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Strategies to address the National Food Security and Environmental Sustainability in the context of changing Climate and Global Trade Rules.

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Synopsis: Food security has been a major area (social & political) of concern of all the Governments, in the island's history, especially after World War II in order to protect the masses from food shortages and starvation. Unprecedented population explosion, technological and industrial development and the ever changing climatic and environmental conditions have had a greater influence in human needs and their life style; creating new dimensions on food security, during the last half century. Considering the vitality of this subject many International agencies have been established in the post war era to take care of this sector. Accordingly, Governments and Funding Agencies have made heavy investment to increase food production (irrigation infrastructure and agricultural research & extension sectors) in the third world since 1960's and the significant productivity gains in the food production process, realized over the last two decades, has been able to protect the masses from starvation.

In Sri Lanka too, large measures were taken to address this issue since 1930's by restoring the abundant ancient irrigation infrastructure. Large investments made in restoring and rehabilitating the irrigation systems in the intermediate and dry zones during the post independence era and the subsequent investment on the Accelerated Mahaweli Development Programme (AMDP) have resulted in increased food production and reduced the food shortage and poverty to a considerable extent during the last 2-3 decades. This reflects the success of the strategies that were implemented by successive Governments, during the last half a century. However, the current situation in Sri Lanka is that there is hardly any scope for construction of large-scale irrigation schemes and/or expansion of the existing irrigation schemes, and the output growth in the agricultural sector is stagnated.

Population growth, land and water resources, climatic and environmental conditions and the rising demand for water in other sectors are the major issues connected to food security, while the changes in political and economic conditions of the country as well as that are in the neighboring countries play the governing role. These factors have to be viewed and analyzed collectively in a single framework in developing strategies to address food security. Improved rural infrastructure (roads, transport, market, electricity, communication), improved irrigation and farming technology, and appropriate, site-specific and farming practices could underpin the success of the strategies for food security. The legislative enactments, trade agreements, management models and the institutional arrangements play key roles in managing and harnessing the former in order to accrue the anticipated results, to provide an improved living condition for all in a sustainable manner.

It is intended to examine, in this paper, the role played by the key elements that are underlying the food security concept, future scenarios of this sector and the most appropriate strategies that are to be developed to address the food security in the next 2-3 decades

1. Introduction

The most fundamental human right, proclaimed by the Universal Declaration of Human Rights is to be free from hunger. Without this right there cannot be any other, for mankind. All people have a right to adequate and safe food, and the actions taken by the governments must respect, protect and fulfill this right. Despite the impressive advances in agriculture in many developing countries, food production and distribution processes have failed to keep pace with the

demand imposed by the rapidly growing population, leaving some 800 million people, especially in the developing countries, to be chronically undernourished, which is the consequence of the lack of access to adequate and safe food. The level of undernourishment in Sri Lanka stands around 4.5 million according to

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the latest report from the FAO, which is nearly 25% of the population.

Ensuring food security is equally important as providing state security and health security and it is the main underlying factor in keeping mankind healthy and active and above all free from hunger, and has been the main concern of every household, state/nation and the global communities. Accordingly the Governments, International Organizations and even a large number of international and local NGOs have stepped into this subject in order to improve the global food security situation.

According to the FAO terminology database (derived from the World Food Summit, 1996) Food Security is defined thus: "Food security exists when all people, at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". It is a function of three main apparent factors, viz: availability (production & transport), stability and affordability (access), but the underlying causes of these factors are large in number and are very complex in nature.

2. Status of Domestic Food Production & Consumption

2.1 Background

Sri Lanka is predominantly an agricultural country with a long history of irrigated agriculture, and has been named as the "Grain house of the Far-east" with surplus grain production in the past. Rice has been the major staple food of the nation and the natural resources (water, soil and the climate) found in the country were very conducive for rice production. Large irrigation infrastructure constructed in the dry and intermediate zones of Sri Lanka during the first and second millennia have been the live wire of the then agriculture in order to achieve such a production. This reflects the success of the vision on food security that the rulers and the Governments in the country had in achieving and maintaining self-sufficiency in rice to feed the nation.

