

Overview: The Volume on Irrigation for Food Security

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Background of the Conference

This is the first volume on the proceedings of the national conference on ‘Water for Food and Environment’, which was held from June 9–11, 2009 at the Bandaranaike Memorial International Conference Hall (BMICH). The volumes two and three have been produced as separate documents of this report series. In response to a call for abstracts, 81 abstracts were received from government institutes dealing with water resources and agriculture development, also from universities, other freelance researchers and researchers from the International Water Management Institute (IWMI). Forty Seven of the eighty-one abstracts that were submitted were accepted for compiling full papers. Further details of the conference have been described in paper one of volume three (see introductory section of volume three of this publication series).

Emerging Issues in the Irrigation and Agriculture Sectors

Thirteen papers were presented at the conference on the theme – ‘Irrigation and Food Security’. The issues, which emerged from the papers that were presented and the subsequent discussions that took place, are summarized below.

Revitalizing Irrigation for Food Security

Food security has become a significant issue globally and it is equally applicable to Sri Lanka. It is imperative to consider food security from a household level to a national level. It has been observed that national food security issues are quite often discussed but household security is not a subject that gets much attention in the food sector discourses. Hence, different strategies are required to address national as well as household food security issues and to ensure that due attention is given to both at the relevant food sector programs.

Food security does not mean ensuring self-sufficiency in rice only – it must entail a balanced and nutritional diet for everybody. This is an important and critical issue among the poverty groups in the country. In most rural families although they have sufficient rice to eat, their regular diet does not include the necessary nutritional food items. This aspect, however,

is not a subject that comes under the purview of the Ministry of Irrigation or the Ministry of Agriculture; it comes under the Ministry of Health.

Factors such as access, affordability, socioeconomic conditions, and health (to absorb nutrients) are other food security issues-related considerations. None of these factors come under the areas managed by either irrigation or agriculture ministries; they come under the purview of other ministries such as finance and planning, trade, and Ministry of Health.

Do We Know Enough About Food Security in Sri Lanka?

This is an important issue in the field of food security. There is no adequate and frequently available information on food security with its multidimensional aspects as described above. This may require further studies and a national data set. The national data set needs to be updated frequently to provide a comprehensive time series picture, and also the situation of a particular year or time for policymakers to develop appropriate policies, other institutional mechanisms and strategies to address the issues of food security.

Major Challenges for Food Security

The prevailing constraints in land and water resources due to population increase are the two major challenges faced by this sector. Although the average annual population growth of the country is significantly less than 1.5 %, the increasing population, nevertheless, is a problem for sharing limited natural resources such as land and water. Less land and less water per person is becoming a significant issue. Land fragmentations in many cases create problems related to scale of economy and the practices of some farmers in small pieces of lands, and also lead to low land productivity. A similar problem is emerging with regards to water resources. The per capita water for agriculture is becoming less and less, creating the need for alternative ways of water management.

The constraints for land and water are due to the fact that they are required for other uses besides agriculture, such as industrial, domestic and so on. One emerging trend that has been observed is that there is a growing number of urban centers that absorb migratory population from /the rural agricultural sector. The urban growth has lead to an increase in water use in other sectors, e.g., industries. It has also increased the use of water for various domestic purposes. The need for land for bio-fuels production is another challenge that is becoming significant in the world. However, in Sri Lanka it has not yet become a significant issue.

Changes in the climate and natural disasters (flood, drought, cyclones and epidemics) have aggravated the constraints on natural resources such as land and water, which have already been strained by population increases. Although flooding is not a frequently occurring problem in the agricultural areas of the country, droughts that occur from time to time in these areas do create serious problems. In some years, farming systems such as agriculture under small irrigation are confined to one season only due to the drought. Farming communities try to overcome these challenges by tapping groundwater for their agricultural requirements. However, the frequency of droughts experienced in certain periods of time has lead to problems even with regards to the availability of groundwater for agriculture. Cyclones and other

pest-related epidemics too occur periodically and create problems. However, these are neither frequent nor impactful enough to create serious problems in the field of agriculture in Sri Lanka.

Options for Addressing Food Security

When facing the challenges of food security, increasing the extent of land cultivated is the option that is often suggested by many experts. However, many irrigation systems including major, medium and minor, lack additional land to develop for agriculture. In most of the irrigation schemes, farmers have already developed more than the area that was originally designed in the command. The reservations for irrigation canals and also for other purposes have been captured already for cultivation by the communities. Therefore, additional land development under the existing irrigation schemes is an option that has serious limitations. Development of new irrigation schemes also has significant limitations, as most of the natural water resources that are economically, socially and technically feasible have been already captured for irrigation development. There may be some limited possibilities for new water resources development. However, such possibilities require careful investigation by multidisciplinary researchers to evaluate their feasibility status. Improving cropping intensity by augmentation (water transfer to major and minor systems) and management interventions will be the best option available for wider application. The government, however, does make interventions in some systems for the augmentation of water to improve the cropping intensities in irrigation schemes where productivity is low due to lack of water for cultivation in the two seasons. Improved water management for crop diversification will be the other strategy worth employing when addressing the problem of low productivity in agriculture. There should be a balance between paddy and other field crops where farmers can improve their cash flows and also improve household food security.

