

FOOD SECURITY AND IRRIGATION DEVELOPMENT IN SRI LANKA: PAST ACHIEVEMENTS AND FUTURE PROSPECTS

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INTRODUCTION

Sri Lanka, historically, has placed a high value of *basic human needs*. This policy has resulted in one of the highest levels of human welfare among low income countries (UNDP 1994). With a priority on food security, all segments of society have had access to basic food staples at a reasonable cost. Food security, poverty alleviation, and other welfare goals have been achieved by expanding irrigation and introducing new technologies to increase rice yields. By the mid-1980s most of the potential for further growth in yield and expansion of irrigation had been exhausted. There is mounting evidence that over the past decade, the food production sector has remained stagnant. This has caused growing concern to the Government in terms of its implications for rural poverty and national food security objectives.

The Report of the National Development Council Working Group on Agricultural Policy (1996, p. 1) states that: "Sri Lanka's non-plantation agricultural sector has lost its momentum over the past 10-15 years. This is reflected in the key indicators such as, per acre yield of crops, total annual output, intensity of the use of irrigated lands, farm family income and employment." A recent report of the World Bank (1996, p.2) argues that, "the current level of 'food security was purchased at a high cost through investment in very capital-intensive irrigation schemes to produce a low-valued commodity" (i.e. rice). The continued focus on rice self-sufficiency inevitably constrains the performance of the agricultural sector.

This paper reviews the achievements and limitations of the welfarist strategy adopted in the past, particularly the role played by irrigation development to achieve food security and promote growth. It is argued that major irrigation schemes will continue to provide the foundation for the nation's food security, but ways must be found to produce more food with less water. The paper contends that improved management of irrigation and water resources is essential for maintenance of food security

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BASIC NEEDS, FOOD SECURITY, AND THE ROLE OF IRRIGATION

Sri Lanka's experience in the field of public provision of basic needs is well documented (Isenman, 1980; Sen, 1981; Bhalla and Glewwe, 1986; Bhalla, Bhalla, 1991; Anand and Kanbur, 1995; World Bank, 1995). For example, Anand and Kanbur (1995), analyzing time series data from 1951-82 period, concluded that systematic and direct government intervention played an important role in enhancing the quality of life in relation to health, education, and nutrition. Sri Lanka's achievements in some areas of human welfare, such as health and education, have been described as remarkable for a country with a low per capita income level (UNDP, 1994). Welfare indicators such as life expectancy at birth of about 71 years, infant mortality rates of 24 per 1000 are similar to those for Malaysia with three times the per capita income and Thailand with twice the per capita income.

From the mid-1950s to the end of the 1970s, welfare expenditures accounted for 30 to 40 percent of total government expenditures (Osmani, 1994). Beginning in 1977, the new government initiated economic liberalization, reduced social expenditures, and replaced universal food subsidies with a targeted food subsidy program aimed at reaching the economically vulnerable groups. The share of GDP for total welfare expenditures fell steadily from 12 percent in 1970 to 8 percent in 1977 and 3 percent in 1985.

The impact of reduced spending on welfare has been a matter of considerable debate. For example, studies by Sahn (1986) and by Anand and Kanbur (1995) suggest that a cut in the food subsidy expenditures after 1977 caused an increase in malnutrition and a reduction in social equity. However, Bhalla (1991) concludes that there is some direct evidence to support the view that welfare of the poor has improved since liberalization. A more recent assessment of poverty in Sri Lanka conducted by the World Bank (1995) supports the conclusion of Bhalla. Osmani (1994, p. 419) undertook a comprehensive review of the evidence to determine whether there was a conflict between growth and welfare? He concludes as follows:

“The general lesson that one can draw from Sri Lanka's experience is that even a poor country can bring about rapid improvement in the living standards of its people by adopting a judiciously designed welfare strategy ...But there is another dimension of the Sri Lankan experience which offers no less valuable a lesson. It shows how important it is to maintain a satisfactory rate of economic growth for the sake of welfare itself.”

