Sri Lanka
State of the Economy Report 2016

Chapter 12
Role of Economic Incentives in Financing Agricultural Investments

by
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12. Role of Economic Incentives in Financing Agricultural Investments

12.1 Introduction

Sri Lanka needs accelerated agricultural growth to meet growing consumer demand for food, as well as to pull people out of poverty in rural areas of the country. Whether this dual burden was satisfactory addressed by sectoral policies adopted during different economic policy paradigms is still open to debate. The country has seen mixed results in relation to both food production and consumption; aggregate consumption of all major food groups has increased over the years. Domestic production and food imports too have increased; the former accounts for nearly 80 per cent of aggregate food consumption, while the value of food imports has grown in absolute terms even though its share in total imports has remained constant over time.

While expansion of local food production is due to both area expansion and yield enhancement, more disaggregated analysis shows that output of other field crops has been overshadowed by rice production. For example, movements in annual crop areas over time indicate that rice is the only crop that has increased sharply. A similar relationship prevails in the contribution of yield enhancement of rice relative to the other field crops due to recent yield stagnation of the latter. Moreover, Sri Lankan farmers who are price takers face severe price discrimination as shown by flat long run trends with short run fluctuations in real producer prices, even with ever increasing retail food prices. This low productivity and sluggish producer prices, combined with small farm sizes averaging at 0.48 ha,[1] do not provide adequate income for farmers to meet their basic consumption needs, let alone investment on farm improvements.

These trends do not support food security or poverty reduction efforts to any degree in Sri Lanka, especially in the rural agricultural sector that employs around 30 per cent of the labour force. This is clearly evident in indicators relevant to both food security and poverty. The depth of hunger for Sri Lanka in 2014 was 216 kcal/capita/day, indicative of a medium level food deficit among undernourished children;[2] the wage rates in the agriculture sector are the lowest, averaging Rs. 12,541 per earner per month compared to the industrial (Rs. 17,142) and services (Rs. 21,886) sectors.[3] While poverty rates in the agricultural sector halved between 2006/07 and 2009/10, and remained

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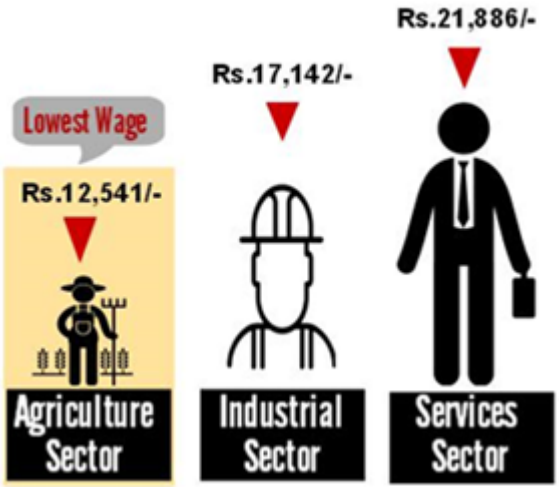
[1] DCS, *Census of Agriculture 2002*, Department of Census and Statistics, Colombo.

[2] Depth of hunger, which is the difference between the minimum and the average dietary energy intake of the undernourished population, indicates by how much food deprived people fall short of minimum food needs. The depth of food deprivation is medium when it is 200 to 300 (Global Hunger Index 2014).

[3] DCS, *Labour Force Survey 2012*, Department of Census and Statistics, Colombo.



Agricultural investment is one of the most important and effective strategies for economic growth and poverty reduction in rural areas where the majority of the agrarian poor live.

at 8 per cent in 2012/13,[4] this is a result of short run producer price fluctuations owing to food price inflation that occurred globally in 2008 rather than a result of potentially sustainable drivers of growth. Under these circumstances, agriculture survives primarily due to direct and indirect support measures such as free irrigation, a massive fertilizer subsidy, support prices for rice and ad hoc trade protection measures for selected crops that are provided by the government to partly alleviate lack of alternative employment opportunities in the non-farm sector.[5]

Agricultural investment is one of the most important and effective strategies for economic growth and poverty reduction in rural areas where the majority of the agrarian poor live. Sri Lanka is indeed blessed with myriad of opportunities to strengthen its agricultural sector that include its strategic location, a growing middle class, and increased tourist arrivals. However, there is global concern about the challenges of financing agricultural development across the developing world; the amount of investment needed to achieve acceptable levels of agricultural growth far exceeds the current trends in investment in agriculture by governments and donors.[6] Fiscal constraints in Sri Lanka have already led to a

[4] World Bank (2015), *Poverty in Sri Lanka: Recent Progress and Remaining Challenges*, World Bank, Washington, D.C.

[5] Weerahewa, J., M. Thibbotuwawa, and P. Samaratunga (2015), *Dynamics of Transforming Agriculture in Sri Lanka: Trends, Challenges and Opportunities*, AERA Conference on Transforming Agriculture in Asia, Mumbai, India, 2-4 December, 2015.

[6] Hazell, P. *et. al*. (2011), "Key Issues in Promoting Increased Investments in Agriculture", Technical Workshop on Policies for Promoting Investment in Agriculture, FAO, Rome, 12-13 December, 2011.

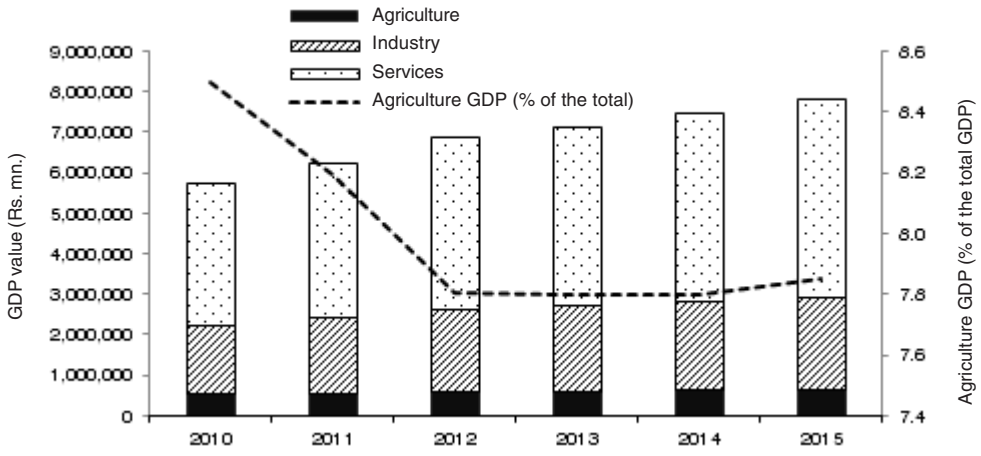
marked reduction in government investment in agriculture. Given the scope of the challenges, identifying innovative economic incentives to leverage the existing resources in a more efficient way and to reverse the decline in investments for agriculture in Sri Lanka are the main focus areas of this chapter.

