

# INTENSIFYING LAND USE IN IRRIGATION SCHEMES WITH OTHER FIELD CROPS: THE CASE OF IMPORT SUBSTITUTION

Anura S. Widanapathirana

Irrigation Management Policy Support Activity (IMPSA).

L. P. Rupasena and W. A. Jayaratna

Agrarian Research and Training Institute

*Paper presented at the 47 Annual Session of the Sri Lanka Association for the Advancement of Science (Section F).*

## Introduction

Ever since irrigated agriculture started in this country in some 2500 years ago, rice has been the main crop planted on irrigable lands. In fact, irrigation was synonymous with paddy cultivation in the country. In the ancient systems, irrigable lands provided rice, the staple diet of the people while other crops came from the chena. Paddy farming has been the main source of agricultural surplus generated at that time (Silva, 1981). The present evidence is that paddy farming has become unprofitable in the country and chena farming is impossible due to lack of forest lands where it could be practised. Here, crop diversification appears to be a solution to improve farmer income. Accordingly, the necessity to grow crops other than paddy commonly known as other field crops (OFCs) is important. It is likely that OFCs increase farm returns and utilize less water compared to paddy. In the recent years, lack of adequate irrigation water has compelled planners and managers to pay special attention for crop diversification in predominantly paddy based systems.

The practice of cultivation of OFCs in paddy soils was introduced in late

1960s (Panabokke, 1989). The main reasons that promoted crop diversification where paddy cannot be cultivated are: (a) lack of water for cultivation of paddy during both seasons, (b) to increase returns to farmers, (c) to increase export earnings into the country by planting appropriate exportable crops, (d) to increase local food production thereby saving foreign exchange which otherwise may have to be spent on food imports, and (e) possibly to avert over-production of paddy. The crop diversification is suggested during the Yala season when water supplies are not adequate for a paddy crop.

Another important factor favouring crop diversification is the availability of irrigable land for their cultivation particularly during the Yala season. In this connection, it is seen that only about 50% of the asweddumized area is actually planted to paddy in a typical Yala season. This means, a large area is available for planting OFCs having set apart some area where paddy is to be cultivated. In 1989 Yala season for instance, the area thus unutilized for paddy cultivation stood at 298, 922 ha. (IMPSA, 1990).

The country cannot afford to put this amount of land area idle since the government has had to spend about 3-8% of the budget in the development of irrigable base enjoyed at present. Additionally, potential sites where irrigated agriculture could be practised are becoming far less and that the available land area must be put into the most productive use. In this connection, development of the domestic food sector is inevitable not only to become self-sufficient in food stuff but also for food security reasons. Moreover, diversification of the production base in irrigation sector with export promotion enterprises will further strengthen the role of irrigated sector in the economic development of the country. Therefore, a clear case for crop diversification exists in the management of irrigation systems in the country.

The approaches and strategies toward crop diversification in paddy fields during the last three decade or so have not yielded satisfactory results. For example, the cropping intensity to major irrigation systems for the last two decades has not been increased beyond 140%. This may be due to several reasons such as lack of water control capacity, lack of clear thinking on what crops to grow, lack of research information pertaining to crop diversification, lack of a

clear policy on crop diversification and weak marketing system.

From the earliest times when crop diversification was undertaken as a pilot experiment by the Department of Agriculture, crops which were found to be suitable were mainly food crops such as pulses, vegetables and onions. It was expected that these crops would contribute to "import substitution" policy. With the free import and removal of import restrictions, and other reasons, imports were freely allowed into the country and the emphasis on import substitution gradually started to decline. With the opening up of the economy for private investments, the attention started to concentrate on the cultivation of crops for export market thereby supporting the "export promotion" policy. In fact it is observed that during the last decade, more attention has been placed on export promotion rather than import substitution. What is better between import substitution and export promotion in the context of intensification of land use under irrigation is a matter for further research. Such studies have not been done in the past. However, it is important to examine the possible gains from import substitution by producing crops which at present are imported into the country. The latter is the focus of this paper.