There are a few reasons for Sri Lanka to be based on this footing in the food security domain. One is that farming, the oldest food production process, has been the traditional occupation of the

rural folk, and they believe that having sufficient quantity of rice (paddy) at home for consumption during a season (six months) is an unchallenged prosperity and a social respect. Further, farming has been practiced in the villages as a cultural event too.

Secondly, until the modern industrial sector intruded into the villages there were no other livelihood activities that they could be engaged in, with their knowledge and skill, except in primitive technology based industries. A traditional farming family is not only engaged in paddy cultivation, but also in home gardening and livestock development. This integrated and comprehensive set up provided a stronger food security condition for the family.

Thirdly, the climatic condition in Sri Lanka is such that the wet season (*maha*) brings substantial rainfall. The only suitable crop for lowland fields is rice. Under the circumstances the vast area developed for agriculture has to be utilized for rice production.

2.2 Policy Objectives

In the modern era of agriculture, successive governments have taken large measures in the post independent era to improve the country's food production to meet the demand for its increasing population. In this context the term "*self sufficiency in food*" has been associated in policy documents as well as in the policy manifestos. The term "Food Security" has come in to the literature in the recent past subsequent to the introduction of open economy policies and as a result of the globalization process. The prominence of agriculture is well illustrated in the Report of the National Policy Framework for agriculture, land and forestry (Ministry of Agriculture, Land and Forestry, 1995). Thus, Paddy is the staple carbohydrate of Sri Lankans and its importance to the nation's economy via saving of foreign exchange through import substitution and employment of a large segment of the rural population cannot be overemphasized. About 1.8 million farmers or 10 % of the total population are engaged in paddy cultivation. Rice accounts for 45 % and 40 % of per capita calories and proteins, respectively, in the Sri Lankan diet. Hence, food security, by pursuing a policy towards achieving self sufficiency in the major staple, rice should be a major goal".

This is further reinforced by the diversified agricultural policies adopted by the government in the recent past, in an integrated manner. The new agricultural policy spans a vast area covering environment, biodiversity, infrastructure development, agricultural research, transfer of agricultural and other technologies, input management, crop diversification, domestic and international trade and so on. Agricultural policy has been aided by a healthy environmental policy being adopted by the Ministry of Environment and Natural Resources (CBSLAR, 2002). Agricultural research has received top priority in the current policy frame and a sum of Rs 100 million has been allocated for this purpose in the budget for 2003. The fund is to undertake research in high priority areas for demand driven research in both private and state sector organizations (CBSLAR, 2002). The marketing infrastructure has been enhanced with the promotion campaign of the Forward Sales Contract System, introduced in 1999, among farmers, buyers, policy makers and the general public. Establishment of Dedicated Economic Centres (DEC) at Meegoda and Embilipitiya is a major breakthrough in providing improved market facilities, which gives immense opportunities for the rural community for better trading in those areas.

The draft policy paper prepared by the Ministry of Agriculture & Livestock on "National Agricultural Policy and Strategies (NAPS)" has clearly identified many issues, which have serious influence in agricultural productivity. The objective of "NAPS" is to present a series of measures at harnessing and energizing the growth potential in the food crop and livestock sectors to maximize its contribution to economic development. It further asserts that although food security is an important aspect, it cannot be pursued at the cost of increasing domestic food prices.

2.3. Current Domestic Status of Food and Nutrition

According to the statistics published by the Department of Census & Statistics based on 2002 survey, "poor household" is defined as the households spending more than 50 % of the expenditure on food and the average adult equivalent food expenditure is less than Rs 1,338.38 per adult per month are considered as poor households. Accordingly Sri Lanka has

Poor households 23.9 %
 Poor population 28.1 % or 5.26 million
 Per capita Energy intake per day in poor households 1778 kcalories
 Per capita Energy intake per day in non-poor households 2185 kcalories

| Year | 1980/ 81 | 1985/ 86 | 1990/ 91 | 1995/ 96 | 2002 |
|--------------|-------------|-------------|-------------|-------------|------|
| Food Ratio % | 65.0 | 57.6 | 59.2 | 53.2 | 43.8 |