12.2 Agriculture Sector in the Economy

Sri Lanka's agricultural sector is dualistic in nature in that it comprises of a well-developed export-oriented plantation sector and a less developed, partially market-oriented food crop production sector. The former produces tea, rubber, and coconut in medium to large estates while the latter producers rice, subsidiary food crops, and vegetables and fruits in predominantly small holdings. A significant transformation has taken place within the agricultural sector in terms of commercialization of the food crop sector with heavy public investments. With these developments, agriculture remains a vital sector in the economy through the provision of income, employment, foreign exchange, food and raw materials.

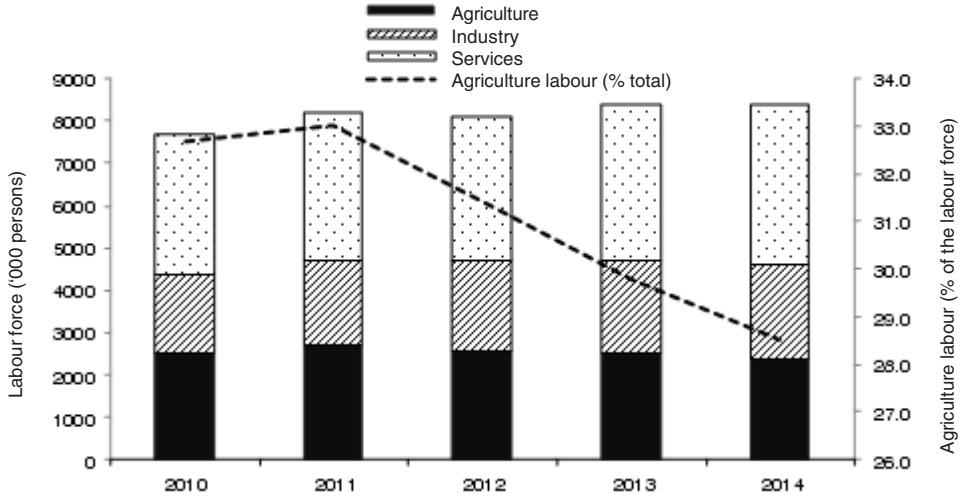
Despite the growth of agricultural GDP over the past few years, its share in total GDP has declined until 2012 and then, become fairly constant since (Figure 12.1). The share of agricultural GDP from total GDP was 8.5 per cent in 2010. This moderate contribution dipped further to 7.9 per cent in 2015 due to faster growth rates recorded by industry and services sectors. Since 2010, the agriculture sector grew at a rate of 4.4 per cent on average. By contrast, industrial and services sectors have shown much higher growth rates of 5.8 per cent and 6.9 per cent, respectively, for the same period. The decline in agriculture's contribution to GDP whilst contributing to absorb a larger share of employment is raising concerns about its productivity and the future role of agriculture in Sri Lanka's economic growth.

Figure 12.1
Agriculture Contribution to GDP (2010-2015)



Source: CBSL, *Annual Report,* Central Bank of Sri Lanka, Colombo, various years.

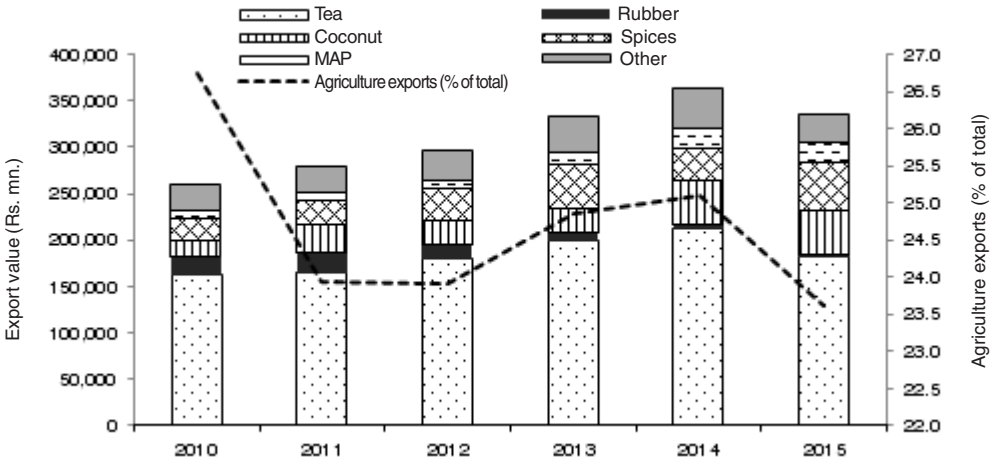
Figure 12.2
Agriculture Contribution to Employment (2010-2015)



Source: CBSL, *Annual Report,* Central Bank of Sri Lanka, Colombo, various years.

Agriculture still continues to be a significant source of employment and livelihood, accounting for 28.2 per cent of the employed in 2015 (Figure 12.2). The largest shares of employment generation come from rice and tea - the two dominant sectors in the non-plantation and plantation sectors, respectively. Further, the sector utilizes 43.7 per cent of the country's total

Figure 12.3
Agriculture Export Diversification (2010-2015)



Source: CBSL, *Annual Report,* Central Bank of Sri Lanka, Colombo, various years.

land area,[7] and remains the mainstay of the rural economy in Sri Lanka.

Earnings from agricultural exports too have not experienced a healthy growth in the past decade; low volume growth in exports and limited value addition are part of the problem. However, all the major agricultural exports, except rubber, have shown positive growth during 2010-15; export earnings have increased in value terms, with the share of agricultural exports in total exports hovering around 25 per cent during 2010-15 (Figure 12.3). Diversifying export commodities and adding value to exports is important. However, Sri Lanka's agricultural exports are still limited to a few traditional products and others such as spices, vegetables and fruits, with some processing.

Table 12.1 shows the availability of major food commodity groups categorized by domestic production and imports in 2014. Domestic agriculture still provides more than 80 per cent of Sri Lanka's food requirement in value terms. Even at individual commodity level, local production of all major food items except for sugar, pulses, canned fish and milk powder which are imported in bulk quantities exceeds 70 per cent of the total availability (Table 12.1).

12.3 Trends in Government Expenditure on Agriculture

Despite the importance of the agriculture sector for the Sri Lankan economy, it is yet to realize its full potential. Thus, the agriculture sector could be viewed as a sector that needs further economic and social development. The means to achieve this is primarily through

Table 12.1
Food Availability in Sri Lanka by Major Food Groups (2014)

	Production Quantity ('000 mt)	%	Gross Import Quantity ('000 mt)	%
Cereals	4,835.36	90.3	522.03	9.7
Roots, tubers & other starchy food	421.87	77.4	123.2	22.6
Sugar	54.86	9.2	538.97	90.8
Pulses & nuts	69.02	30.0	161.23	70.0
Vegetable (including onions)	1,055.71	85.1	184.26	14.9
Fruits	609.81	90.7	62.48	9.3
Meat	162.05	98.3	2.77	1.7
Eggs	92.81	100.0	0	0.0
Fish	512.84	97.0	15.84	3.0
Dried fish	68.2	64.5	37.61	35.5
Tinned fish	1.1	4.9	21.84	95.1
Fresh milk	278.0	100.0	0	0.0
Whole dried milk	11.6	11.4	89.91	88.6
Oil & fats (including coconut)	939.4	98.1	18.54	1.9
Total	9,134.7	83.7	1,779.21	16.3

Source: Department of Social Protection, "Food Balance Sheet 2013/14".

