

Sri Lanka
State of the Economy Report 2010

Chapter 14
Adoption of ICT in Agriculture for Post-conflict
Development

by
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14. Adoption of ICT in Agriculture for Post-conflict Development

14.1 Introduction

Agriculture is one of the key sectors of the Sri Lankan economy with significant contributions to GDP, employment and income. Although its contribution to the GDP has declined over the years, agriculture is still the most important source of employment in rural areas. Almost 33 per cent of the employed persons are estimated to be engaged in agriculture at present. Attaining sustainable agricultural development is a worldwide strategic concern and Sri Lanka is no exception to this. Policy concerns related to agricultural development in the country has been subject to continuous debate as issues change over time, following the transformations that the sector has gone through in the past.

Intensification of agricultural productivity and improved market orientation are the main challenges that have to be overcome in order to enhance the future viability of the sector. Reducing agrarian poverty, ensuring food security, enhancing public investment in technological and institutional innovations, adapting to climate change and integrating agriculture in dynamic markets are considered to be the major issues relating to agricultural development. In this context, information and communication technologies (ICT) have the potential to contribute to achieving significant economic, social and environmental benefits by addressing most of the above issues either directly or indirectly.

Allocation of public resources for adoption of technological innovation that contribute to overall development is an undisputable

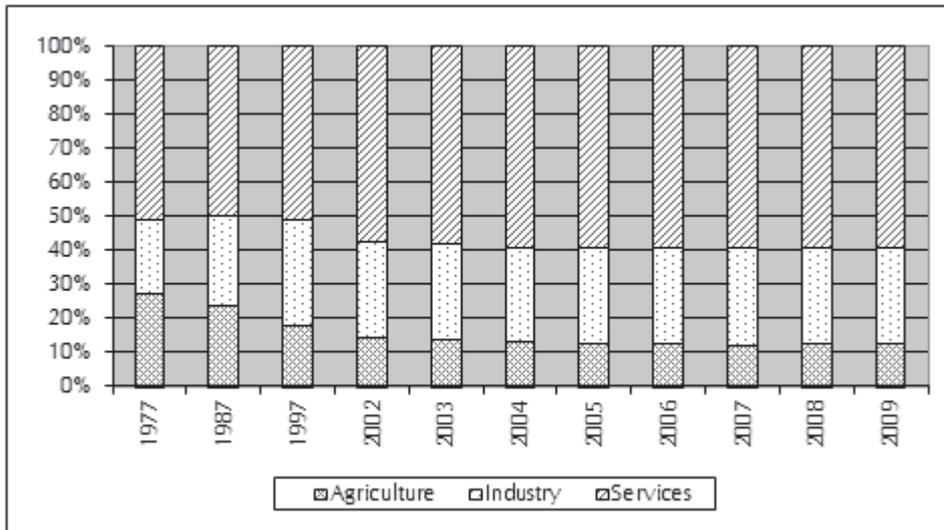
global policy priority. Rapid advancements that have taken place in ICT have had their impact on the agricultural sector as well, demonstrating the important role it can play in enhancing food security and supporting rural livelihoods. Recently, Sri Lanka also promoted the utilization of ICT in agriculture with a view to development of the sector. This discussion will set out an initial exploration of ICT application in Sri Lanka's agriculture sector, giving emphasis to the potential and challenges in the post-conflict milieu.

14.2 Problems in Agriculture: Where Do We Stand?

While Sri Lanka has traditionally been an agrarian economy with significant contribution to GDP, employment and income, the relative contribution of agriculture to GDP has declined sharply over the years - from 26.7 per cent in 1977 to only 12 per cent in 2009 (Figure 14.1). Nonetheless, agriculture remains important considering the share of the population dependent on it for livelihood opportunities.

