survey, 1989

Table 3 Crop Profitability

Crop Group	Crop	Annual Profitability (M\$/ha)	Labor Productivity (M\$/manday)
Fruits			
1.	Durian	77,396	50.8
7.	Guava	33,456	44.7
8.	Banana	3,108	13.9
13.	Papaya	5,778	17.2
15.	Mandarin orange	168,186	201.7
21.	Pineapple	3,879	15.3
28.	Watermelon	2,746	30.5
Industrial crops			
2.	Coconut	3,603	13.0
3.	Oil palm	14,637	585.5
4.	Cocoa	39,697	145.9
5.	Rubber	19,610	316.3
6.	Sago palm	213	3.2
9.	Cashewnut	41,584	28.1
10.	Coffee	45,780	18.1
11.	Tea	2,976	0.3
12.	Clove	50,944	10.1
14.	Tobacco	1,935	6.2
17.	Sugarcane	1,726	6.9
20.	Pepper	49,729	9.0
Vegetables			
16.	Ginger	3,838	14.6
22.	Groundnut	451	4.5
23.	Vegetable (Cabbage)	13,330	72.4
Food Crops			
24.	Wet paddy		
	Traditional	1,850	24.0
	Mechanized	2,100	38.2
18.	Maize (fresh)	950	18.6
19.	Sorghum	-410	-7.6
Feed crop			
25.	Maize (grain)	-624	-12.2
Freshwater fish		13,850	7.5

Source: Guideline on Economic Viability of Selected Crops, MOA, 1989

Table 4 Priority Order of Selected Crops for Each Scheme (1/42)

State : Perlis

Code No.	Scheme	Annual Crops	Perennial Crops
PR001	Ban Seberang Ramai	VG*	CN, SC
PR002	Ban Bukit Tok Poh	VG	
PR003	Ban Wang Bintong	VG	CN, SC
PR004	Tali Air Bt. Pahat Kanan	DP, VG	DM, CN, SC, CR, PL*
PR005	Sg. Siran	DP, VG, GG*	DM, CN, SC, CR*, PL*
PR006	Alur Baroh	VG	CN, SC, DM*, PL*
PR007	Pdg. Melangit	DP, VG	DM, CN, SC, CR*, PL*
PR008	Alor Sena	DP, VG, GG*	DM, CN, CR, SC, PL*
PR009	Bukit Tau	DP, VG, GG*	DM, CN, CR, SC, PL*
PR010	Kubang Badak	DP, VG	DM, PL, CN, SC, CR
PR011	Kg. Belukar	DP, VG	
PR012	Kg. Darat/Tok Daboi	SP	
PR013	Sg. Repoh	DP, VG*, GG*	CN, SC, CR*, PL*
PR014	Titi Tinggi	DP, VG, GG*	DM, CN, SC, PL*
PR015	Pdg. Siding	DP, VG*	CN, SC, DM*, PL*
PR016	Kok Klang	DP, VG	DM, CN, SC, CR, PL*
PR017	Kuala Tunggang	DP, VG	DM, CN, SC, PL*
PR018	Alor Melaka	DP, VG	CN, SC, DM*, PL*
PR019	Sg. Santan	DP, VG*	CN, SC, DM*, PL*
PR020	Pdg. Telela	DP, VG*	CN, SC, DM*, PL*
PR021	Kg. Parit		DM
PR022	Sg. Siran/Jln. Abi/Kurong Batang	DP, VG	DM, CN, SC, CR, PL*

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

CN; Cashewnut

CR; Citrus

PL; Pineapple

SC; Sugarcane

Table 4 Priority Order of Selected Crops for Each Scheme (2/42)

State : Kedah (1/3)