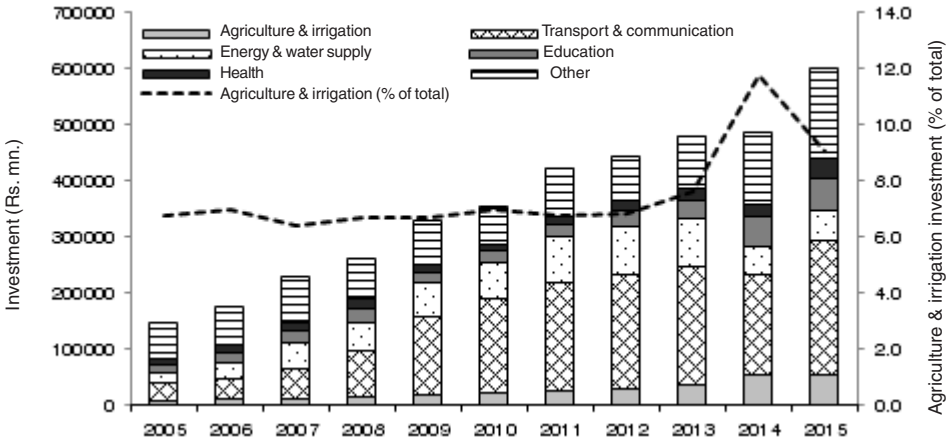
[7] http://data.worldbank.org/indicator/AG.LND.AGRI.ZS.

enhancement of agricultural productivity via increased investments.

The World Bank has noted that GDP growth in agriculture has been at least twice as effective in reducing poverty as growth originating in other sectors.[8] The regions of the world where hunger and poverty are most widespread today have seen stagnant or declining rates of agricultural investment over the past three decades. Eradicating hunger in these regions, alleviating agrarian poverty and increasing food production requires substantial increases in the level of investment in agriculture. The Food and Agriculture Organization (FAO) estimates that the yearly investment in agriculture needs to rise by more than 50 per cent in low and middle income countries.[9]

Since Sri Lanka's independence, investments on agriculture occupied a priority position in the country's public investment programme. The policy of expanding agriculture in the dry zone through heavy public investment on irrigation development and land settlement continued for over half a century from pre-independence era to the late 1980s, when the final stages of the Accelerated Mahaweli Development Project (AMDP) were completed.[10] Around 45 per cent of agricultural land is provided with irrigation facilities sourced by surplus water from the wet zone through a complex system of river diversion schemes. The simultaneous promotion of green revolution technological package of high-yielding-varieties (HYVs), inorganic fertilizer, farm machinery and agro-chemicals helped to increase food crop productivity significantly. The government invested on research and extension facilities to develop and promote HYVs and offered subsidies for purchasing fertilizer imported by public and private companies.

Figure 12.4
Public Investments 2005-2015



Source: MOFP, *Annual Report*, Ministry of Finance and Planning, Colombo, various years.

[8] World Bank (2008), *World Development Report: Agriculture for Development*, World Bank, Washington, D.C.

[9] Syed, S. and M. Miyazako (2013), "Promoting Investment in Agriculture for Increased Production and Productivity", Food and Agriculture Organization, Rome.

[10] AMDP was the biggest and the last major multipurpose (irrigation-land settlement-hydro power) river diversion scheme implemented in Sri Lanka.

Over the last decade or so, public investment has focused more on economic and social development projects such as roads, ports, expressways, bridges, etc. Currently, a high percentage of public investment goes to the transport and communication sector followed by energy and water supply, agriculture and irrigation, education, health and other investments. The investment on agriculture and irrigation increased gradually over the past ten years (Figure 12.4). Official estimates on agriculture and irrigation investments remained in the range of 6-7 per cent of government capital expenditure during the recent period. During 2014 and 2015, agriculture and irrigation investments saw higher shares of 11.7 per cent and 9 per cent, respectively, of government capital expenditure.

In 2015, the amount of agriculture and irrigation investment was Rs. 54,447 million of which a higher percentage was spent on irrigation development followed by fertilizer subsidy, plantation development and crop cultivation subsidies. Public investments in the agriculture sector are composed of food crops (41 per cent), plantation (27 per cent), fisheries (10 per cent), livestock (6 per cent) and export agriculture (6 per cent). The main public investment in the food crop sector is the fertilizer subsidy. Apart from that, public investments are on quality seeds and planting materials, research and extension, and for land sector development. These have typically been the core elements of public interventions on agriculture investments in Sri Lanka, and all other efforts such as guaranteed price schemes, cultivation loans, etc., can be considered as ancillary to this core strategy.

12.4 Is Sri Lanka's Agricultural Investment Focused in the Right Direction?

This section briefly reviews the major investments and incentives in the agricultural sector in order to identify their strengths and weaknesses for sustainable development in the sector. The main focus areas include irrigation, R&D, fertilizer subsidy, and guaranteed price scheme.

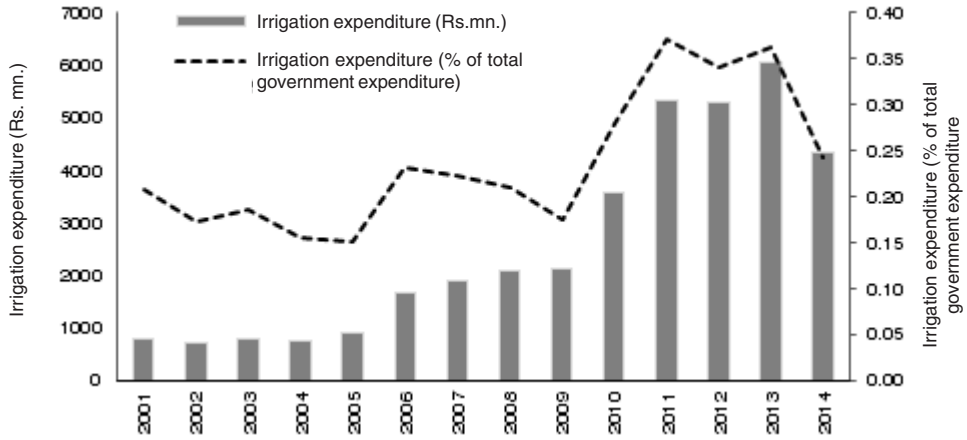
12.4.1 Irrigation Development

Sri Lanka being a predominantly rice based agricultural economy has historically been heavily dependent on irrigation and as a result, the country has been endowed with a sophisticated irrigation infrastructure. Public investments on irrigation infrastructure had been a major focus in agricultural policy even in the pre-independence era.

