A policy dialogue on rice futures: rice-based farming systems research in the Mekong region

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Increasing diversification with ‘Cambodia HARVEST’ (Helping Address Rural Vulnerabilities and Ecosystem STability)

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Abstract

Cambodia HARVEST (Helping Address Rural Vulnerabilities and Ecosystem STability) is a United States Agency for International Development initiative that engages with poor rural populations to implement practice change for improved productivity, food nutrition and diversity. In doing so, it seeks to enable improved food security, facilitate sustainable natural resource management and minimise environmental degradation. The initiative also acts to increase the capacity of the public and private sectors to support agricultural competitiveness. Cambodia HARVEST has had success in utilising leading farmers to extend best-practice implementation of diverse vegetable production within the rice production rotation. Investment in labour-saving technologies, such as direct seeding and low-cost drip irrigation, together with private-sector support to create seed multiplication capacity, has made the transition to seasonal horticulture possible. The formation of grower groups, which can create greater scales of production, helps lower input costs and maximise negotiating strength with traders and buyers. As a result of the Cambodia HARVEST program, farmers who have diversified their cropping enterprises report substantial gains in income, while the consumption of nutritious vegetable crops provides benefits to many farmers and their communities.

United States Agency for International Development

The United States Government supports poverty alleviation through many regions of the world via the United States Agency for International Development (USAID). Within Cambodia, USAID has developed programs in four main sectors for the benefit of the Cambodian population. These comprise:

• **Democracy, human rights and governance**—USAID has helped create the National Anti-Human Trafficking Committee, which brings together the Cambodian Government, non-government organisations and community groups to combat human trafficking.

• **Health**—the quality and accessibility of health care available to the poor has been improved through USAID health programs. The organisation provides training to enhance clinical skills and health-financing programs for the poor. These activities have greatly decreased the spread of HIV/AIDS and improved access to health care by the poor. USAID also has projects aimed at overcoming malnutrition through the provision of nutrition education and access to nutritious food, with clear linkages to agriculture.

• **Education**—education is a key component of poverty alleviation and USAID continues to fund teacher training, especially in the fields of agriculture, aquaculture, horticulture and sanitation. Increasing the proportion of the population

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receiving education, especially women, has considerable benefits to adoption rates of agricultural technologies and enterprises.

- Food security and environment—USAID has sought to tackle food security challenges in Cambodia by fostering provision of finance for purchase of fertiliser and farm equipment, increasing productivity, and providing education and training in the cultivation of diverse vegetable crops, which offer nutritional benefits and gains in income compared with the traditional practice of growing rice. The activities of the organisation also aim to provide more efficient use of natural resources and to enhance sustainability. These activities are collectively undertaken within the USAID program called ‘Cambodia HARVEST’—Helping Address Rural Vulnerabilities and Ecosystem STability.

### Cambodia HARVEST

Cambodia HARVEST (Helping Address Rural Vulnerabilities and Ecosystem STability) is a 5-year agricultural program running from January 2011 until December 2015. It aims to decrease poverty and malnutrition by increasing the diversity and volume of food production in rural Cambodia. The project operates within the provinces of Kampong Thom, Siem Reap, Battambang and Pursat, which surround the Tonle Sap Lake. The percentage of the population in these provinces estimated to be below the national poverty line is 52%, 51%, 34% and 40%, respectively (WFP 2014). These areas were also selected due to the relatively high levels of estimated food deprivation and food poverty (WFP 2014). Within the area of operations, the stated objectives of Cambodia HARVEST are to: increase incomes for 70,000 rural households; create economic benefits for 150,000 people; develop income-generating activities for 8,500 ‘extreme poor’ households; diversify cropping systems for 31,500 households; and generate US$25 million in incremental new agricultural sales (USAID 2014).

Cambodia HARVEST has implemented projects dealing with natural resource management, farm pond based aquaculture, social inclusion and nutrition, horticulture and the rice value chain. Often these areas are intrinsically linked and this paper reports on the integration of the horticulture, nutrition and rice value chain projects as they are particularly pertinent to the ACIAR Rice-based Systems Research (RSR) program. Within the rice projects, Cambodia HARVEST works directly with 40,000 rice farmers in 520 villages from the four target provinces. It achieves this magnitude of participatory engagement with the use of a leading-farmer extension system implementing a ratio of approximately 10 farmers to each leading farmer. The leading farmers were selected based on their technical abilities, community influence, and having a farm size of at least 2,000 m². Using this extension model, the program has created practice change related to diversification of crop production with the inclusion of vegetables in rotation with rice. The Cambodia HARVEST program also engages with the private sector to provide vital elements of the supply chain, such as labour-saving mechanisation and seed production.