Food Ratio 43.8 %

Household consumption quantities per month for selected food items by survey period

| Item | Unit | 1980 /81 | 1985 /86 | 1990 /91 | 1995 /96 | 2002 |
|-------------|-------|-------------|-------------|-------------|-------------|------|
| Rice | kg | 46.6 | 44.4 | 44.8 | 37.9 | 36 |
| Wheat Flour | kg | 3.6 | 4.1 | 2.6 | 2.8 | 3.0 |
| Bread | kg | 7.8 | 9.2 | 9.6 | 12.3 | 9.9 |
| Beef | grams | 590 | 780 | 805 | 482 | 1300 |
| Chicken | grams | 45 | 115 | 334 | 870 | |
| Eggs | No | 7 | 7 | 12 | 13 | 10.9 |
| Cow's milk | ml | 2175 | 2076 | 1743 | 630 | NA |
| Milk powder | grams | 590 | 453 | 840 | 1113 | 1300 |

Source: Department of census and Statistics

Food ratio value of 65 % in 1980/81 has fallen to 43.8 % in 2002. High food value ratio indicates higher vulnerable segments in the society. Decline in food ratio indicates that there is some reasonable improvement in the domestic food and nutrition status and poverty reduction processes.

The above table shows that there is a decline in the consumption of rice and beef from 1980 to 2002 while a steady increase in the consumption of bread up to 1995/96 then a decline and an upward trend in the consumption of chicken, eggs and milk powder indicating a diversified food consumption pattern. However, consumption of cow's milk has decreased from 2175 ml to 630 ml over the period from 1980/81 to 1995/96 and it is a notable feature.

| Country | Proportion of population undernourished 1996-98 % | Number of undernourished 1996-98 Million | Average per capita Dietary Energy Supply (DES)** 1996-98 kcal/day) | Share of cereals, roots/tubers in total DES % | Life expectancy at birth (years) 1998 M/F | Under five mortality rate per 1000 | Prevalence of child malnutrition 1992-98 (children < 5 years) |
|-----------------|---|--|--|---|---|------------------------------------|---|
| Bangladesh (5)* | 38 | 46.8 | 2890 | 84 | 58/59 | 96 | 56 |
| India (4)* | 21 | 207.6 | 2830 | 64 | 62/64 | 83 | - |
| Nepal (4)* | 28 | 6.2 | 2390 | 80 | 58/58 | 107 | 57 |
| Pakistan (4*) | 20 | 28.9 | 2440 | 57 | 61/63 | 120 | 38 |
| Sri Lanka (4)* | 25 | 4.5 | 2410 | 56 | 71/76 | 18 | 38 |

- (4)* Indicates that the percentage undernourished is 20 % - 34 %.
- ** High values of DES indicate low diet diversification and vice versa.

The "Committee on World Food Security" of FAO has published the assessment of the World Food Security Situation (Report No CFS: 2001/2, March 2001). The committee has developed seven indicators for global monitoring of food security outcomes in the domain of food consumption, health and nutrition status. The available data with respect to six indicators are reproduced below.

The above table shows that Sri Lanka ranks third in percentage of population undernourished, second in average Dietary Energy Supply (DES) but is the highest with respect to other indicators, reflecting an improved status in the area of food security.

3. Food Production in Sri Lanka

3.1 Irrigation Development

Irrigation has been the predominant element in the agricultural policy in the country since the 1930s. Since then, a number of irrigation and settlement projects were constructed in the dry zone of Sri Lanka until very recently and this was viewed as one of the most important investment opportunities in the country receiving the support from one political regime after another. Consequent to the introduction of an open economic policy in the country in 1977, the

country's economic development direction took an important turning point. The thrust of the changes was in the direction of reducing government interventions and allowing the market forces to guide the pattern of economic activities. However, in this regime, too public investment in the irrigation sector received top most priority. During this period the Mahaweli development project was already under implementation on a phased out mode but it was declared as the Accelerated Mahaweli Development Project (AMDP), the largest multipurpose water resources development project, in that configuration, having a number