Successive governments invested in large-scale irrigation projects, and farmers received irrigated water for free. There are two main types of irrigation schemes in Sri Lanka; 'major irrigation' which comprises at least 650 ha of irrigated land fed by a relatively large reservoir and a network of canals, and 'minor irrigation' which consists of smaller tanks and small stream diversion projects.[11] The two types of irrigation systems are handled by separate government agencies. The Irrigation Department and the Mahaweli Authority are responsible for managing major irrigation systems. The Agrarian Development Department has a stake

[11] See IPS (2006), "Agricultural Reforms, Irrigation Water Charges and Land Policy" in *Sri Lanka: State of the Economy 2006*, Institute of Policy Studies of Sri Lanka, Colombo.

Figure 12.5
Irrigation Investment Expenditure



Source: Department of Irrigation, "Annual Administrative Reports", various years.

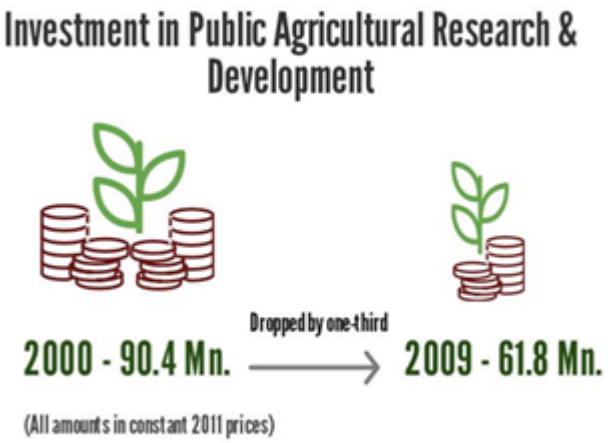
in the management of minor irrigation systems. In all, public irrigation investment can be categorized into three aspects namely, new constructions, rehabilitation of existing constructions, and operation and maintenance of existing facilities. Expenditure on irrigation management shows an increasing trend over the last decade (Figure 12.5).

Owing to this structural and organizational setting, Sri Lanka's irrigated agriculture sector currently faces two major problems; inefficiency of irrigation water utilization and the rising budgetary burden of providing irrigation water. Both these factors point to the need for some form of charging, or pricing, of irrigation water. It was suggested by the World Bank in 1996 that Sri Lanka should stop subsidizing irrigation water and introduce a water charging scheme in order to minimize inefficiency of water use and recover the budgetary expenditure on irrigation.[12] These major schemes are plagued by inefficient and wasteful use of water, largely due to its free provision by the state. On the other hand, large sums of capital have been invested initially on these projects and a substantial recurrent expenditure on operation and maintenance (O&M) is being incurred every year. Due to the absence of a mechanism of cost recovery, it is imposing a heavy burden on the public budget which is worsening over time.

12.4.2 Research and Development (R&D)

The major share of agricultural R&D is still met by public funds. All national agricultural research institutes, except the four plantation institutes, are almost entirely financed by the government. Government funding is supplemented with a few research grants from local and international sources. However, Sri Lanka's progress in agriculture research in recent decades appears to be slow. A major

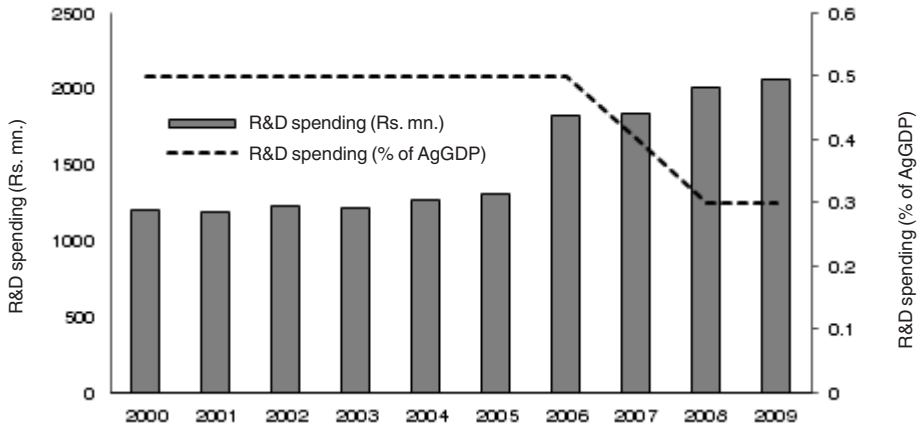
[12] World Bank (1996), *Sri Lanka: Non-plantation Crop Sector Policy Alternative,* World Bank, Washington D.C.



reason is lack of investments on research and brain drain. R&D expenditure has increased only marginally since 2000. However, there has been a sharp decline in R&D expenditure on agriculture from 0.5 per cent of agricultural GDP in 2000 to 0.3 per cent in 2009 (Figure 12.6). Investment in public agricultural R&D dropped by one-third from Rs.3.5 billion (or 90.4 million 2011 PPP dollars) in 2000, to Rs. 2.4 billion rupees (or 61.8 million PPP dollars) in 2009 (all amounts in constant 2011 prices).[13]

The reason for the decline in public agricultural R&D expenditures is twofold. First, the country's security situation pressed the government to divert resources toward combating civil unrest at the expense of other public causes. Second, revenues from a CESS on the production and export of plantation crops were gradually channelled away from R&D.[14] However, state intervention is required to promote effective R&D in agriculture as R&D in the agriculture sector shows public good characteristics.

Figure 12.6
Investment Expenditure on R&D

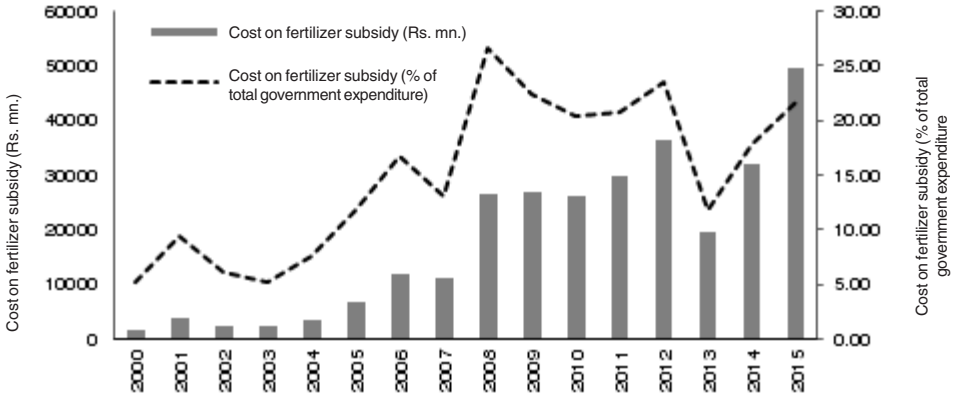


Source: Agricultural Science and Technology Indicators, available at http://www.asti.cgiar.org/sri_lanka.

[13] http://www.asti.cgiar.org/sri_lanka

[14] Girihagama, P. *et. al*. (2012), "Recent Developments in Public Agricultural Research in Sri Lanka: Country Note", Agricultural Science and Technology Indicators (ASTI), IFPRI.