Food Security

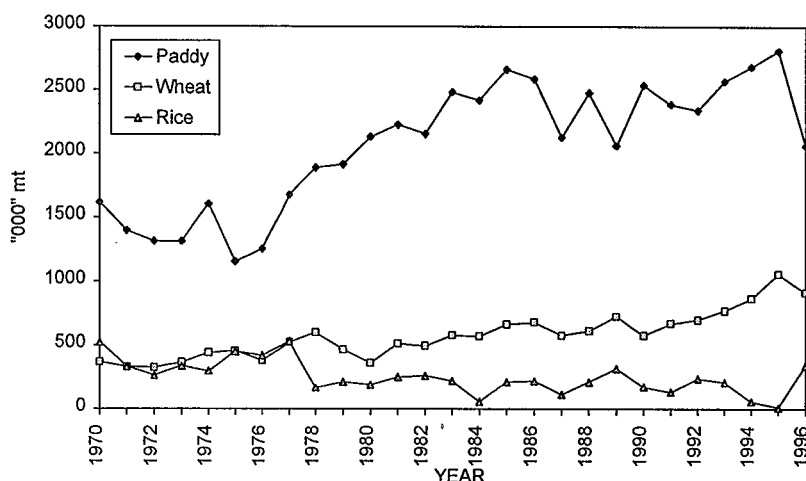
Rice accounts for 75 percent of the total cereal consumption and 45 percent of calorie intake. Irrigated paddy accounts for two-thirds of the harvested area under paddy and provides around three-fourths of the total output of paddy in the country.

The National Agriculture, Food, and Nutrition Strategy (NAFNS) of the government of Sri Lanka published in 1984 states, self-sufficiency in basic foods, rice, milk, sugar, fish and pulses is one of four objectives. According to the 1993 Report of the Presidential Tariff Commission, "rice in any case is a staple diet and for strategic reasons the country should rely on its own production." The National Policy Framework for Agriculture, Lands and Forestry (1995) emphasizes self-sufficiency in rice as a major national objective. This objective is combined with the aim of saving foreign exchange by substituting domestic for imported rice, employment creation, and satisfying the nutritional needs of the population. Recently the objective of food security has been redefined as "rice self-sufficiency at affordable cost" (as quoted in World Bank, 1996).

According to the World Bank report (1996, p.2) this "affordable cost approach does not appear to be working. The opportunity cost of defining 'food security' in terms of 'physical self-sufficiency' may actually be unaffordably high in terms of sectoral growth foregone." Public investment in irrigation is seen as the main factor contributing to the unaffordably high cost. The major investment in new irrigation construction in the past two decades was for the World Bank supported Mahaweli Development Project which from the mid-1970s to the mid-1990s accounted for 90 percent of total irrigation investments.

The government strategy for food security in Sri Lanka involves more than "rice self-sufficiency" and must take into account the growing importance of wheat in the Sri Lankan diet. Between the mid-1960s and mid-1980s rice production grew at close to 4 percent per annum (Figure 2). Per capita consumption in this period ranged from 105 to 115 kg. per annum, with no apparent trend. Since 1977 imports have averaged about 200 thousand mt per annum and ranged from 7 to 15 percent of apparent consumption. Meanwhile, government subsidies for wheat have encouraged growth in wheat consumption and imports making it possible to avoid heavy imports of rice even when growth in production stagnated over the past decade. Annual per capita wheat consumption has risen from less than 20 kg. in the early 1960s to approximately 50 kg in the mid 1990s. Annual imports have risen to 700 to 800 thousand mt per annum. Thus, government food security is based on maintaining rice production at 85 to 90 percent of domestic needs, but encouraging a substitution of wheat for rice in the diet to take advantage of the substantially lower price paid for wheat vs. rice imports.

Figure 2
SRI LANKA-PADDY PRODUCTION AND
RICE/WHEAT IMPORTS 1970 - 1996



Irrigation Development

The development of irrigation has been a major element and one of the largest costs in the Government's food security program. In the early 1950s, investments in irrigation accounted for about one third of total public investments. It declined to 15% in the mid-1960s and then rose to as high as 25 percent in the 1980s.