Code No.	Scheme	Annual Crops	Perennial Crops
KH001	Bandar Baharu	DP, VG*, GG*	CN, SC, DM*, PL*
KH002	Serdang Bt. 16	SP	DM, RB
KH003	Kilang Bt/Kg. Ulu	SP	DM, RB, FC
KH004	Serdang Batu 18		DM, RB, FC
KH005	Sg. Tengas	SP	DM, RB, FC
KH006	Sg. Taka	SP	RB, DM*
KH007	Kg. Berjaya	SP, VG*, GG*	CN, SC, PL*, CR*
KH008	Sidam Kanan	SP	DM*
KH009	Sg. Seluang		OP
KH010	Ulu Mahang	SP	RB, DM*
KH011	Bendang Sena	SP	RB, DM*, FC
KH012	Jemerli		OP
KH013	Otak Kerbau	VG, GG*	CN, SC, PL*, CR*
KH014	Kulim	SP	RB, DM*
KH015	Terat Batu	SP	RB, DM*
KH016	Selarung Panjang	VG, GG*	CN, SC, PL*, CR*, FC
KH017	Merbau Pulas	SP	RB, DM*
KH018	Padang Meha/Pagar Musch	SP	RB, DM*
KH019	Kg. Lobak	VG	CN, SC, PL*, CR*
KH020	Titi Karang	SP	RB, DM*
KH021	Pulai	DP, VG, GG*	CN, SC, DM*, PL*, CR*
KH022	Kg. Iboi	SP	RB, DM*
KH023	Kg. Tawar	SP	DM, RB, FC
KH024	Simpang Empat	SP	DM, RB, FC
KH025	Ulu Bakai	VG, GG*	DM, CN, SC, CR, PL*

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

CN; Cashewnut

CR; Citrus

PL; Pineapple

OP; Oil palm

RB; Rubber

TB; Tobacco

SC; Sugarcane

Table 4 Priority Order of Selected Crops for Each Scheme (3/42)

State : Kedah (2/3)

Code No.	Scheme	Annual Crops	Perennial Crops
KH026	Kg. Badang	SP, VG	
KH027	Kg. Luar	SP	RB, DM*
KH028	Ulu Sedim/Si Puteh	SP	DM, RB
KH029	Landak	SP	DM, RB
KH030	Kg. Mempelam	SP, VG	DM, CN, SC, CR, PL*
KH031	Sg. Tiak	SP	DM, RB
KH032	Tg. Pari	SP	DM, RB
KH033	Pantai Cicak	SP, VG	
KH034	Sg. Limau/Carok Sikin		DM, RB
KH035	Sidam Kiri	SP	RB, DM*
KH036	Pekula	DP, VG*, GG*	CN, SC, DM*, PL*, CR*
KH037	Sg. Gelam	SP	DM, RB
KH038	Merbok Bunding	SP, VG*	CN, OP, SC, PL*, CR*
KH039	Pinang Tunngal	DP, VG	CN, OP, SC, DM*, PL*, CR*
KH040	Tandop Pekan Merbok	SP	DM, RB
KH041	Kota II	DP, VG*, GG*	CN, SC, DM*, PL*, CR*
KH042	Pantai Prai/Serukam	SP	RB, DM*
KH043	Kemumbong	SP	DM, RB
KH044	Lubok Kiab		DM, RB
KH045	Kg. Parit	DP, VG*	
KH046	Tg. Sik	SP, VG*	
KH047	Tg. Besar	DP, VG*	
KH048	Sg. Teloi	SP, VG	
KH049	Padang Cicak	SP, VG	
KH050	Sg. Cepir		RB, DM*

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

CN; Cashewnut

CR; Citrus

PL; Pineapple

OP; Oil palm

RB; Rubber

TB; Tobacco

SC; Sugarcane

Table 4 Priority Order of Selected Crops for Each Scheme (4/42)

State : Kedah (3/3)

Code No.	Scheme	Annual Crops	Perennial Crops
KH051	Gua Ginu	SP, VG, GG*	DM, PL, CN, CR, SC, TB, RB
KH052	Nawa Gajah Mati	VG, GG*	DM, CN, CR, SC, TB, RB, PL*
KH053	Binjal		RB, DM*
KH054	Lembah Bata Phase I		RB, DM*
KH055	Sg. Pering	DP, VG*, GG*	CN, SC, TB, RB, DM*, PL*, CR*
KH056	Che Kedo/Putat	DP, VG*, GG*	CN, SC, TB, RB, DM*, PL*, CR*
KH057	Sg. Gelong	SP	RB, DM*
KH058	Lembah Bata II	SP	RB, DM*
KH059	Janing	SP	RB, DM*
KH060	Carok Kejal	SP, VG*	
KH061	Kurong Hitam	SP	RB, DM*
KH062	Pdg. Pusing	VG*	CN, SC, TB, RB, DM*
KH063	Paya Rawa I	DP, VG, GG*	CN, SC, TB, RB, DM*, PL*, CR*
KH064	Pdg. Kerbau I & II	SP	RB, DM*
KH065	Sg. Lampam/Rambai	SP	RB, DM*
KH066	Kg. Ruat	SP, VG, GG*	DM, CN, SC, PL*, CR*
KH067	Sinkir, Sg. Pial	SP, VG*	CN, OP, SC, DM*, PL*, CR*
KH068	Bakar Bata	SP, VG, GG*	DM, CN, SC, PL*, CR*, FC
KH069	Bakong/Lubok Boi	DP, VG*, GG*	CN, SC, DM*, PL*, CR*
KH070	Pdg. Gaung	SP	RB, DM*
KH071	Bukit Kemboja	SP	RB, DM*
KH072	Pdg. Matsirat, Limbong, Raggut	SP	RB, DM*
KH073	Terusan Seimbang Sg. Tok Peteri	SP	RB, DM*
KH074	Kg. Kok	SP	RB, DM*, FC
KH075	Pdg. Kerbau III	SP	RB, DM*