### Increasing crop diversity

Traditional rainfed rice production tends not to be very economical in Cambodia (Singh et al. 2007). Reported yields of farms involved in Cambodia HARVEST range up to 4 tonnes/hectare (t/ha). Without accounting for family labour, gross margins of US$450 ha/year are reported. However, yields are variable due to unreliability of early-season rainfall and excessive rainfall at flowering, which causes crop damage. Although improvements in rice production have enabled a shift to higher-value aromatic rice with improved yields, farm profit remains low. The Cambodia HARVEST program encourages farmers to integrate vegetable crops in rotation with rice in order to increase farm profit. This requires the provision of finance for inputs and equipment and training of farmers in the agronomy of short-duration rice varieties established with minimal soil preparation. Short-duration varieties enable early harvests, which facilitate preparation for vegetable establishment. Cambodia HARVEST also provides education for farmers in vegetable agronomy, safe and effective crop-protection options, and irrigation management using low-cost gravity-fed irrigation dripper systems (Bowman 2013). For example, the program co-invests in improved water delivery systems. This support has allowed farms that have access to available water to produce seasonal vegetables for household consumption. If the area of land suitable for vegetable production is greater than 1,000 m², commercial-scale horticultural production is possible for local and export markets. On these larger farms, cucumber, sweetcorn, watermelon and bitter gourd are commonly grown. Gross margins, excluding
household labour, of US$3,400 ha/crop have been reported. In addition to the gains in income, the increased consumption of these nutritious vegetables has improved population health. Vegetable varieties recommended in the program are selected based on the highest content of iron and vitamins A and C (Bowman 2013). However, the Cambodia HARVEST program acknowledges that there are compromises between growing what is nutritious for the consumer and what is profitable for the farmer. Some farmers prefer to grow certain vegetables due to ease of production and sale at market. For example, farmers generally find sweetcorn easy to grow and sell compared with other vegetable crops.

Increased commercial horticultural production can result in increased employment opportunities and increased wages at various stages of the supply chain; input supply, on-farm or postharvest (Weinberger and Lumpkin 2007). In Cambodia, vegetable production requires approximately five times the labour input of rice (Abedullah and Farooq 2002). Therefore, implications for farm labour are significant and, as such, the cost of family farm labour needs to be considered. In most studies of small household-scale vegetable production, the cost of labour from family members is not taken into account and therefore gross margins for vegetable production appear favourable. However, it could be argued that to enable meaningful comparison of enterprises, family labour should be valued as an equivalent achievable off-farm wage. When all inputs and labour were accounted, the net farm income per family member producing horticulture in Cambodia was 117% of that for rice production (Abedullah and Farooq 2002). The benefit of diversification is greater when comparing enterprises based on profit per growing day, as vegetable crops generally exhibit shorter growing durations (Weinberger and Lumpkin 2007).

**Introduction of labour-saving technologies**

Labour migration and ageing of existing farmers has increased the demand for farm labour. Although the higher price of horticultural produce may justify hiring labour, the same cannot be said for rice production. Therefore labour-saving technologies, such as mechanisation, are required. Cambodia HARVEST co-invests with participants to purchase equipment for on-farm demonstrations comparing new techniques with traditional practices. At the start of the Cambodia HARVEST program, drum seeders for rice establishment were sourced from a neighbouring country. Owing to poor quality, breakdown of seeders was common and seeding rates of 300 kg seed/ha were required. Procurement of improved drum seeders has allowed much lower seeding rates (90 kg/ha) to be used with rice establishment similar to that possible using the traditional, labour-intensive transplanting techniques. However, in order to achieve this result, water management and field preparation need to be of a higher standard than for transplanting, so adequate training is provided.

**Seed production**

Expansion of any crop enterprise is reliant on the availability of high-quality seed (Weinberger and Lumpkin 2007). In order to produce the required volumes of improved seed varieties approximately 500 seed producers, each with a minimum of 5,000 m² of farmland, have been established with support from Cambodia HARVEST. This private-sector engagement is a crucial component to program success as the public sector does not have the capacity to meet the demands of the industry.

**Market groups**

Cambodia HARVEST has established horticultural production groups comprising 10–30 vegetable producers. There are currently more than 20 groups in operation (USAID 2014). These groups are able to secure bulk discounts on inputs to increase profitability. They build relationships with traders and buyers who seek the efficiencies of trading at larger scales. Through group consensus, they coordinate production and bulk products to gain greater strength in market negotiations. Successful involvement in these groups has provided some farmers with additional income that has made expansion of their farmland possible, further enhancing productivity.

**Challenges and policy implications**

Opportunities for diversification may not be available to all farmers. The quality of the land plays a role in the success of incorporating horticultural production within the rice system. Sandy clay soils enable post-rice soil structure improvement for vegetable production, whereas heavy clay soils tend not to be suitable for vegetable growth after rice. Farm size also plays a role in the successful implementation of diverse crops. The poorest farmers normally have small plots of land and therefore have limited scope for further income generation compared with wealthier
farmers. In the past, smallholders engaged in horticulture had a comparative advantage over larger farms. Successful horticultural production tended to be a result of regular and careful agronomy, weeding, monitoring and irrigating, and the effort required was provided by family labour (Weinberger and Lumpkin 2007). However, due to labour migration, the smaller farmers no longer have access to the necessary labour. Therefore, only farmers with more land have the scale of operation required to make the cost of hired labour effective. Notwithstanding the improvements in household nutrition offered by diversification with horticultural production, the long-term viability of smallholders within the existing business models is questionable. Opportunity exists for exposure to alternative farm management, such as share farming and collaborative farming.

Vegetable production carries greater risk due to high input costs and yield variability associated with water scarcity. Therefore, policy implementation to foster development of efficient irrigation resources will enable rural communities engaged in diversification enterprises to have greater reliability of production. Once production is secured, successful development of horticulture is dependent on the availability of, and access to, market infrastructure, including transportation access via road networks (Weinberger and Lumpkin 2007).

Development of commercial horticultural production should progress with the provision of food safety standards within commercial markets. This should include education about pesticide use and residues management, postharvest handling and record-keeping. Improved environmental and population health may result from greater regulation of pesticide use and advice services, together with improved information access.

References