Though the main occupation of the rural population is agriculture, development in other sectors and high off-farm wages have led to the movement of labour out of the agricultural sector since late 1980s. Thus, the importance of agriculture in providing employment has gradually dwindled. Nonetheless, the sector still employed 32.6 per cent of the total labour force in 2009 (Figure 14.2). Most importantly, almost 70 per cent of the rural population is involved in agricultural

Figure 14.1
Contribution to GDP by Industrial Origin (1977-2009)



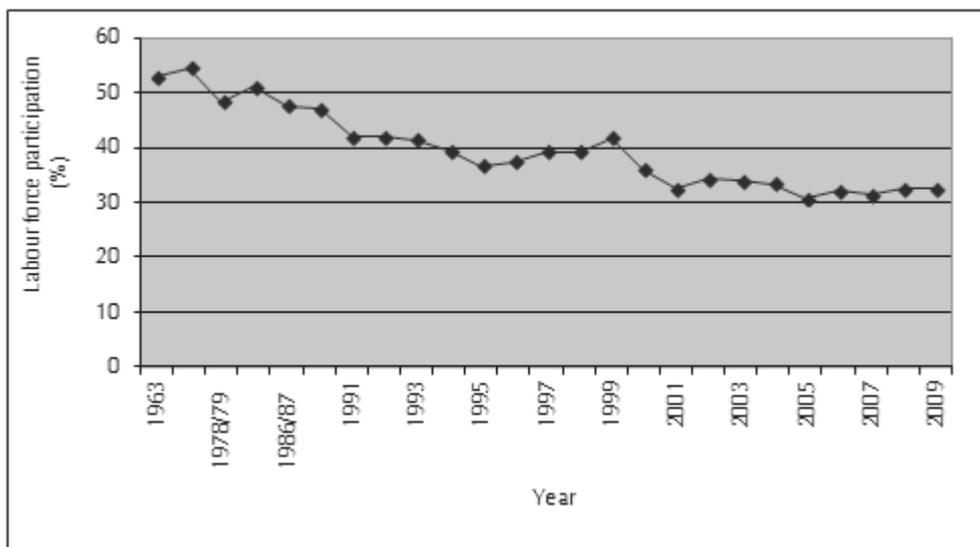
Notes: In constant prices.

Source: Department of Census and Statistics; and Central Bank of Sri Lanka.

activities of some form or the other. One of the important implications of the above is that one-third of the labour force is utilized to produce just over 10 per cent of GDP.

On the other hand, even though a large amount of government finances is spent on agriculture as subsidies (such as on fertilizer) which can be invested on some other thriving

Figure 14.2
Labour Force Participation in the Agricultural Sector



Source: Department of Census and Statistics.

ing sectors, poverty continues among rural people who are engaged in agriculture. According to the 2006/07 Household Income and Expenditure Survey, an estimated 22 per cent of agricultural households were in poverty. This is much higher than the national average poverty headcount ratio of 15.4 per cent. As a share of all households in poverty, the agriculture sector accounts for as much as 45 per cent of the poor. These numbers indicate the importance of addressing agricultural poverty in order to lower overall poverty in the country.

Even though the causes of agrarian poverty and the means available to overcome it vary across regions, the poor basically suffer from a set of common issues such as low resource endowment, low skills, and poor access to technology and inadequacy of institutional support. On the other hand, long run measures to empower farmers by providing improved technology through research, extension services and training programmes on agricultural activities as well as non-agricultural activities is another serious issue that needs attention. A clear implication that can be drawn is that there is a problem

of poor productivity within the agriculture sector that needs immediate policy attention.