Figure 12.7
Actual Expenditure on Fertilizer Subsidy Programme



Source: CBSL, *Annual Report,* Central Bank of Sri Lanka, Colombo, various years.

12.4.3 Fertilizer Subsidy

The fertilizer subsidy scheme was started in 1962 as a price subsidy. Its main objective was to increase productivity by encouraging the use of fertilizer. Fertilizer is a variable input and represents a variable cost rather than a capital investment in farmers' budgets. However, as a public expenditure, the fertilizer subsidy can be considered as an investment for maintaining the productive capacity of the country's agricultural land. Public investment on the fertilizer subsidy programme saw a remarkable increase during the last decade (Figure 12.7).[15]

Over the years, there have been several changes to the fertilizer subsidy programme in terms of price, type of fertilizers subsidized, crops that received the subsidy and the method employed - i.e., whether a fixed or variable subsidy (Box 12.1).[16] Several drawbacks have been identified in the process; these include selling subsidized fertilizer, limited storage and transport facilities,

[15] 2013 saw a sharp reduction in the fertilizer subsidy as a result of excess fertilizer stocks due to bad weather in 2012. In 2014, expenditures on fertilizer picked up again as arrears to importers in 2013 were paid off.

[16] Herath, H.M.K.V. *et. al*. (2013), The Impact of *"Kethata Aruna"* Fertilizer Subsidy Programme on Fertilizer Use and Paddy Production in Sri Lanka", *Tropical Agricultural Research,* 25(1).

Box 12.1
Major Milestones in the Fertilizer Subsidy Programme

1962:	Introduced fertilizer subsidy programme. Fertilizer subsidy was given for Urea, Sulphate of Ammonia, Muriate of Potash (MOP) and Triple Super Phosphate (TSP) at different rates according to the type of crop.
1975:	Introduced a uniform subsidy scheme for all crops, but the subsidy rates varied according to the type of fertilizer.
1983:	Introduced a fixed fertilizer price (variable subsidy programme).
1988:	Removal of subsidy for some selected fertilizer types (Sulphate of Ammonia, Rock phosphate).
1990:	Removal of fertilizer from all sectors of agriculture due to heavy burden on the government budget.
1994:	Re-introduced subsidy for Sulphate of Ammonia, Urea, TSP and MOP.
1997:	Removal of subsidy for all fertilizers except for Urea.
2004:	Fixed retail price on fertilizer until December 2005.
2005:	Introduced 'Kethata Aruna' fertilizer subsidy programme. In this only paddy farmers received a packet of fertilizer (50 kg) for Rs.350. This packet included Urea, TSP and MOP.
2011:	'Kethata Aruna' programme was extended to provide 50 kg fertilizer bag for Rs. 1200 for all the other crops.
2016:	Provide fertilizer subsidy as an allowance of Rs. 25,000 to paddy farmers for 1ha land and for two seasons.

shortage of fertilizer in the market, excessive usage of fertilizer, budgetary burden, etc. In 2015, the government introduced a mechanism to give a hectare based allowance to buy fertilizer in the market.[17]

12.4.4 Guaranteed Price Scheme

While providing foods for the rising population, Sri Lanka's agriculture sector faces a number of challenges that include production at competitive prices and meeting local and global quality standards. Agricultural commodity prices have been more volatile than those of manufactured goods over the last three decades, mainly due to the impacts of changing climate or weather related risks, and price related risks which is inherent to the agriculture sector.[18] This leaves farmers uncertain about the prices to be received at the point of sale. This problem is however, not limited to farm income, but affects the investment decisions of farmers as well. In the absence of appropriate risk management instruments, financial institutions are reluctant to finance farmers. As

[17] CBSL, *Annual Report 2015*, Central Bank of Sri Lanka, Colombo.

[18] Wijesooriya, N. and J.Champika (2015), "Agricultural Forward Contracts as Pre-harvest Commodity Marketing: Problems and Prospects", Research Report No.180, Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI), Colombo.

Sri Lanka's agriculture sector faces a number of challenges that include production at competitive prices and meeting local and global quality standards.

a result, lack of price risk management has become one of the major reasons that poor farmers stay poor.[19]

Since the early 1970s, successive governments in Sri Lanka have intervened in agricultural marketing by various ways, including the offer of guaranteed prices to farmers for selected food crops. The two main objectives of government intervention in agricultural marketing were to stabilize food prices and to ensure that farmers receive remunerative prices for their produce.[20] Since 1977, the role of state intervention gradually diminished and private sector participation has increased in agricultural marketing, partly due to the obvious failure in state intervention and partly due to renewed interest in market based alternatives and innovation mechanisms.

At present, farmers in Sri Lanka have two options regarding marketing of their produce; they can approach government institutions or private traders. Farmers who are price takers tend to be exploited by private traders. As a result, the government declared a guaranteed price in the case of paddy for instance, with the intention to ensure paddy stock would be purchased at the guaranteed price by private paddy buyers as well. However, this is in fact not the case in practice. The government had directed the Paddy Marketing Board (PMB) to purchase paddy at the guaranteed price as a possible solution. Unfortunately, the monetary allocation provided to the PMB was not sufficient to buy a significant amount of the paddy stock. Thus, farmers were still dependent on prices offered by private buyers which are usually well below the guaranteed price. There are requests from farmer organizations to gazette the purchasing price of paddy. However, such a situation will violate the principals of demand and supply, and ultimately adversely impact efficiency of the paddy market further. Even under the current guaranteed price system, important production factors like cultivation extent, productivity, varietal selection, etc., which should be ideally determined by demand and supply, will no longer be valid.

Despite lower prices, private marketing agents may be still preferred by farmers because

[19] WBCSD (2004), "Insuring Fair Prices for Farmers in Developing Countries", World Business Council for Sustainable Development, Geneva.

[20] Weliwita, A. and R. Epaarchchi (2003), "Forward Contracts: A Market Based Alternative to Government Intervention in Agriculture Marketing in Sri Lanka", Agricultural Policy Series No. 6, Institute of Policy Studies of Sri Lanka, Colombo.

private buyers provide certain economic services such as collection at the farm gate, spot cash payments, accepting sub-standard products at discounted prices and credit services that the PMB never provides. Moreover, rapid and on-going changes are occurring in domestic and export procurement systems,[21] with increased quality and food safety awareness in the local and global trading system which create difficulties in commodity marketing by small scale producers. Therefore, efficient market based mechanisms have to be introduced in order to make the agricultural sector more productive. However, any alternative mechanism should give due recognition to the relationship between farmers and private traders.

12.5 Potential Economic Incentives for Agricultural Development

In the light of weakening productive investments and looming inefficiencies in current interventions, this section looks at possible economic incentives that could replace or supplement the aforesaid incentives for agricultural development in the country. The idea of incentives is not to strictly forbid/allow, but rather to provide signals on public objectives while leaving some room for individual and collective decision-making to respond to them.[22] They seek to induce individuals and firms to change their behaviour to more socially and environmentally desirable alternatives.