### Scope of the Paper

Sri Lanka continues to depend on the import of a wide range of commodities most of which can be grown locally particularly under irrigation. The present paper examines potential for import substitution in the intensification of land use in paddy-based systems. The paper examines the type of food commodities imported and analyses the financial resources involved. It then compares value of imports with that of the GDP as well as the total export earnings from agricultural sector. The paper does

not discuss policy and institutional issues relating to the promotion of import substitution which have already been the focus of several other papers. The paper makes use of customs returns data covering the period 1980-90 for the analysis.

### State of Crop Diversification to Paddy Fields

There have been so many strategies and programmes to demonstrate farmers the need for crop diversification under irrigation. Most of these projects have come from the top. However, substantial progress has not been made in this subject to date. The data base with regard to crop diversification such as the extent and type of crops planted is not yet developed. The Department of Census and Statistics is still not geared to collection of basic statistics such as area planted to OFCs and estimation of their yields under irrigation. The cropping intensity of irrigation is still worked out on the basis of paddy area although crop diversification is catching up slowly. The irrigable area put under OFCs at the national level is still not available. In the case of some premier irrigated settlements such as Parakrama Samudra, Minneriya, Giritale etc. it is estimated that only about 5-10% of the land area is planted to OFCs (AICS, 1991).

One important aspect in crop diversification under irrigation is to examine the type of crops which are available for planting. In this respect, it is seen that some crops such as green gram, chillies, vegetables and onions have been cultivated by farmers since 1960s. For these crops, there is a definite domestic demand and the knowledge and skills required in their cultivation are available to the producers. There is some research information concerning the cultivation of these crops. The second group of crops are those grown in the country but have not been cultivated under

irrigation before. They are pineapples and bananas. The third group of crops consist of entirely newly introduced crops such as gherkins, asparagus, baby corn, suchini, sweet corn, silver-skin onion, and strawberries. The technology relevant to their cultivation has been generated or imported by the private entrepreneurs which ventured into their promotion. The extension is also provided by them and the marketing arrangements are also made by the private companies. Farmers have profited from the cultivation of gherkins in the early period of their introduction but has been declining since then (Gleason, J.E., 1989).

### Prospects for Import Substitution

Since the focus of the present paper is on import substitution, let us examine the prospects for crop diversification with food crops. With regard to import substitution, there are three main issues. First, there are commodities which are imported into the country when the very same crops can be grown locally. This may be identified as 100% import substitution and the examples are maize, onion, chillies, ground nut, soybean, vegetables and dairy husbandry. Second, in the case of some other commodities, the imported variety may not be a 100% substitute when locally grown although an acceptable substitute for the imported commodity can be grown locally. Here, an example is green gram for imported dhal. The third case is when the imported commodity may not be produced locally due to agro-ecological or other reasons. In this case, there are substitutes for what is imported at present. In this connection, substitution of wheat with local starches is a case in hand. However, this shift requires a host of facilities such as research and development work, attitudinal changes, clear policies, provision of other services and facilities.

In order to make satisfactory progress in import substitution, it

may be better to concentrate on commodities which can be cultivated locally for quick results. Their promotion can be facilitated without incurring extra investments on R&D, extension and changing attitudes of the consumer. In the case of commodities for which there are no full-substitutes, it may not be possible to promote production in the short-term. Here, it is necessary to develop processing methods in order to make the commodity palatable when locally grown. Investments on food industry, research and even attitudinal changes of the consumer may also be necessary. In the case of the third type of crops, the issue is to produce an altogether a different commodity which could be a substitute for the imported commodity. Hence, nothing can be done in the short-run to expand local production and thereby to curtail imports. With this distinction in mind, let us examine the scope for import substitution in the intensification of land use in irrigation schemes.

Let us first examine the type of agricultural commodities that are imported into the country. As seen in the schedule below, there are 37 commodities which are imported. They can be grouped into two major categories, namely the basic necessities and those which are demanded by specific sectors such as the tourist industry as well as for consumption by the affluent class of people. The agricultural commodities classified under the two above categories are given in the following schedule.