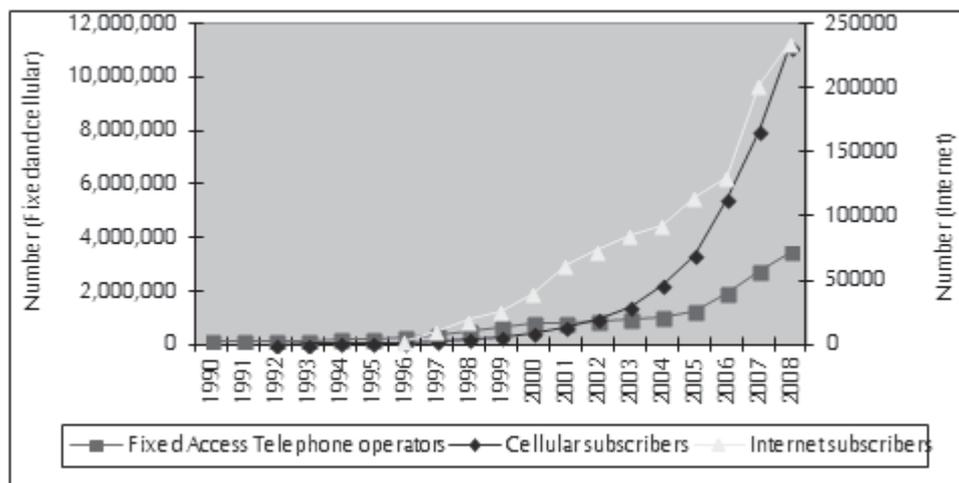
14.3 ICT Coverage in Sri Lanka

The rapid developments in information and communication technology (ICT) have greatly contributed to enhancing human living standards worldwide, and Sri Lanka is no exception in this regard. Most of the key economically effective environments are increasingly ICT dominant and, therefore, investing on ICT developments in the present era has become a compulsory requirement for the development and survival of the country.

In Sri Lanka, there has been a significant increase in cellular and fixed line telephone subscribers from the mid-1990s following a gradual increase prior to that. In addition, the number of internet subscribers has been accelerating since its introduction to Sri Lanka in 1996.

However, while Sri Lanka has made significant progress in ICT coverage, regional distribution remains inadequate and inequitable. For example, in 2009, 41 per cent of fixed-line subscribers were found to

Figure 14.3
ICT Coverage in Sri Lanka (1990-2008)



Source: Telecommunication Regulation Commission of Sri Lanka (TRC).

be from the Western Province followed by Southern and Central Provinces (at 11 per cent each). The figures were much worse in the case of Internet usage. However, the Information and Communication Technology Agency of Sri Lanka (ICTA) has launched sustained efforts more recently to popularize ICT in rural areas under various initiatives such as 'e-Society Development Programme' and 'Information Infrastructure Development' programmes.

14.4 Agricultural Productivity: How Can ICT Fit In?

There are many factors such as the policy environment, legal framework, technology, knowledge, marketing, research and development, etc., to be considered while attempting to improve agricultural productivity. However, there is vast potential for information and communication technology (ICT) to act as a catalyst in all the above factors. ICT refers not merely to computers and the Internet but includes traditional means of communication such as TV and radio, as well as the more recent developments in mobile phone technology and geographic information systems (GIS). Even though ICT application in the traditional-oriented Sri Lankan agricultural sector is a novel concept, there are several positive initiatives of applying ICT by the government, NGOs and the private sector (Box 14.1).

One of the major issues of concern in the Sri Lankan agriculture for some time has been poor information dissemination or poor 'agricultural extension'. Extension is often regarded as a combination of communication activity (transmission of technical information to farmers) and educational activity (development of skills to make use of the technical information). Governments

have traditionally taken the lead role in the provision of agricultural extension services because of its important contribution towards agricultural development. However, certain state policies such as the transfer of over 2000 front line extension workers known as 'Krusha Viyapathi Sewaka Niladharis' (KVSNs) of the Department of Agriculture (DOA) to the Ministry of Public Administration as Grama Niladharis in 1990 resulted in the collapse of the extension services at the village level. This created a large void in the extension system, hampering the regular information flow from researchers to farmers and vice versa. The weak inter and intra sectoral linkages among research, extension, training and service sectors like marketing have left the farming community relatively destitute.

The general perception of traditional Sri Lankan agricultural practices - which is very much practice based and undocumented - is that they are stable and environmental friendly, but not economical. On the other hand, Sri Lanka is adapting various modern technologies for agriculture. Though there are a number of initiatives to disseminate agricultural knowledge in Sri Lanka, the general farmer community, except for a few professional farmers, is not fully conversant with them. Thus, there is a problem of integration of agricultural services and products at the grass root level. This has a serious impact not only on productivity, but also on the marketing of agricultural products. The latter in turn creates various other challenges for farmers.

Sri Lankan farmers come across a wide range of market related problems, such as low prices during harvest time. Lack of guidance, and hence difficulties in arriving at decisions pertaining to time, extents, crops and

² A cultivar is a cultivated variety of a plant that has been deliberately selected for specific desirable characteristics (such as the colour and form of the flower, yield of the crop, disease resistance, etc.).

cultivars² to be grown, manifest as the major features of such problems. This situation can be rectified by coordinating market forces more effectively, by improving information to producers, and operating the entire system in an integrated mode making producers aware of potential market opportunities and vice versa. Under such circumstances, wholesalers can go directly to producers without getting involved with a large number of unnecessary intermediaries.