From the mid-1960s to the mid-1980s area irrigated grew from about 300 to 500 thousand hectares. Most of the growth was in major irrigation schemes in the dry zone, principally under the multi-purpose Mahaweli Development Program initiated in the early 1970s, which provided over 100,000 ha of land with improved irrigation. (World Bank Appendix 2 p. 14?).²

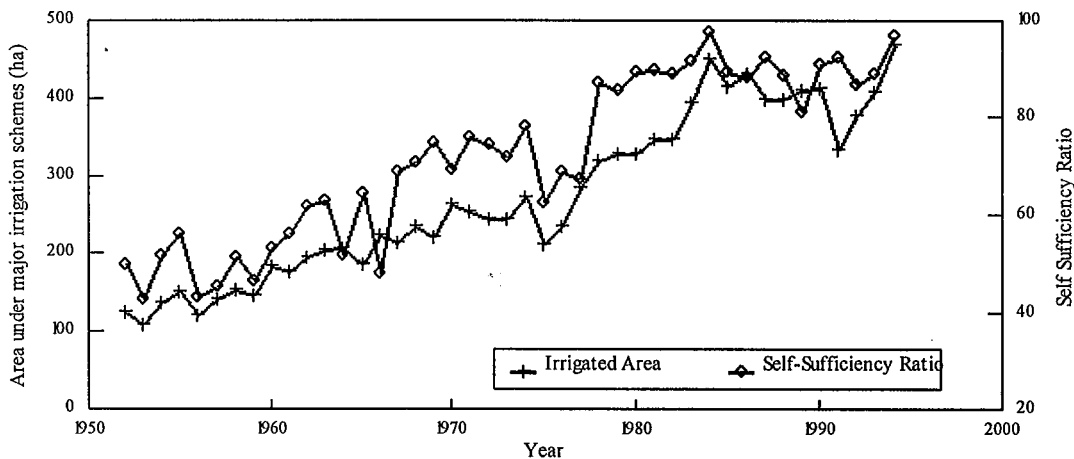
Irrigation development coupled with the introduction of new technology played a pivotal role in increasing rice production in the country and realizing the national policy objective of self-sufficiency in rice. At present about half of the national rice output is produced in the major irrigation schemes which provide irrigation principally to the Dry Zone districts where high levels of solar energy have permitted more rapid growth in yields. Between 1952 and 1985 the area planted to rice in the major irrigation schemes grew at 4 percent, whereas the area under minor irrigation and rainfed rice grew at 2 percent and 1.5 percent respectively.

² Major irrigation schemes are those with command areas of 200 ha. Or more. Minor irrigation schemes are those with command areas of less than 200 ha.

Fig. 2 shows the close correlation between the expansion of the area under major irrigation schemes and the move toward rice self-sufficiency.³ We have estimated that without the investments in major irrigation schemes, rice self-sufficiency in 1994 would have been 78% as against the 94% realized in 1994.

The Mahaweli Development Project has been the center piece of irrigation development in the last two decades, and at the center of some controversy. Following the food and energy crisis of the mid-1970s and the apparent uncertain outlook for both food and energy prices, Mahaweli looked like an attractive investment from the point of view of both the Sri Lankan Government and the World Bank. However, Aluwihare and Kikuchi (1991, p. 24) show that the benefit-cost ratios for new irrigation construction which were well above 1 in the 1960s and 70s fell below 1 in the 1980s as construction prices rose and rice prices fell. This gives rise to the conclusion of the World Bank Report (1996) that “rice self-sufficiency has been costly to achieve as has its efforts to alleviate poverty through large-scale irrigation development.” The right question to ask, however, is: “What would the international price of cereal grains have been if the World Bank and other donors had not financed the construction of large-scale irrigation systems such as

Figure 2 Rice self-sufficiency and the expansion of the irrigated area (1950-94)



Mahaweli in the 1970s and 80s?” Most observers would agree that the global and domestic food security and agricultural surpluses achieved by these investments was well

³ Degree of self-sufficiency is defined as the ratio of locally produced rice to the total supply (locally produced plus imports).

worth the cost. Today's low benefit-cost ratios reflect a large measure of success in achieving global food security.