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

CN; Cashewnut

CR; Citrus

PL; Pineapple

OP; Oil palm

RB; Rubber

TB; Tobacco

SC; Sugarcane

Table 4 Priority Order of Selected Crops for Each Scheme (5/42)

State : Pulau Pinang

Code No.	Scheme	Annual Crops	Perennial Crops
PP001	Pinang Tunggal	SP, VG*	CN, SC, PL*
PP002	Sg. Jarak	SP, VG*	CN, SC, PL*
PP003	Tasek Gelugor	SP, VG*	CN, SC, PL*
PP004	Jarak Tengah	VG, SP	CN, SC, PL*
PP005	Kuala Tasek	VG, SP	CN, SC, PL*
PP006	Sg. Kulim	SP, VG*	CN, OP, SC, DM*, PL*
PP007	Sg. Kulim	SP, VG*	CN, OP, SC, DM*, PL*
PP008	Sg. Renjau	VG, SP	CN, SC, PL*
PP009	Juru	VG, SP	CN, SC, PL*
PP010	Machang Bubok	VG, SP	CN, SC, PL*
PP011	Tasek Junjung	VG, SP	CN, SC, PL*
PP012	Alma	SP	
PP017	Fasa I & IIA/IIB, Sg. Burong	SP	FC*
PP018	Padang Kumunting	SP	FC*

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

CN; Cashewnut

PL; Pineapple

OP; Oil palm

SC; Sugarcane

FC; Freshwater fish pond

Table 4 Priority Order of Selected Crops for Each Scheme (6/42)

State : Perak (1/3)

Code No.	Scheme	Annual Crops	Perennial Crops
PK001	Batu Kurau	DP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*
PK002	Air Kuning	VG, SP, GG*	DM, CN, SC, PL*, GV*, CR*
PK003	Jelai dan Tambahan	VG, SP, GG*	CN, SC, DM*, PL*, GV*, CR*
PK004	Pantai Besar	VG, SP, GG*	DM, CN, SC, PL*, GV*, CR*, FC
PK005	Jemerang Setar	DP, VG, GG*	CN, SC, DM*, PL*, GV*, CR*
PK006	Bukit Gantang	SP, VG*, GG*	CN, PR, DM*, GV*, CR*
PK007	Jebong	VG*, GG*	CN, PR, DM*, GV*, CR*
PK008	Bukit Bertam	VG, SP, GG*	CN, SC, DM*, PL*, GV*, CR*
PK009	Beruas/Tambahan	SP	RB, DM*, GV*
PK010	Dendang A.	SP	DM, RB, GV*, FC
PK011	Dendang B	SP	RB, DM*
PK012	Sg. Segar	SP, VG*	
PK013	Sg. Chop	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK014	Sg. Simpol Kiri	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK015	Sg. Rambutan	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK016	Sg. Damak	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK017	Sg. Berdarah	DP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK018	Sg. Nor	DP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK019	Sg. Garok	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK020	Batu 3,Kg.Medan	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK021	Gua Petai	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK022	Bukit Torak/Lubuk Sengga	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, CR*, FC
PK023	Tapah Hulu	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, GR*, FC
PK024	Bukit Tunggal	SP	RB, DM*, GV*
PK025	Belukar Hantu	SP, VG*, GG*	CN, SC, DM*, PL*, GV*, GR*, FC

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

RB; Rubber

SC; Sugarcane

PR; Pepper

FC; Freshwater fish pond