ICT can play a leading role in this context, not only in domestic agricultural marketing but also in international trade by providing reliable and accurate information about buyers and producers. This will enable producers to identify buyers who require products of certain specific quality standards at a particular time in definite quantities, and buyers can identify producers who grow crops targeting international markets. Moreover, farmers will be able to obtain information on input suppliers and prices of inputs without unnecessary delays.

Climate change is widely recognized as one of the most complex challenges that humankind has been facing. Sound adaptation processes are required to sustain the agriculture sector which is the sector that suffers the most from climate change. There is significant potential to manage information as an important factor determining adaptation mechanisms to cope with climate related risks. Thus ICT can play an important role in this regard as well.

Sustained agricultural growth through some level of commercialization has the ability to reduce poverty by raising farmer incomes, and indirectly by generating employment and reducing food prices. However, the major

challenge in a country like Sri Lanka where the agriculture sector is dominated by small scale subsistence farmers is the high transaction cost associated with this transformation. ICT become important in the context of reducing high transaction costs that farmers find difficulty in meeting. Not only does it reduce the information search costs, but also it ensures timeliness and accuracy of information.

14.5 Predicaments in ICT Application in Agriculture

Even though the role of ICT is obvious and important for the development of the agriculture sector, its application is not an easy task that can be done overnight. There are a number of interwoven challenges which are discussed in this section.

A sharp widening of the 'development gap' between urban and rural areas in Sri Lanka in terms of telecommunication, electricity, education, etc., that has emerged over the past few decades has become a major barrier for ICT application, not only in agriculture but also in most of the other sectors.³ Though successive governments launched a number of development activities in rural areas, these have contributed only marginally towards bridging the rural urban divide. This has been further aggravated by Sri Lanka's protracted conflict that served to further widen gaps between provinces of the country.

Rural accessibility to ICT has been limited due to poor connectivity and non-availability of Internet service while the Internet use remains very low due to the high cost of computers, low bandwidth and low computer literacy. There is also an acute urban/rural disparity with respect to access to the Internet, and public Internet facilities are also

² Withanage, D., 2003, "e-Sri Lanka-The Use of ICTs for Poverty Reduction", paper presented at the "Global ICT Forum", Bangkok, Thailand, 27-28 November, 2003.

³ Reddi, U.V. and V. Sinha, 2003, "ICT Use in Education: Meta-survey on the Use of Technologies in Education", UNESCO.

Box 14.1
ICT Application in Agriculture

A web based Wikipedia and e-learning system that contains specific information related to all major local crops with audio, video and flash animation has been established (<http://www.goviya.lk>) in order to facilitate farmer training. This content will be further developed and expanded with knowledge and information added, edited, changed or deleted on a continuing basis. It is expected that with time it would develop into a comprehensive compilation of agricultural and agriculture related information. The system is structured with pre-defined levels of rights and privileges. The login page of this Wikipedia can only be edited by the Administrator while the Cyber Units Agriculture Instructors (AIs) will have their own pages which constitute the community portal. These pages can be edited by the agricultural instructors as well as farmer and their family members. The unique feature of this project is the concept of interlinking of the e-learning system with a community driven dynamic agricultural data base - the Agricultural Wikipedia. Farmers enrich the site with their own ideas, and practical experiences. It is then open to other farmers who can learn from it, or improve on it or edit it as they think fit.

Nava Goviya (CIC Agrochemicals Ltd.)

This project focuses on five districts - Anuradhapura, Matale, Badulla, Moneragala and Kandy. It seeks to improve agricultural productivity and product quality through a modern on-line agriculture knowledge learning portal and is developed both in Sinhala and Tamil languages. The curriculum is specially designed with inputs from agricultural professionals. It provides modern farming knowledge on crop selection, land use planning, pest control, fertilizer application, farm management, harvesting, post-harvest technologies and food processing. It also addresses the development of farm business skills like market reach, banking and commodity exporting. The content is enriched with case studies and made attractive and user friendly with video, animation and graphics. The content encourages sustainable agriculture, recycling of natural wastes, use of appropriate technology, planned use of fertilizers and chemicals to enable better yields combined with increasing soil fertility and an improved environment.