12.5.1 Irrigation Pricing and Participatory Management

The major irrigation schemes are plagued by inefficient and wasteful use of water, largely due to its free provision by the state. At zero pricing of irrigation water, there is no incentive for farmers to limit their water use or to adopt water saving technologies. One possible solution for this is to introduce a water pricing programme. However, in developing countries, irrigation water is frequently considered as a free gift of nature. This leads to a strong socio-political denial of any attempt to charge for irrigation water. Both free supply and under pricing practices have resulted in a serious misuse of water and poor O&M of irrigation in many parts of the world. The growing scarcity of water calls for a new market based approach that recognizes water as a scarce economic resource. Hence, the need for proper pricing of irrigation water is increasing.

Despite its theoretical appeal, pricing has many inherent problems, especially in the case of gravity flow irrigation systems. It may even fail in ensuring water use efficiency due to the very high implementation costs, particularly in relation to water metering. On the other hand, pricing and charging usually does not address the problem of inequity in irrigation water distribution unless variable charges dependant on the quality of irrigation services and the productivity of water are introduced. But, equity will come at the cost of some efficiency loss. Therefore, fixing a suitable pricing mechanism

[21] Product quality standards such as ISO 9000, ISO 14000 certification and process quality standards such as HACCP have become essential parameters in the food industry.

[22] Bailly, D. and R. Willmann (2001), "Promoting Sustainable Aquaculture through Economic and Other Incentives" in R.P. Subasinghe, *et. al*. (eds.), *Aquaculture in the Third Millennium*, Technical Proceedings of the Conference on Aquaculture in the Third Millennium, Bangkok, Thailand, 20-25 February 2000, FAO, Rome.

is very important; it will require information on marginal costs, marginal productivity and willingness to pay in relation to irrigation water.

There is another approach to solve this problem based on New Institutional Economics and participatory irrigation management (PIM) which is rapidly gaining ground. This approach is often presented as a better alternative to water pricing, especially in developing countries. Although this may be capable of improving water use efficiency at farm level, it does not perform the cost recovery function of a water price. Although there are claims that O&M expenditure reduced due to the introduction of PIM, the remaining burden on the Treasury will be still large.[23] The other reason is that PIM is still far from perfect, despite scattered success stories. They can be seriously affected by social non-cohesiveness resulting from social segmentations due to different factors such as education, economic background, caste, political affiliations, etc.

Although a decision to curtail the irrigation subsidy is politically risky, the ever increasing O&M expenditure and budget constraints are certain to force the government to at least partially reduce its expenditure on irrigation services provision. In fact, improved institutions with farmer participation can vastly enhance efficiency in implementing water pricing programmes. The PIM looks particularly attractive considering Sri Lanka's encouraging past experiences in this respect.[24] In terms of both efficiency and cost recovery grounds, these two approaches are viewed as complements rather than substitutes. Hence, the long-run solution to the problems of irrigation water use efficiency, equity and cost recovery should involve a suitable combination of participatory management and irrigation charges.

The long-run solution to the problems of irrigation water use efficiency, equity and cost recovery should involve a suitable combination of participatory management and irrigation charges.

[23] IPS (2006), "Irrigation Water Charges for Sri Lankan Agriculture", in *Sri Lanka: State of the Economy 2006*, Institute of Policy Studies of Sri Lanka, Colombo.

[24] In 1998, Sri Lanka became one of the first countries to institute sharing responsibility for O&M. PIM programmes was implemented in a number of major and medium schemes under three government schemes, namely: Integrated Management of Irrigation Schemes; Management of Irrigation System Programme and Mahaweli Project Systems.

12.5.2 Intellectual Property Rights and Private R&D

It is estimated that 94 per cent of agricultural R&D in developing countries is conducted by the public sector.[25] There are several constraints which need to be addressed when promoting private investments in agriculture. Due to lack of strong protection for property rights, private investments in agriculture in developing countries are very limited. The nature of the agriculture products also demotivates private investments to a certain extent. For example, once seeds in self-pollinated crops are given to farmers, it is exchangeable within the community and the technology would thus be freely shared among them; this can demotivate private investors as they cannot effectively market their inventions.[26] The legal institution of intellectual property rights (IPRs) - for example, patents, breeders' rights, copyrights, trade secrets, trademarks, etc. - is the main mechanism for accomplishing this. These property rights are created by countries and enforced by states and international conventions or treaties. With patents, breeders' rights, and copyrights, the discoverer is given an exclusive right to control the use, including charging a fee for use, for a finite time period. This provides an added method by which discoverers can expect to obtain remuneration from others for the use of their discoveries.

In the agricultural sector, there is sufficient evidence to suggest that IPRs have influenced private investment in R&D as intended, particularly with respect to crop genetic improvement. Box 12.2 provides in-depth facts on how India has attracted private investments in agriculture, especially in the seed industry after implementing rules and regulations to protect new seed varieties under the Trade Related Intellectual Property Rights (TRIPs) agreement. However, if no proper institutional structure exists to easily enforce them, the granting of IPRs to innovations is of little value. Insecure private property rights frequently arise from weak and inefficient institutions, as reflected in bureaucratic delays in the provision of civil services, weak contract enforcement, and public takings of private property without fair compensation. Therefore, encouraging private sector investments by providing a better investment climate and establishing a strong institutional system and an IPR system is very important.

Encouraging private sector investments by providing a better investment climate and establishing a strong institutional system and an IPR system is very important.

[25] World Bank (2008), *World Development Report: Agriculture for Development*, World Bank, Washington, D.C.

[26] *Ibid*.

Box 12.2
Private Investments in Indian Seed Industry

India's intellectual property rights in agriculture are closely linked with the seed industry. The seed industry evolved in the mid-1960s as a SOE. In 1987, India allowed private companies to produce and market seeds. Further, in 2002, India introduced a strong regulatory framework based on IPRs. At present, the seed industry comprises of competitive foreign and domestic firms, and the industry is rapidly expanding and opening up for several market and technology opportunities.

India signed the TRIPs agreement in 1995, and in 2001, the government passed the Protection of Plant Varieties and Farmers' Rights Act (PPV&FR Act) with the objective of: (i) providing an effective system for protection of plant varieties; (ii) protecting the rights of farmers and plant breeders; (iii) encouraging the development of new varieties of plants; (iv) stimulating R&D investment and seed industry growth; and (v) ensuring the availability of high-quality seeds and planting materials to farmers. It was noticeable that after 1987 and 2001, there was a huge increase in private sector involvement in the seed industry. From 1987 to 1995, the change was more than 150 per cent in some agricultural crops.

Number of Firms in Indian Agriculture in 1987 and 1995

	Number of firms with R&D		
Crop	**1987**	**1995**	**% change**
Sorghum	10	27	170
Pearl millet	12	30	150
Maize	6	24	300
Sunflower	10	26	160
Cotton	9	27	200
Mustard	1	9	800
Rice	0	15	

By 2005, the commercial seed sector was dominated by the private sector with the ratio of private and public involvement at 76:24, measured by volume. At present, there are five multinational companies, 410 domestic seed companies (10 large sized, 50 medium, 350 SMEs). The Indian seed industry is growing at an average rate of 12-13 per cent per year. Further, during 2008-09, the industry generated revenues between US$ 1.3-1.5 billion and ranked as the world's fifth largest seed market.