As shown above, there are 20 basic necessities which are imported a majority of which can be produced locally under irrigation. The only exception is wheat for which a near-substitute does not exist. A question which may have to be raised here is which of these crops can be profitably produced under local conditions. In the case of agricultural commodities

imported for specific purposes are fruit juices, fresh and chilled fruits and vegetables, chicken, mutton and dairy products other than milk powder. Looking at the long list of crops given above, a strong case can be made for the local production of agricultural commodities which are imported at present thus intensifying land use under irrigation.

The volume of imports show that it is consistent for some crops while in the case of others, the volume fluctuates over the years. In the case of chillies and dhall, there is a large fluctuation in the volume imported mainly because of the fluctuation in local production.

Based on import data, the total foreign exchange spent by the government on the import of these commodities and its comparison with the GDP and export earnings from the entire agricultural sector are worked out. These calculations are shown in Table 1.

**Schedule 1: Agricultural Commodities Imported by Purpose.**

<i>Basic necessities</i>	<i>Special purposes</i>
Rice	Tomato juice
Wheat	Tomato fresh/chilled
Wheat flour	Orange juice
Maize	Orange fresh
Chillies	Pineapple fresh
Potato	Pineapple juice
Sugar	Apple fresh
Big onion	Grapefruit
Red onion	Grapes
Beans and peas	Grape juice
Groundnut	Exotic vegetables
Soybean	Ghee
Dhall	Butter
Turmeric	Cheese
Garlic	Mutton
Mustard	Chicken
Fenugreek	Flavoured milk
Coriander	
Ginger	
Milk powder	

Source: Customs returns

The above Table reveals three interesting findings. First, the value of food commodities imported into the country has been in the region of Rs. 2 to 8 billions per year during the last decade. The basic necessities occupy about 98% of the total value of agricultural commodity imports.

Second, the size of import bill on food commodities ranges from a low of 1.5 to a high figure of 8% of the Gross Domestic Product of the country. The lowest rate of 1.6% was recorded when the domestic paddy production reached the highest mark.

Third, the food import bill has swallowed 10 to 54% of the total agricultural export earnings per year. The export earnings include the traditional export crops such as tea, rubber, coconut as well as the new types of crops being encouraged in irrigation schemes. This point stresses the need for increasing local production of commodities mainly for import substitution. It is to be noted that the savings from import substitution policy are likely to be higher than the possible gains from export promotion of the new crops that have been grown under irrigation. The non-traditional exportable crops such as gherkins have contributed to only an insignificant amount of value of the overall export earnings.

In the case of gherkins, asparagus and other new crops, it is necessary to import seeds, packing materials and even materials for processing the produce in order to expand their production for exports. Therefore, in the promotion of production of exportable crops, it is necessary to examine the value added in 'net terms'. However, there are no studies which have focussed on the net value position with regard to the non-traditional export crops which have been grown in the country. Therefore, a study to examine the net export

**Table 1**  
**Value of Imported Food Items Compared with GDP and**  
**Agricultural Export Earnings.**

Year	Value of Imports		Total value (C)	C as a of Total GDP (D)	C as a % of Agri. exports (E)
	Basic necess. (A)	Other food (B)			
1980	5531	40	5571	8	51
1981	4593	51	4644	5	10
1982	3147	61	3208	3	28
1983	4842	101	4943	4	34
1984	2173	137	2310	1.5	10
1985	5476	97	5573	3	29
1986	8463	122	8585	5	54
1987	4978	103	5081	3	29
1988	8643	145	8789	4	44
1989	7279	95	7374	3	33
1990	5525	87	5612	2	19

All values in Rs. million.

Basic necessities includes all items listed in column 1 of schedule 1 except for milk powder; other imported food includes all items listed in column 2 of the schedule except for liquid milk.

Agricultural exports are tea, rubber and coconuts, spices, coffee, cardamom, cloves green vegetables, gherkins, out flowers, fruits and few other items.