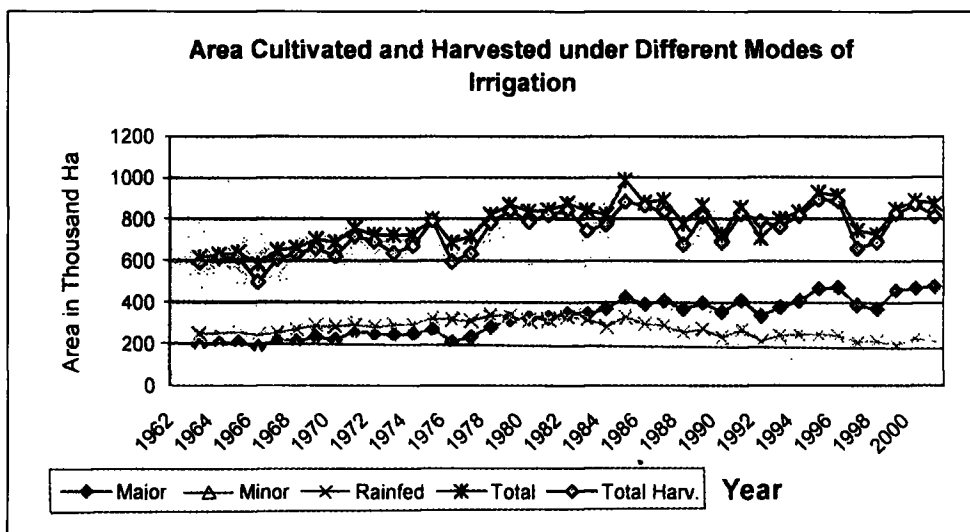
of large reservoirs constructed for irrigation and hydropower generation. The main objectives behind these projects were food production towards self-sufficiency and employment generation, reducing population pressure in the wet zone, in addition to hydropower generation. Accordingly, from the early 1960s to 2000, the area cultivated under major irrigation schemes rose from 200 to 480 thousand hectares, while that in the minor irrigation sector has remained fairly constant and the rain-fed agriculture has recorded a decline (Chart I).

Pumped irrigation systems too were developed as a complementary activity in most of the irrigation projects in order to cultivate cash crops. Ground water also has been tapped, especially in small-scale farming, to supplement surface water in minor irrigation schemes, especially in the dry (Yala) season. High rates of returns, socially as well as privately, on investments in

agro-wells and pumps have encountered their rapid diffusion, making the private investments as major options in phase III of irrigated agriculture. Large potentials exist for diffusion of agro-wells and pumps in irrigation schemes (Kikuchi M et al, 2003).

While there is an upward trend in the area cultivated under irrigated conditions there is a marked decline in the area cultivated under rain-fed conditions. The decline is very much prominent in the urbanized wet and intermediate zones due to an unprecedented increase in demand for land for housing and other commercial needs. A significant increase in land fragmentation in the agricultural sector from 1.8 million holdings in 1982 to 3.3 million

Chart I



Source : Department of Census & Statistics

holdings in 2002, has taken place in the country during the last two decades as a result of the division of land (DCS, 2002). However, the decline in the land cultivated under rain-fed