SMS Enabled Commodity Trade Matching Portal (Sarvodaya-Fusion)

This project leverages on the convergence of mobile phones and an on-line trading platform to improve the rural commodity trading environment. The SMS enabled Commodity Trade Matching Portal contains details of requests from buyers for bulk purchases of various crops, as well as details of sellers who have on offer various produce. Sellers and buyers can send their requests and offers to this portal via coded SMSs. When a seller and buyer are matched by commodity and district, the system will generate SMSs to both parties with contact information in order to facilitate the actual transaction. A daily summary of requirements is also sent via SMS to all parties registered with the portal. This gives them a clear understanding of the market situation. All the main activities and reports in the portal are available to buyers and sellers via SMS, but if they so wish, they can also log on to the site to view the trading activity. The initial pilot of this project has been launched in Kandy and Nuwara Eliya districts.

Crop Price Tracker (ICTA)

The Information and Communication Technology Agency of Sri Lanka (ICTA) developed a Crop Price Tracker (CPT) as a means of supporting farmers in making informed decisions with regard to choice of crop at the time of cultivation, when to harvest and at what prices to market the crop. It can also help traders in making decisions with regard to sales and purchases; agricultural economists in analyzing market trends and making projections; and the general public in understanding day-to-day fluctuations in market prices. The CPT has at its back end, a data base on crop prices updated directly from commercial centres. The system provides for uploading of prices from multiple locations. Currently, prices are being uploaded from the Dambulla Economic Centre. The CPT is accessible from the website of the Department of Agriculture. One of the key features of this is the SMS gateway which enables the retrieval of prices via short code messages sent through a mobile phone.

Source: Mubarak, C., 2009, "e-Sri Lanka: What is in it for Agriculture?", Proceedings of the Joint National Conference on Information Technology in Agriculture, 16th July 2009, University of Moratuwa.

limited. Even though internet services have been available in Sri Lanka since 1996, popularization of it throughout the country has been inadequate and biased towards urban areas. Lack of English knowledge to handle and operate computers has contributed to low level of computer literacy and non-acceptability of computer education, especially amongst rural poor people. This has been further aggravated by limited availability of content in local languages. Thus, lack of ICT skills and resultant ambiguous feelings towards technology may hold back farmers from accessing available information.

Additionally, the sustainability of ICT application projects related to agriculture has become a serious issue of concern in a country like Sri Lanka as there is no continuous funding mechanism to sustain such projects.⁵ Given budgetary constraints, it is unrealistic to expect long term state intervention, while NGO involvements have been limited to pilot projects. Being more profit oriented, sustainability of private sector participation is uncertain too, in a situation where the majority of farmers are poor smallholders with

a subsistence orientation who would not be able to afford the cost.

A noticeable feature of all the efforts is that there is no cohesion in the approach of incorporating ICT in agriculture. The absence of an ICT policy for agriculture, coupled with a lack of clear appreciation of the objectives has resulted in an ad hoc nature in available initiatives. On the other hand, lack of awareness within the farming community, as well as of stakeholders on the opportunities and benefits that can be reaped through ICT initiatives is another stumbling block.

14.6 Post-Conflict Challenges and Opportunities

The previous conflict-affected Northern and Eastern Provinces have traditionally been high potential agricultural areas, providing livelihood to a community of hard working and resilient farmers. The development of rural agriculture is a key priority in reducing conflict-induced poverty, increasing rural incomes, reducing vulnerability and ensuring food security. These need a development strategy that envisages shifting from subsis-

⁴ Most of the donor funded ICT projects related to agriculture are pilot projects with no assurance of continuity.

tence agriculture to commercially oriented agriculture, cultivating high-value items for the domestic and export markets, and establishing agro-industries. As a start, increasing the availability of more fertile lands for agricultural production in the North and East (N&E) has created a major opportunity that has to be harnessed in conjunction with the rest of the country.

However, the ending of conflict does not necessarily mean that constraints to making use of new opportunities do not exist. Although the challenges other agrarian areas are facing are more or less similar in nature, they are much severe in the N&E. A major challenge for post-conflict rehabilitation related to the agricultural sector is physical and institutional infrastructure recovery. Physical infrastructure includes irrigation, transport, storage and ICT, while institutional infrastructure entails revival of the organizational setup for service provision.