Source: Customs reports and Central Bank.

earnings attributable to the production of exportable crops under irrigation is highly recommended. Further expansion of their cultivation has to be based on the findings of a study of the type referred to above.

Another important issue is that the knowledge and skills which are necessary in the cultivation of food crops are known to the producers; the marketing facilities for these crops are also available. It is to be noted that the price of some of these crops during the production season drops far low. For instance, tomato is a crop which can be produced under irrigation. The wholesale price of tomatoes goes as low as Rs. 4.87 during the production season which must be compared with the price of Rs. 77.61 per kg when imported. Hence, such commodities can be processed during the production season and thereby avoiding the imports. The same is true with regard to several other commodities which are imported at present.

Of these food commodities, the production of certain crops such as

rice, chillies, tomatoes, onion, soybean, groundnut, maize, pineapple, butter and ghee can be expanded immediately. With regard to others, it may not be possible to increase production in the short-term. Still others require long-term strategies and programmes in order to produce significantly higher volumes. In this regard, a host of institutional, policy and implementation arrangements will have to be developed. A brief outline of these strategies is found in the forthcoming section.

#### Unresolved issues

There are several issues that must deserve the attention in import substitution policy. Among them are trade policies, market research including demand forecasts, production planning and monitoring, setting up agro-based industries, research and development work, and economic incentives for the producer. These issues are not discussed in this paper which have already been the focus of previous studies such as Kikuchi (1990) and Wijayaratna (1990). A pro-

gramme aimed at import substitution must consider these issues and appropriate implementation strategies are undertaken if satisfactory progress is to be made.

#### Conclusion

There have been several programmes to diversify the irrigation land base which have apparently not had any significant impact yet. In the recent past, the efforts have been thwarted toward export promotion as against import substitution, apparently in the absence of a clear policy. The paper explains the case for import substitution since a substantial foreign exchange is spent on the import of basic and other food items which can be locally produced under irrigation. The country has been importing 37 food items of which 29 can be successfully grown under irrigation even in the short to medium term. Out of this, production of 17 items can be embarked upon immediately while in the case of few such as dhal and exotic vegetables may not be produced for full-import substitution since their being not able to grow locally. Still in the case of wheat, full-import substitution is not possible since the country does not have a substitute for this crop. An important reason favouring the import substitution policy is the import bill the country has to shoulder which is as much as Rs. 5 - 8 billion per year. In this context, the importance of import substitution is to be pin pointed where a clear policy is necessary. In intensifying land use in irrigation, a large variety of crops can be grown for import substitution.

Finally, it is to be concluded that intensification of land use in irrigation should consider the potentials for import substitution in addition to export promotion policy. Such decisions should be based on the study of profitability of crops which can be grown under irrigation and a critical examination of the net value added by the export-oriented crops.

Cont. on page 33

---

Cont. from page 22

### References

1. Agricultural Industry Consultancy Service, Pvt. Ltd. (1991). ISMP sub-study on "Maximizing Profitability of irrigated Crop production in the Polonnaruwa Systems, Colombo.
  2. Gleason, J.E. (1989). Gherkin Outgrower Programme, Yala 1989. MARD.
  3. IMPSA (1990). Population and Land Dynamics Affecting Irrigated Agriculture. IMPSA Staff Working Paper, Colombo.
  4. Kikuchi, Masao (1990). Policy and Research Issues in Irrigation Management for Crop Diversification with special reference to Sri Lanka. Paper presented at the First Progress Review and Co-ordination Workshop of the Research Network on Irrigation Management for Rice-Based Farming Systems, Manila.
  5. Panabokke, C.R. (1989). Irrigation Management for Crop Diversification in Sri Lanka. IIMI—Sri Lanka Country paper No. 3, IIMI, Sri Lanka.
  6. Silva, K.M. de (1981). A History of Sri Lanka, Oxford University Press, Delhi.
  7. Wijayarathna, C.M. (1990). Socio-economic and Institutional Issues on Crop Diversification. Paper presented to the Philippine National Workshop on Irrigation Management for Rice-based farming Systems, Laguna.
-