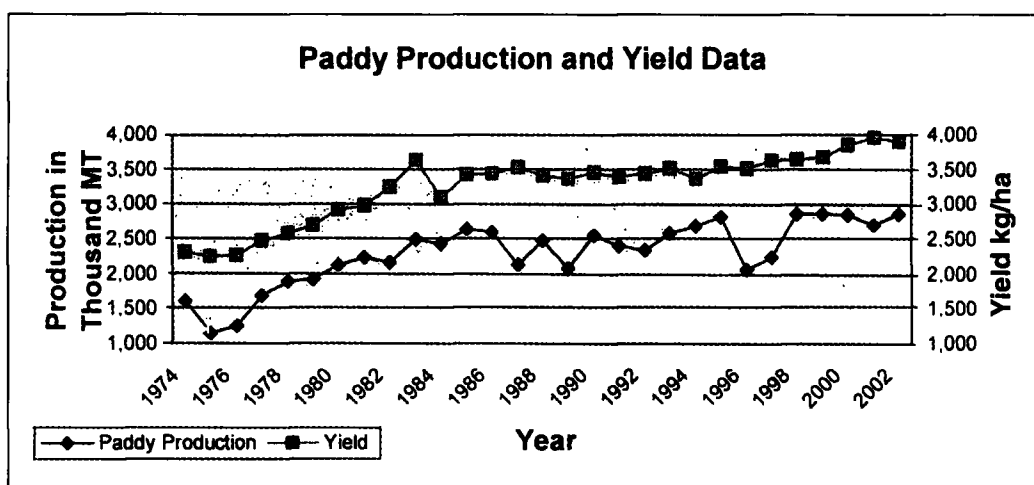
conditions is not felt very much in paddy production because of the substantial increase in production under intensified irrigated conditions with increased yields.

3.2 Paddy Production in Sri Lanka

Chart II

Chart II shows that there had been a steady increase in paddy production from 1974 to date except for few shortfalls intermittently, due to decline in the area cultivated, caused by droughts. The yield levels have steadily improved over the years and reached a new record value of almost 4 MT/ha. The average yield during Yala 2001 exceeded 4 MT/ha for the first time and reached 4.1 MT/ha. The improvements on the yield levels

could be attributed to the use of good quality seeds along with the adoption of the technology package recommended by the Department of Agriculture. Reduction in the extent cultivated



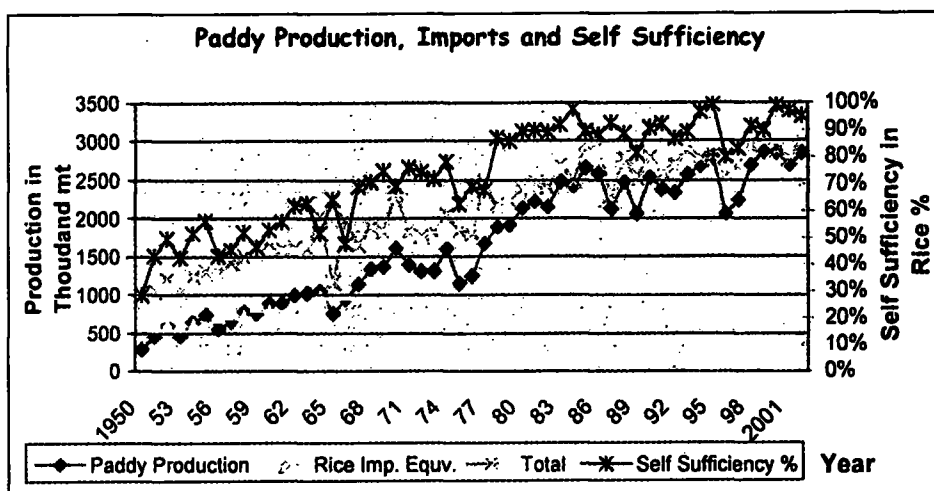
Source: CBSLAR 2002, DCS

due to the scarcity of water during both seasons has eliminated the cultivation of marginal lands, which had a positive impact towards improving the yield.

Chart III information reflects that irrigated agriculture has been the most important strategic factor in the economic development of Sri Lanka, coupled with the diffusion of seed fertilizer technology. Irrigation development has tremendously contributed to increase the rice production and, as a result, import of rice has declined considerably and the degree of self-sufficiency in rice has risen from about 30% in 1950s to almost 100 % in 1995 and 2000 (Chart III). This is a great achievement the country has realized in spite of many crises in the past.

the policy makers, donors and the water managers that the performance of irrigation schemes is far below expectations. This sector utilizes almost 85 % of the developed water, which refers only to the water abstracted from blue water (surface water and renewable ground water) reserves (lakes, rivers and aquifers), and is the water flow conventionally considered as an economic resource. High operational and maintenance cost, ineffective operation, low productivity of water and low water use efficiency and environmental degradation are the major concerns in this sector. Poor on-farm water management, wasteful irrigation deliveries, improper input management, non-adaptation of location specific cultivation practices are some of the issues concerned.