There is an emerging need to seek new technologies for water management in irrigation systems. The conjunctive use of surface and groundwater for irrigated agriculture is a common practice in countries like India. Sri Lanka too can explore this option. Other technologies such as sprinkler irrigation are useful methods for improving water use efficiency.

The efficient and sustainable use of natural resources is a recommended precaution for natural resources management. In Sri Lanka, many people discuss managing water that is developed for use but rarely talk about managing natural water resources that are flowing in rivers and moving under the ground. These are factors to be considered for the long-term sustainability of land and water resources. Watershed management strategies are also recommended to enrich the water in the soil.

What are the Challenges for Irrigated Agriculture and Options?

As mentioned above, exploring possibilities for using groundwater as a conjunctive resource in irrigation schemes is a useful option. Tapping groundwater for agriculture cannot be a solution that can be prescribed to every region or every location. There are specific locations that are feasible for the application of this option. Extracting groundwater can be a high-cost intervention in some locations and in some other locations it will not be feasible due to

environmental issues. Likewise, options for micro-irrigation (drip and sprinkler) must also be explored. Similar to groundwater, this option can be applied in areas where high-value crops are cultivated. Growing high-value crops with intensive water management technologies may be one solution for improving the productivity of small-land parcels.

The system of rice intensification (SRI) has been identified by some groups such as Oxfam Australia (an NGO working in Sri Lanka) as a suitable option for managing the problem of water scarcity in relation to rice cultivation. Different people have different opinions on the SRI system and its suitability for wider application. However, further studies are needed to draw firm conclusions on this issue.

Water availability is becoming a critical issue and, therefore, all possibilities are to be explored to make water available from all potential sources. Rainwater and runoff harvesting are two such potentials discussed by many persons doing research in this field. Rainwater harvesting is being practiced by communities in some areas of the country for domestic use. This potential source can be further improved to use even for home gardening at a small-scale level. Runoff harvesting needs to be carefully investigated so that it can be implemented in the kind of locations that won't create water scarcity in the runoff harvesting schemes, which have already been developed in the same water sheds.

Small-tank-cascade-systems play a significant role in the rural economy of the country. Water for agriculture in the dry zone is provided by the small-tank-cascade-systems. Some tanks in the cascades require rehabilitation and modernization. The rehabilitation programs should consider cascades as a single unit when improving the individual tanks in the cascades. There may be possibilities for the augmentation of new water sources to some tank-cascade-systems in the dry zone. These potentials need to be planned carefully through studies, taking into consideration hydrological and socioeconomic factors.

It is observed that the cropping intensity of some major irrigation schemes is lower than the expected rates. Furthermore, infrastructure and management improvements in major irrigation schemes need to be carried out to improve the cropping intensities. In addition, specific interventions for different tanks are required for improving their performance in agriculture.

The Challenge Goes Beyond Irrigated Agriculture – Livelihoods Security

The agriculture sector needs innovative approaches to establish sustainable economies for communities depending on such systems. A variety of options will have to be available depending on local conditions and needs. To ensure food security, the solution needs a livelihood-focused approach. Every possibility should be explored to enhance all livelihood capitals. The livelihood capitals include social relations, economic diversities, cash flows, physical infrastructure, health, education and other environmental considerations. This means planning by multiple organizations is a critical need for irrigation systems to establish sustainable livelihood systems for the people. Coordination is a key requirement for these multidimensional development programs. Combining production of grains with fruit and vegetables, fisheries and livestock are potential economic diversifications in irrigation systems in the country. The production systems, whatever that are introduced and practiced, need to consider environmental sustainability in the irrigation systems as whole.

Agriculture versus Environment

There are evidences that current agricultural practices have impacted negatively on the environment, including water, soil etc. Excessive use of synthetic fertilizer and other agrochemicals have created this problem.

In some irrigation schemes concrete-lined canals have created negative impacts on the groundwater in the areas that are close to these lined irrigation canals. However, research is required to justify these assumptions. Changes are needed (reduce the use of chemical inputs) and are taking place, e.g., canals are no longer lined.

The challenge is how to balance these aspects to ensure irrigation efficiency while protecting the environment for long-term sustainability and food security.

Some Suggested Needs

- * More scientific research on new methods and techniques.
- * Specific options for specific locations or situations.
- * Better data on food security.
- * Appropriate management — collaboration between sectors and community involvement.
- * Balancing agricultural production with environment.
- * Taking account of wider livelihoods needs.
- * Ensuring food and nutritional security, at various levels.

Key Issues Determined from the Papers Presented at the Conference on the theme – Irrigation and Food Security

1. We must consider and learn from the ancient irrigation systems when planning new systems.
2. We need to improve water productivity at several levels – from the basin, scheme, to the household level.
3. We should manage rural irrigation systems as a total production system (environment, agroforestry, fisheries and livestock).
4. Maintenance of wet zone irrigation systems to ensure sustainability.

5. Management of aquatic plants – to benefit irrigation schemes and for sustainable utilization.
6. Need to consider, test and where appropriate, promote new technologies such as SRI and zero-tillage.
7. Verification of agro-ecological zones (climate change).
8. Simplified and up-to-date monitoring of irrigation systems – pro-active management.