Moreover, the private sector has pursued protection under the 2001 PPV&FR Act. In 2008-09, 64 per cent of the 460 PPV applications received by the PPV&FR Authority were from the private sector, with the balance from the public sector. The applications were mainly for hybrid varieties - hybrid maize, cotton, pearl millet, sun flower, etc. Several studies have stated that the private investors were encouraged to invest in the agriculture sector after implementing proper IPR mechanisms via PPV&FR. After opening up the markets for the private sector with strong IPRs mechanisms, India is leading the region in agricultural R&D.

Source: Kolady, D., *et. al*. (2010), "Intellectual Property Rights, Private Investments in Research and Productivity Growth in Indian Agriculture", IFPRI Discussion Paper 01031, International Food Policy Research Institute, Washington D.C.; Dewan, M (2011), "IPR Protection in Agriculture: An Overview", *Journal of Intellectual Property Rights*, Vol. 16, pp 131-138.

12.5.3 Removal of Fertilizer Subsidy and Organic Agriculture

There are two major steps which can be taken in order to overcome the dual problems of inefficient use and budgetary burden attached to the fertilizer subsidy; withdrawal of the subsidy completely, or formation of a better mechanism to target farmers who are actually in need of the subsidy.[27] A removal of the subsidy is likely to see a sharp escalation of fertilizer prices. Wasteful application of fertilizer at subsidized rates can be overcome by increasing their price. At the same time, it will secure the soil from nutrient imbalance conditions which may result in long-term adverse effects on soil fertility. However, a withdrawal of the subsidy may create serious problems to small scale paddy farmers, especially in the short run. A likely increase in the cost of production may cause a shift away from paddy. It may lead to an outflow of foreign exchange due to higher rice imports, and to greater poverty and landlessness in the rural sector, as well as increasing malnutrition in the rural economy.

Thus, what needs to be done is to manage the fertilizer subsidy effectively and efficiently, targeting only the farmers who are in need of the subsidy. The government's role in this regard is to support resource poor farmers who are in poverty and who do not have enough purchasing power to buy fertilizer at market prices or acquire credit to do so. A proper identification of the proportion of farmers who are truly in need of the subsidy and effective distribution of subsidized fertilizer by a system such as a voucher scheme,[28] are of great importance. Farmers can be permitted to purchase fertilizer from any dealer who will be able to redeem the voucher, possibly with a commission.

The Budget 2016 indicated a positive move with a surprise proposal to remove the long standing fertilizer subsidy and to introduce a cash grant scheme. Under this, a paddy farmer is entitled to a maximum of Rs.25,000 per hectare of paddy land. This will allow the farmer to buy fertilizer from private markets at a competitive rate, and permit private markets to develop. Since the impacts of the new scheme are yet to be known, the government should take precautionary actions to minimize the adverse impacts on farmers. Research has shown that fertilizer use is more responsive to farm gate price than the fertilizer price.[29] Therefore, one option is to introduce measures to increase the farm gate price of paddy. Alternatively, subsidies could be provided for organic farming in order to popularize the new trend towards organic agriculture.[30]

12.5.4 Land Markets and Property Rights

Along with the mobility of resources, equity plays an equally important role to achieve efficiency of land utilization, since poverty may arise from an unequal distribution of holdings. The

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[27] Thibbotuwawa, M. (2010), "Better Targeting of Transfers: The Fertilizer Subsidy", available at http://www.ips.lk/talkingeconomics/2010/08/16/better-targeting-of-transfers-the-fertilizer-subsidy/

[28] Voucher is a coupon carrying the name, predetermined quantity of fertilizer. and cash value given to target farmers.

[29] Rajapaksa, R.D.D.P. and K.S. Karunagoda (2009), "Factor Demand for Paddy Cultivation in Sri Lanka with Special Reference to Fertilizer Subsidy Programme", *Sri Lanka Journal of Agrarian Studies,* 13(2).

[30] Even today, organic paddy production is only around 5 per cent of the country's total paddy production. See Rodrigo, C. (2016), "Reducing Fertilizer Dependency in Paddy Farming in Sri Lanka: Should We Change Our Approach?", available at http://climatenet.blogspot.com/2016/01/reducing-fertilizer-dependency-in-paddy.html.

allocation of land in Sri Lanka has mostly taken the form of redistributive measures enacted by the government at various times. These redistributive measures have been closely linked with certain restrictions, leaving the beneficiaries with no option of selling the land. Urban and plantation sectors are endowed with well-established property rights for both ownership and user rights. The reason for the existence of formal property rights in these sectors was for commercial reasons because it was believed that the optimal level of investment takes place only through formal property rights, with long-term tenure security.

However, due to the absence of formal land titles in the rural sector, owners are reluctant to rent out land and also to make substantial investments in their land. This has resulted in poor tenure security associated with unclear ownership or user rights. Presently, a number of informal arrangements,[31] which are usually biased in favour of land owners, are occurring in the rural sector. The lack of formal property rights, and the rigidity of some formal rights in practice, has contributed the most towards existing issues in the agriculture sector; these include environmental unsustainability, overexploitation of scarce resources, low investment and declines in household welfare.[32]

No significant development in property rights, especially at the policy level, has occurred during the recent past in Sri Lanka. Insecure property rights have become an impediment to the efficient use of the land.[33] Therefore, revising outdated regulations on ownership, and removing restrictions on transactions of such lands to increase access to land by efficient farmers, is a requirement in terms of meeting the dual objectives of equity and efficiency. By creating a context of long-term tenure security, especially through long-term leases of state owned land, the right incentives will be created to encourage investment in land and adoption of modern technology. Even though securing land rights is an important issue, serious thought has to be given to avoid the possible equity implications for marginalized and vulnerable groups. Measures to mitigate the effects of imperfections in credit, and input and output markets have to be undertaken simultaneously in order to prevent large farmers getting a competitive advantage over small farms, resulting in a large scale land sell-out by the rural poor. However, these negative implications should not be constraints, as there will be net benefits, especially significant enhancement in land productivity and production efficiency.

12.5.5 Forward Sales Contracts

The conventional solutions for price stabilization such as guaranteed price schemes and the establishment of government marketing institutions are not sustainable in the long-term. This is mainly due to difficulties in maintaining a dual price system continuously, and the inefficiency of government marketing boards in functioning as effective marketing institutions.[34]

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[31] Such as 'Thattumaru' and 'Kattimaru' (both forms of joint cultivation) and also 'Ande' cropping (share cropping).

[32] IPS (2004), "Land Market in Sri Lanka", in *Sri Lanka: State of the Economy 2004*, Institute of Policy Studies of Sri Lanka, Colombo.

[33] Deininger, K. (2003), *Land Policies for Growth and Poverty Reduction*, World Bank, Washington D.C.

[34] Wijesooriya, N. and J. Champika (2015), "Agricultural Forward Contracts as Pre-harvest Commodity Marketing: Problems and Prospects", Research Report No. 180, Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI), Colombo.