Chart III



Source: CBSL Economic Reports, Kikuchi et al, 2002
 The current population of the country is around 18.7 million with an approximate household of 4.5 million. The population growth is 1.1 % and the expected population in 2020 would be around 23.0 million. If the same population growth rate and food consumption pattern continues, the country has to secure nearly 2.3 million MT of rice per annum, equivalent to 3.5 million MT of paddy, for which the country has the resources and the potential. Rice will remain as the important part of food security at household level in the foreseeable future.

There had been ups and downs in the performance of this sector during the last four decades, but the sector has maintained a steady growth. Despite these achievements, the country's agriculture sector continues to suffer from natural shocks, technology gaps, low investment, inadequate availability of quality inputs, inadequate funding, transportation & marketing problems, and the lack of a consistent set of trade and tariff policies. The problems are manifested in post-harvest losses, low labour productivity, producer unrest, out migration of labour and volatile prices (CBSLAR, 2002).

3.3 Performance of the Irrigated Agricultural Sector

Although irrigation development has played the key role in increasing food production towards realization of the policy objectives in self-sufficiency, yet there is a general concern among

3.4 Adverse impacts of Irrigated Agriculture on Environment

The overall perception about irrigation development to ensure food security and the environment, among the majority of the general public, has been very poor in the past, confining

only to the extent of meeting their short-term needs. The considerable regard and pervasive feeling about water and the environment, that had existed, based on religious and cultural heritage, for ages, got eroded during the last few decades under the increasing pressure of poverty, hunger, mismanagement of natural resources and unplanned development activities. This could have resulted due to political reasons, lack of knowledge & technology, lack of funding or even due to ignorance. Whatever the reason, this may end up in the destruction of development and the ecosystem in the long run. It is impossible to consider water, environment and development, singly, in isolation, as they individually and collectively interact eternally. Under natural conditions they are mutually dependent on each other and separation is impossible.

The investment in the irrigated agriculture sector has resulted in increased benefits, but productivity response and sustainability of irrigation systems have been constrained by salinity, water logging, low yields, lower prices and poor markets. Discharge of effluents containing suspended solids, nitrates and phosphates cause marked changes in the ecology of the receiving water. The use of agro-chemicals and fertilizers in agricultural and farming activities, have created considerable changes in the quality of return water, biodiversity, aquatic ecosystems and change of soil properties. These changes include blanket-weed growth and algae blooms in rivers and reservoirs, which are detrimental to human use. Further, soil erosion and overexploitation of natural resources are the other adverse effects caused by this sector. Deterioration of the quality of groundwater also has been reported from many parts of the country. Sustainability of food production mainly depends on the sound and efficient water use and conservation practices, primarily in irrigated and in rain-fed agriculture, and also in livestock, inland fisheries and agro forestry. Therefore, the current subsistence agriculture needs to be transformed into an environmentally sustainable, productive and economically viable venture in order to ensure food security.

4. Future Scenarios

4.1 Trend for New irrigation Projects

Irrigation development means large investments and recurrent expenses, substantial energy requirements, loss of large areas of land and waste of diverted water. This is why the investment on new irrigation development is not gaining much attraction of the investors and forcing the water professionals even to consider the withdrawal of water that is being used for agriculture right now. The low rice price since the collapse of the commodity boom in the mid 1980s discouraged the government and international donor agencies from investing in new irrigation construction.

However, any new irrigation development has to be accompanied by environmental impact assessments, the extent of which will depend on the scope of the project and the potential negative impacts. Also, the proposals for such schemes should consider more rational exploitation of natural resources, increased water use efficiency and productivity. The technologies employed in such a proposal should be thoroughly evaluated, including their potential conflicts with other land and water uses.