Furthermore, the benefits of irrigation investments include more than the value of the physical commodities produced. The development of Dry Zone irrigation also has led to major population resettlement and employment creation. Between 1946 and 1981 the population in the Dry Zone, which accounts for 62 percent of the country's land area, increased from 1.2 to 3.8 million or from 12 to 26 percent of the total population of Sri Lanka (Statistical Abstracts, 1995). A majority of the new settlers have been landless persons from the Wet Zone who were resettled in the irrigation schemes and provided with employment opportunities in farming. Investments in irrigation and the development of the dry zone discouraged rural-urban migration and reduced the social costs associated with overpopulation in the cities. Also overlooked in benefit-cost calculations, are the many other uses of water in irrigation systems such as fish, livestock, and garden production as well as domestic uses.

The process of resettlement has had its problems. For example, some critics of the Mahaweli Development Project have pointed to the strong engineering bias in the planning and execution of the project (Muller and Hettige, 1995). It is argued that this bias has resulted in inadequate attention to the provision of social services and lack of planning for the second generation of settlers.

In sum, rice self-sufficiency has been a major objective of the Sri Lankan Government's food security program. This goal has been achieved through investment in major irrigation schemes. The benefits from crop production have been lower and the irrigation construction and crop production costs higher than originally anticipated. Lower than expected benefits are the consequence of a similar strategy implemented successfully by countries throughout Asia which has led to lower rice prices. However, the benefits of irrigation investments cannot be confined to food security alone. Irrigation water is used for a multitude of purposes and irrigation investments have created employment for new settlers and fostered growth in the relatively less populated Dry Zone of Sri Lanka. However, the benefits and costs of food security policies need to be carefully reevaluated in the light of today's economic conditions and government financial constraints.

THE STAGNATION OF AGRICULTURE: RESOLVING THE DILEMMA

The World Bank Report (1996) identifies what it sees as the key constraints to agricultural development and the Report of the National Development Council (1996) offers a comprehensive action plan for getting agriculture moving. While these two reports differ in the details, the general recommendations are similar, and the key recommendations can be summarized as follows.

- Move towards a market oriented agricultural economy which provides farmers with greater incentives and control over their resources.
- Introduce land tenure reform and create a land market to promote investment in large scale commercial agriculture.
- Diversify agriculture and create an internationally competitive exportable surplus of quality agricultural products.
- Provide farmer organizations with greater responsibility and legal authority for the operation and management of public irrigation schemes.

We will examine the reasons for the stagnation, and then assess the likely impact of the first three recommended policy reforms.

Growth and stagnation. As previously noted, Sri Lanka has pursued a policy of increasing domestic food production and enhancing the welfare of the population. This growth-equity strategy proved very successful from the mid-1960s until the mid-1980s. The main sources of growth were the new seed-fertilizer technologies in rice and the expansion of irrigation. The success of this growth strategy pursued by Sri Lanka and most Asian countries has led to a what economists refer to as a “cost-price squeeze.” While the price of rice and other crops has fallen the costs of many of the cash inputs and irrigation construction have steadily risen (National Development Council, 1996). The dual emphasis on welfare and growth meant that the government subsidies associated with this growth have been heavier than in other countries following the same growth strategy.

The 4 percent agricultural growth based on irrigation expansion and new seed-fertilizer technology was not sustainable. Efforts to date to maintain growth in output through crop diversification have not been successful. The subsidies associated with agriculture have become an increasing drain on government financial resources.

There is evidence of a potentially high degree of complementarity between agricultural and industrial growth in the early stages of economic development (Johnston and Mellor, 1960). Satisfactory growth in one sector depends on delivery of inputs from the other. Grain, raw materials, and labor flow from agriculture to industry and in return consumption goods and modern farm inputs are supplied by industry to agriculture. The growth of industries linked to agriculture, such as food and raw material processing and equipment repair, initially facilitate this two-way flow. As the economic transformation proceeds, agriculture as a percentage of the total economy shrinks.