Box 12. 3
Lessons from International Experience

Global experience show that more secure property rights could affect productivity by: (i) improving households' security of tenure and thus their ability to make investments; (ii) providing better access to credit; and (iii) reducing the transaction costs associated with land transfers.

Secure long-term individual property rights are directly linked to higher demand for investment. For example, having more secure tenure in Ghana increased the probability that individuals would plant trees, and undertake a wide range of other investments such as drainage, irrigation, mulching, etc. Secure ownership rights even without either a formal or permanent title was found to facilitate improvements in Burkina Faso, Niger, and China.

In addition to enhancing demand for investment, secure formal land ownership can increase the supply of credit to undertake investment from formal sources, thus making an important contribution to the evolution of financial markets in more general terms. The importance of this credit supply effect is supported by evidences from Thailand, Brazil, Honduras, and Paraguay.

With regards to transferability of land, written records of land ownership allow verification of ownership status of land, making land transactions cheaper to implement. This was the experience in China.

(Source: World Bank (2003), available at http://documents.worldbank.org/curated/en/2003/02/2171986/sri-lanka-promoting-agricultural-rural-non-farm-sector-growth-vol-2-2-annexes-statistical-tables)

It has become necessary to approach the problem through a system which would be effective both in the short-run and in the long-run. Many countries have achieved this by establishing different market based instruments (MBIs) for agricultural produce to guarantee an acceptable price for both the seller and the buyer in the market. These instruments include forward sales contracts, futures contracts, options and commodity swaps.[35] The key advantages of MBIs instruments over price stabilization schemes are that MBIs provide certainty of future revenues and ensure the use of concrete cash flows, rely on market prices rather than administrative prices, thus shifting risks to viable financial markets that are better able and willing to assume risks.

A forward sales contract is generally a legally binding agreement between a buyer and a seller. By this agreement, the seller agrees to sell (and the buyer to buy) a given quantity of agricultural produce of a specified quality on a given future date at a predetermined price. The advantages of such contracts are: (i) they are tailor made to the needs of buyers and sellers; (ii) they ensure a physical market for the commodities produced; (iii) they enable contracting parties to obtain production or pre-export finance; and (iv) they increase the credit worthiness of the borrower.

The CBSL introduced commodity forward contracts in 1999 under the scheme called 'Govi Sahanaya'. It was the first attempt to introduce a forward contract system in Sri Lanka on a

[35] Weliwita A. and R. Epaarchchi (2003), "Forward Contracts: A Market Based Alternative to Government Intervention in Agriculture Marketing in Sri Lanka", Agricultural Policy Series No. 6, Institute of Policy Studies of Sri Lanka, Colombo.

formal basis. In this scheme, provision was made for a bank to participate as a facilitator of the contract in addition to the buyer and the seller. This voluntary based tripartite forward sale contract arrangement helps the farmer by assuring a stable price for the produce. The option that the price can be fixed by a mark-up over the cost of production assured a net profit to the farmer. At the same time, the buyer also benefitted due to guaranteed supply at a given price.

12.6 Conclusion and Way Forward

Agriculture is one of the key sectors of the Sri Lankan economy with a significant contribution to GDP, employment, and income. While the importance of the agricultural sector is well recognized, the future trends in agricultural production do not seem adequately supportive food security or poverty reduction efforts in Sri Lanka. Hence, the problem at present is accelerating agricultural growth to meet growing consumer demand for food, as well as to reduce poverty in rural areas of the country.

Investments in agriculture play a crucial role in fostering development of agriculture in Sri Lanka because it has the potential to drive growth, raise productivity, reduce poverty, and hence enable sustainable development efforts. However, there are concerns about the challenges of financing agricultural development; the amount of investment needed to achieve acceptable levels of agricultural growth far exceeds current investment trends. This chapter attempted to identify innovative economic incentives to leverage existing resources in a more efficient way.

Much of the current discussions on agricultural investments in Sri Lanka evolve primarily around investment on irrigation O&M, fertilizer subsidy, R&D and price support schemes. Agriculture spending, whether public or private, benefits smallholder farmers. However, it is highly questionable whether state funding is diverted towards appropriate investments in terms of their cost effectiveness and efficiency. This is important because increasing the agriculture budget alone, without proper prioritization in allocation, may result in the extra resources not being spent effectively.

Since the 1980s, the policy of agriculture expansion in the dry zone through heavy public investment in irrigation development and land settlement, along with simultaneous promotion of a green revolution technological package that include R&D and fertilizer subsidies, helped to increase productivity of food crops significantly. However, there was a reversal of this investment climate with increased focus on popular measures such as subsidies and price support in recent years. This strategy of ever increasing government spending on inefficient subsidies such as on fertilizer have continuously crowded out the most important investments like R&D investments. Public investments should be prioritized and restricted to pure public goods but not for input subsidies like fertilizer or irrigation.

The inefficient use of resources and cost effectiveness of most investments have become concerns with increasing budgetary burdens over the years. Therefore, new economic incentives that address budgetary pressure and are more efficient and effective in agricultural development are needed. In this regard, pricing irrigation water, taxing fertilizer (subsidy removal), private property rights and resource ownership, IPRs and contract farming are potential economic incentives.

Increasing the agri-culture budget alone, without proper prioritization in allocation, may result in the extra resources not being spent effectively.

A withdrawal of subsidies on irrigation and fertilizer will have a positive effect on not only the government budget but also on the efficiency with which these resources are used. Since irrigation pricing and PIM would not deliver better results in isolation, the long run solution to the problems of irrigation water use efficiency, equity and cost recovery would be a suitable combination of participatory management and irrigation charges.

While elimination of the inefficient subsidy on fertilizer is recommended, the transition towards such a policy framework needs to be done gradually due to several reasons such as the long standing dependence by farmers, political affiliation due to a large vote base, etc. Hence, the current system should first be reformed to support only the most deserving farmers and to prevent lengthy and inconvenient procedures of subsidized fertilizer distribution.

Moreover, a sudden withdrawal of existing subsidies may create serious problems at least in the short run to small scale rice farmers, especially in remote areas with poor infrastructure and non-functioning credit markets. Therefore, a gradual withdrawal that is coupled with provision of adequate R&D and property rights, improvements to the rural credit market, and creation of an environment where farmers get a better price for their product should be done. These investments will bring about improvements in resource use efficiency, which along with a subsidy removal in irrigation and fertilizer will ease government budgetary pressure on these investments and improve farm welfare.

The large sum of money that can be saved from subsidy removals should be directed towards more productive investments like improving R&D. Moreover, private property rights and resource ownership will lead to increased investment, particularly private investments, and productivity gains. This too needs the existence and accessibility of formal credit markets so that any pressures on farmers to sell land should not ultimately see farmers return to poverty. The formalization of forward sales contracts with increased private sector participation will result in better market mechanisms which give a fair price for the produce of small farmers. These efforts will not be effective in the absence of a sustainable agricultural policy. Hence, the development of a sustainable agricultural policy with a long-term vision will be the stepping stone to initiate these economic incentives.