4.2 Future Directions

Based on the drawbacks experienced by the irrigated agriculture sector at home, one can argue that Sri Lanka has no comparative advantage in producing rice at a higher cost whereas it can be purchased at a lower price. This argument holds true as long as the market conditions are perfect and the farmers who are getting expelled from paddy cultivation have alternate employment elsewhere. Although open economic policies are in operation for more than two decades in Sri Lanka, it has not developed to a level where aspirations of the sectors can be achieved.

On the other hand, the heavy investment made in developing irrigation infrastructure, not only using local funds but also on borrowed funds, during the last half a century, merely to achieve self sufficiency in rice cannot be simply overlooked in the light of liberalized economic policies. This was the major reason for the rice prices to decline in the international market, due to increased production, which largely reflects the success of global and domestic strategies adopted

to ensure food security. Under these arguments a series of questions emerge.

- What would have been the market price of rice if not for the large investment made in this sector, which fostered increased production?
- Just because of the current low market prices of rice, if rice cultivation is given up in the already developed irrigation schemes, what will happen to this infrastructure?
- Will this not lead to another series of heavy investment in restoring the infrastructure when the market price of rice goes up?
- Where to find alternative employment for the farmers who are already engaged in rice production?

4.3 The Future of Irrigated Agriculture

Irrigated agriculture will continue to play the dominant role in feeding the nation in spite of the shortfall discussed above. Also, agriculture continues to be the country's largest water user in terms of volume, with relatively low efficiency. Further low labour productivity in agriculture and relatively high cost of fertilizer and agro-chemicals do not allow the cost of rice production to come down. Labour wages have increased much faster than productivity in this sector and lags far behind the productivity in the industrial and service sectors. Under the circumstances, the domestic agricultural sector, especially the rain fed, is already facing a decline in extent cultivated and in the yield. In the future, the irrigated agriculture sector has to be more conscious with regard to water withdrawals and its efficient use, labour productivity; crop technology and the environmental issues in order to bring down the cost of production and to make the sector lucrative.

This will necessitate enhanced investments in modernizing the existing irrigation infrastructure, improved operation and maintenance and introducing new technologies, which are obviously capital intensive but, under liberalized economic conditions, private sector participation would be an appropriate and feasible solution to face the challenges. A viable response to falling productivity in this sector is an intense research

and extension services aiming at enhancing productivity.

5. Strategies to Address Food Security

The strategies employed to address food security in Sri Lanka during the last half a century have been very successful and it has been possible to ensure the production of the major staple grain to meet the total demand. In the overall perspective the country and its resources have the potential to feed its population today and in the future, and most of the institutional arrangements and the policy guidelines for this are in place. What is mainly and urgently required is the political will to mobilize the necessary financial and other resources with good governance, user participation and commitment. Most investment in agriculture derives benefits in the long run and, therefore, the policies governing this sector have to be firm, well specified, consistent with that of trade, and environment, and should be made known to all stakeholders in order to crowd in private sector investment.

The available water resources for agriculture in the country are diminishing gradually and this sector will face increasing competition for water from industrial and domestic users. Efficient use of water in agriculture will be the key element in achieving enhanced productivity gains as well as saving water for other uses. Thus, implementing smarter water saving agricultural technologies becomes very essential. Also, in water scarce areas, instead of rice, less water consuming, commercially viable crops, which have an export market, have to be promoted, so that at least a part of the import bill for rice could be recovered.

Modernizing and diversifying the agriculture sector through increased investment is another potential area where a substantial improvement can be realized. Since the investment in new irrigation projects indicates negative returns, modernizing the existing infrastructure and the institutions would be the most attractive alternate. The traditional food commodities offer a limited scope for increasing returns to intensified investments. Therefore, the sector needs to explore the possibilities to increase return through prioritization and diversification in order to attract the commercially oriented private sector investment.

Irrigation infrastructure needs to be modernized and Irrigation technology needs to be upgraded while the water management has to become more service-oriented and cost effective with user participation. Modernizing the existing irrigation infrastructure for improved performance in water deliveries, better water saving agricultural practices and for improved on-farm water management, are very essential to achieve productivity gains. Also, introducing agricultural implements with low cost technologies is an important area to be focussed, since the productivity of labour in agriculture is very low.