Table 1 shows the change in the percentage distribution of *gross domestic product* (GDP) between 1970 and 1993 for Sri Lanka and four neighboring Asian economies. The economic transformation has been most rapid in Thailand and Indonesia and slowest in

the Philippines and Sri Lanka. One quarter of the GDP and approximately 50 percent of the labor force remains in agriculture in Sri Lanka and labor productivity remains low. The Philippines and Sri Lanka also export a significant portion of their “surplus” labor to other parts of the world. Thus, in Sri Lanka the potential complementarity between agricultural and industrial growth seems to have been lost; the slow growth of the non-agricultural sector has become a major constraint to the further development of the agricultural sector.

Table 1. Percentage Distribution of GDP

Country	Agriculture		Industry		Services	
	1970	1995	1970	1995	1970	1995
Sri Lanka	28	23	24	25	48	52
Bangladesh	55	30	9	18	37	52
Indonesia	45	17	19	42	36	41
Philippines	30	22	32	32	39	46
Thailand	26	11	25	40	36	49

Source: World Bank: World Development Report, 1995 and 1997

Market Oriented Agricultural Economy: The basic thrust of the recommendations in this area is to allow market prices to allocate resources, to remove the subsidies on inputs and the wheat flour subsidy, and to shift protection from imports to a tariff basis so that they are more transparent. The role of the government should be to create the environment and provide the incentives which will allow both input and product markets to perform effectively and allow private sector activities and investments to expand in the rural areas.

Land tenure reform, farm size, and efficiency. Sri Lanka’s land tenure policy in the irrigated settlement schemes since the inception of the program in the late 1930s has been guided by the country’s emphasis on basic needs. The size of the holdings alienated varies from 8 acres per family in the irrigated settlement schemes established in the 1950s (e.g. Galoya) to 2.5 acre holdings alienated under the Mahaweli Development Project. The land is alienated under the concept of “protected holdings with restrictions on transactions in land.”

The concept of protected holding was initially to prevent land fragmentation. Despite legal restrictions, informal fragmentation and transactions are widespread in the irrigated settlements. The provision of tradable (and mortgageable) land tenure rights should encourage more private investment in land improvements. But whether privatizing land would lead to an increase in farm size and productivity as suggested in the World Bank

Report (1996) is a matter of debate. For example, studies conducted in several countries show that in the production of rice and other vegetables, there are no economies of size (Lau and Yotopoulos, 1971). The evidence in Sri Lanka also suggests that large farms are no more efficient than small farms in terms of unit cost of production.

The National Development Council Report (1996, p.4) correctly observes that expansion of farm size will depend not only on a well functioning land market but also on alternative investment and employment opportunities in the non-agricultural sectors that pull labor out of agriculture and raise the productivity of farm labor. Without such opportunities, the unemployed or underemployed landless laborers will increase. Given the limited opportunities existing for non-farm employment, the common practice of dividing the rural household labor force between farm and non-farm activities is an appropriate solution for maximizing the productivity of household labor and one commonly practiced in many parts of Asia.

Issue related to farm size and land tenure need to be considered carefully in developing land tenure policy. Given the uncertain employment opportunities, the Government in the short run would like to avoid a situation leading to consolidation of land into large holdings and displacement of labor..

Crop diversification: The Sri Lankan Government has promoted crop diversification as one alternative to raise farm incomes. Wijayaratna et. al. (1996) studied crop diversification in Sri Lanka over a ten year period - 1982-93. All crops were analyzed as import substitutes and the results clearly showed that rice and all other field crops (OFCs) analyzed except green gram, had a comparative advantage for local production. Edirisinghe (1991) estimating domestic resource cost (DRC) also concluded that Sri Lanka has a comparative advantage in rice production. By contrast, using the same methodology, the World Bank Report (1996, p. i) concluded that "overall, Sri Lanka shows no comparative advantage in the production of rice or OFCs in either major or minor irrigated or rainfed agriculture." The different conclusions seem to rest principally on different assumptions regarding the cost of labor and of irrigation in crop production. Given the fact that rice is almost the only crop that can be grown on puddled land in the wet season, and that non-farm employment opportunities are extremely limited, for most rural families producing rice provides the highest return to their labor and other owned inputs. In addition, farmers like to ensure food security by producing their own subsistence.