The prolonged conflict has weakened agricultural productive capacity in the N&E, and displaced most of the agriculturally productive segment of the population. Hence, improving food security to prevent hunger and malnutrition is basic to post-conflict agricultural rehabilitation. This includes measures to improve agricultural productivity, access to markets and to stabilize farm-gate prices. The substantial increase in supplies of agricultural commodities in these regions is likely to exert downward pressure on prices, creating a beneficial effect for consumers. Therefore, managing extra production in order not to create adverse consequences on farmers is very important from the farmers' point of view. But, it is unlikely to happen immediately as much remains to be done to regain the supremacy it had before the war. However, infrastructure recovery including transportation, storage, processing has to be given more emphasis in these situations..

Connectivity is a key driver of economic growth and better marketing can reduce poverty among communities occupied in agricultural activity. Thus, improving market linkages to facilitate movement of physical and information resources from surplus to deficit areas is very important to revive the agricultural sector in the previous conflict-affected areas. Lack of market information and isolation from supply chains remain significant barriers for trade operations and very few operators are integrated into well-coordinated supply chains. This has limited their access to wider markets and their capacity to respond adequately and in time, to additional demand. A vast majority of firms sell their goods directly to consumers or traders in their locality, whereas access to wider markets is very rare.

Thus, farmers in the N&E require information on efficient utilization of farming capacity, including new seed varieties, modern fertilizer application and better livestock management. Enhancing their productivity by disseminating lessons learnt in other areas of the country will also be useful, since the farmers in the N&E areas are unaware of modern developments and techniques in the rest of the country such as new seed/planting varieties, fertilizer application techniques, agricultural machinery irrigation practices and post-harvest technology. ICT has the potential to meet many of the information challenges that the post-conflict agriculture sector faces in the N&E.

14.7 Conclusion and Policy Recommendations

Agriculture is one of the key sectors of the Sri Lankan economy with a significant contribution to GDP, employment, and income. Thus, agricultural development has been a subject of continuous policy discussion. Despite the intense policy focus, the sector suffers still from various long-standing prob-

lems related to productivity, income and marketing. These have placed the Sri Lankan agricultural sector well behind many comparative countries in the region.

The end to a protracted conflict that hampered agricultural development in a very fertile and productive region of the country has created fresh opportunities in agriculture. However, if the sector is to undergo a comprehensive revival, existing barriers have to be addressed in order to harness opportunities in a post-conflict environment. Knowledge, information and data, and the related social and physical infrastructures are widely recognized as key building blocks for a more commercially oriented and sustainable agriculture sector. Here ICT has the potential to play a lead role as a catalyst in the revival process, while facilitating agricultural development in the N&E and re-integrating it with the rest of the country.

It has been proven through such initiatives that there is an excellent potential for Sri Lanka to effectively use ICT in the agricultural sector. There are a number of key challenges to be faced during the process of incorporating ICT in agriculture, primarily as agriculture is not fully equipped for advanced technologies. Thus, filling the existing gaps needs more concerted effort from the government, private sector and other stakeholders. There should be a well coordinated and conducive ICT policy environment that fos-

ter the use of ICT to enhance rural livelihoods and encourage rural people to reap the benefits of the introduction of ICT. It is necessary to incorporate ICT into national agricultural policies which is lacking at present.

The use of standard and common systems is beneficial to make information easily accessible to end users. Appropriate communication systems are needed to ensure that the information reaches the farmer effectively, in an accurate and clear way - i.e., farmers need to be able to access reliable information on time and in a clear manner. Thus, any knowledge transfer mechanism should take into account the farmers' point of view as well. It is necessary to encourage software developments in local languages in order to increase the availability of content in local languages.

Awareness creation has to be done on the potential benefits of ICT on improving agricultural production and generating increased incomes, complemented by training on ICT usage in order to empower rural masses. Most critically, what has to be done immediately is to develop new infrastructure and upgrade the existing infrastructure facilities to improve rural ICT penetration, especially mobile penetration which is far higher than Internet penetration. Development of applications with convergence of the mobile with the Internet can be regarded as more successful than using one alone.

⁶ For example, more than 60 per cent growth was recorded from 2006 to 2008 in usage of the 'Toll Free Agricultural Advisory Service' established by the DOA.