Dissemination of already developed technologies to the farming communities through an intensified extension network is a vital process in enhancing the productivity. Also, more research is required in using fertilizer, agro chemicals and other inputs in order to reduce the cost of production. More and more high yield varieties should be developed and distributed in order to increase the yields since there is considerable potential for improvement. Also, action should be taken to promote the cultivation of high quality rice for the export market in areas where assured water and other resources are available.

Strategies implemented to enhance food security in the country have to be coupled with integrated rural development inclusive of agriculture, staple as well as other field crops, livestock, inland fishery and other industries in order to enhance diversified income for the farmers. This has to be backed by a well-constructed, regulatory framework and stronger user participation at all levels with required legal backing. Fostering this approach through dedicated commitment of all the sectors (political, private, GOs, NGOs & civil groups) is very vital in realizing the desired benefits.

Agriculture is exposed to all natural conditions and erratic changes of climate and, therefore, uncertainty plays a major role in accruing benefits. In the case of industry or any other venture the uncertainties can be controlled and the production target can be achieved most of the time, but not in agriculture. Though the farming community is the poorer sector in the developing countries, they are the people who produce food to kill the hunger of the others by farming. They should be patronized and supported by all others.

The government should restore the fertilizer subsidy for the rice farmer even though there are many cross arguments and advocacy against this, because, the cost of the subsidy would be negligible compared to other wasteful expenses the country has to incur.

6. Conclusions

Agriculture remains as the dominant economic sector at home, in terms of food security, poverty alleviation and providing employment, since the majority of the population is in the rural areas. Currently, they are mostly engaged in agriculture to feed themselves as well as the urban population. They will continue this exercise in the future too, not only to feed the existing and rapidly increasing rural population, but also the urban population. In the absence of any new irrigation development in the near future, the existing irrigated agriculture sector has to play a dynamic and prosperous role in a sustained manner in order to deliver these expectations and meet other social aspirations.

Since the demands for food are non-negotiable, the country has to produce food for the growing population and hence it always emerges at the top of the political agenda. Food security can be achieved by a combination of local production (irrigated & rain-fed), food import and proper distribution of food among all. Many are not in favour of un-secure food imports due to the involvement of scarce foreign exchange and the possible risk of embargo but on the other hand the rice import bill is a very small fraction of the country's total import bill. The most preferred option is to produce food locally, by improving the productivity in the agricultural sector. Enhancing the productivity of water should be the theme for agriculture, both in the irrigated and rain-fed, with the positive support of other factors, which have an influence on crop production. However, there is no single solution to ensure and maintain food security with diminishing water resources and changing global trade rules, but an appropriate combination of these factors could lead to a better situation in ensuring food security,

Further, ensuring food security and poverty reduction are in a vicious circle and cannot be viewed in isolation. Market failure is one of the main contributing factors, among many, which

cause lack of access to adequate and safe food. The people who are suffering from hunger are the poorest of the poor, least able to express their needs in terms of market language; effective demand. The situation is worse under liberalized economic policies, since the needs of the poorer are not felt in the open market and therefore the government has to implement safety-net measures for the vulnerable groups in the society. Also, the government has to implement consistent policies in enhancing the production and distribution of food through a balanced combination of policy adjustments and practical measures. Substantial investments are required in developing rural infrastructure, institutions, rural industries and market facilities, which would not only help the farming community for productivity gains but also enhance rural income through both farm and non-farm employment.

Though the primary responsibility for ensuring access to adequate food rests with the individual, his or her family, their wider social circle and the communities in which they live, it has to be fostered by all the sectors in the country, the government, civil society and the private sector, under a firm and consistent policy frame with good governance, as it affects every one finally. Social and political commitment is a pre-requisite for continued maintenance of food security. Efforts to eradicate hunger need, therefore, to focus on empowering families, groups and communities to achieve self-reliance inclusive of food security, but supporting this, where absolutely necessary, with external inputs to address priorities articulated at local level. Also, such strategies should include sufficient protective measures in order to maintain the environmental sustainability and the ecological balance.

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