OFCs are more suitably grown under irrigation in the dry season. However, depending on the soil conditions, the cost of serving individual fields and of switching back and forth from wet season rice to dry season upland crops may be so high as to make the practice uneconomical (World Bank, 1985). In addition, domestic demand is relatively low and prices very volatile. Wijayaratna et.al. (1996, p. xiii) conclude that the opportunities for continued expansion of production of traditional OFCs - chili, onion, green gram, black gram, and vegetables - are limited. There has been a declining trend in the profitability of all OFCs related to the narrowing gap between demand and local production as well as

the increase in the cost of production. Thus, more attention needs to be paid to searching for special crops for special markets and to increase the agribusiness opportunities for added value and for exports.

In summary, the rapid growth in nonplantation agriculture from the mid-1960s to the mid-1970s is no longer sustainable since the potentials offered by the new seed-fertilizer technologies and the development of new irrigated areas have now been almost fully exploited. A major constraint to agricultural development lies in the slow growth of the non-agricultural sector and lack of non-farm job opportunities.

Another emerging constraint is the growing scarcity and competition for water for both agricultural and non-agricultural purposes. Since food security in Sri Lanka still relies heavily on the irrigation sector, we now turn to examine issues related to the growing competition for water and the potentials for improving water use efficiency through the recommended privatization of irrigation schemes.

Literature Cited

Anand, Sudhir and Ravi Kanbur, S.M.(1995), *Public Policy and Basic Needs Provision: Intervention and Achievements in Sri Lanka*, in Jean Dreze et al (ed), *The Political Economy of Hunger*, Clarendon Press, Oxford.

Aluwihare, P.B. and Kikuchi, Masao. 1991. *Irrigation investment trends in Sri Lanka: New construction and beyond*. Colombo, Sri Lanka: International Irrigation Management Institute (IIMI).

Bhalla, S. S. And Glewwe, P (1986), *Growth And Equity In Developing Countries: A Reinterpretation Of The Sri Lankan Experience*, World Bank Economic Review, 1.

Edirisinghe, Neville. 1991. *Efficiency and Policy Incentives in Rice Production in Sri Lanka*. International Food Policy Research Institute (IFPRI).

Human Development Report. 1994. United Nations Development Programme (UNDP).

Isenman, P. (1980), *Basic Needs: The Case of Sri Lanka*, World Development, 8.

National Development Council (1996), *Agricultural Policy: Report of the national Development Council Working Group on Agricultural Policy*, Colombo, Sri Lanka, duplicated.

Muller, H.P and Hettige, S.T.1995. *The Blurring of a Vision The Mahaweli*.

National Policy Framework. 1995. Ministry of Agriculture, Lands and Forestry, Sri Lanka.

Osmani, S.R. 1994. *Is there a Conflict Between Growth and Welfarism? The Significance of the Sri Lanka Debate*. Extract from *Development and Change* Vol. 25.

Sahn, D.E. (1987), *Changes in the Living Standards of the Poor in Sri Lanka during a Period of Macroeconomic Restructuring*, *World Development*, 15.

Sen, A.K. (1981), *Public Action and the quality of Life in Developing Countries*, *Oxford bulletin of Economics and Statistics*, 43

Wijayaratna, C.M; Panabokke, C.R; Aluwihare, P.B; Charles, S.H and Sakthivadivel, R. 1996. *Potential for Diversified Cropping in the Rice Lands of Sri Lanka*. IIMI Country Paper, Sri Lanka No. 14. Colombo, Sri Lanka: International Irrigation Management Institute (IIMI).

World Bank (1996), *Sri Lanka Non-Plantation Crop Sector Policy Alternatives*, Agriculture and Natural Resources Division, South Asia Region.