



Human Resource Development for Sustainable Agricultural Mechanization in Cambodia

3rd Regional Forum on Sustainable Agricultural Mechanization in Asia and the Pacific
3rd ASEAN Conference on Agricultural and Biosystems Engineering
Co-located with the 12th Engineering Research and Development for Technology in Agriculture
9-11 December 2015, Manila, the Philippines

I. Agricultural production and labor force in Cambodia

Cambodian farming systems are largely subsistence oriented and are dependent on rainfed conditions, thereby excessively exposing producers to production uncertainties. Most agricultural activities are based on low inputs and rainfed production systems centered on paddy rice production.

Cambodia grows a range of agricultural crops over a cultivated area of 4,505,267 ha out of its total land area (181,035 km²). Paddy, which is the main crop, occupies about 68% of the cultivated area, followed by subsidiary and industrial crops 21%, rubber plantation 7%, and permanent crops 4%.

Table 1: The cultivated area in Cambodia in 2013

Crops	Cultivated area (ha)	Remarks
Rice crop	3,052,420	Wet & dry seasons, receding, floating
Subsidiary and industrial crops	941,028	Maize, cassava, sweet potatoes, vegetables, all kinds of bean, sesame, sugar cane, tobacco etc.
Permanent crops	183,048	Cashew, banana, oil palm, coconut, mangoes, coffee, durian, pepper, orange, and other fruit etc.
Rubber plantation	328,771	
Total	4,505,267	



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I. Agricultural production and labor force in Cambodia

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Although there were increases in both productions and yields, the share of labor force in agriculture had decreased from 66% in 2009 to 62% in 2011. This decline was likely caused by farmers' migration to work in the cities, urban areas, or abroad such as Thailand, Malaysia, and South Korea.

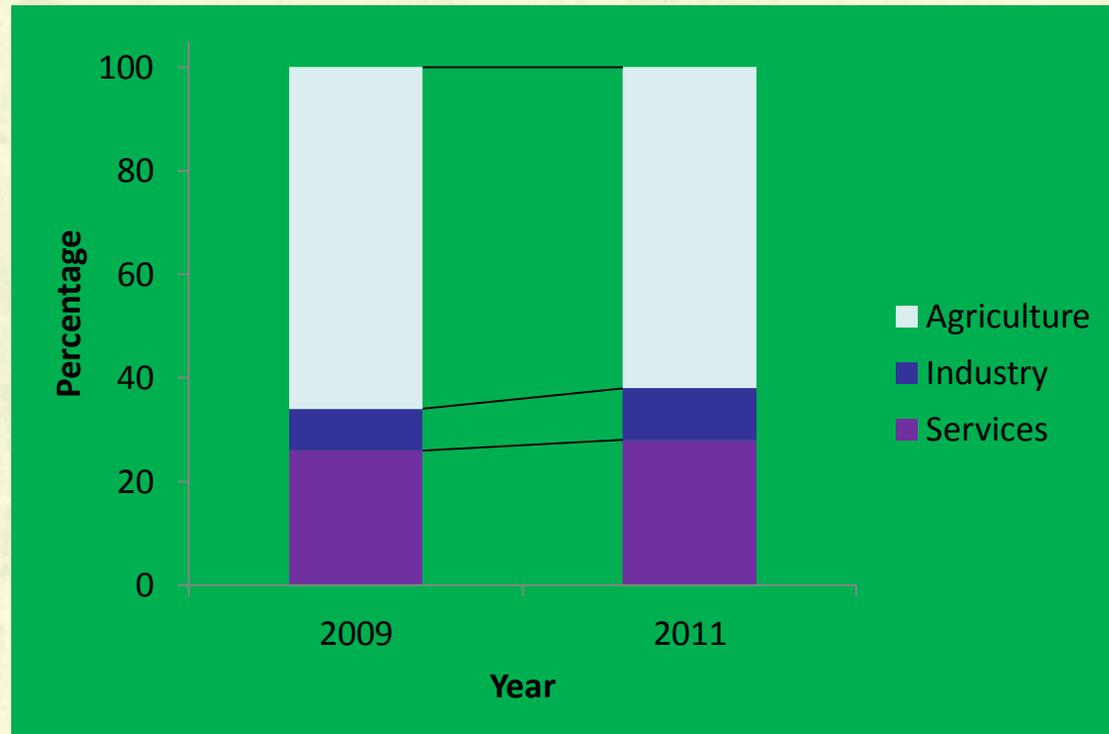


Figure 2: Share of labor force in Agriculture in 2009 and 2011 (MAFF 2014)

II. Overview of human resource development work in the field of agricultural mechanization in Cambodia

2.1 Current status of agricultural mechanization workforce

Currently, more farmers are using agricultural machineries in farming. However, the use of traditional tools and local made machineries are still practice by some farmers, especially those whose farms are not suitable to use machineries since their farm size is small or not leveled.

As demand for food is increasing as population grows. This is an opportunity for farmers to expand their food production by intensification. For example, some regions used to produce one crop per year, now farmers grow 2 or 3 crops per year on their existing lands or expand growing areas. These are the reasons which forced farmers to begin using agricultural machineries.

However, the majority of agricultural machinery users in Cambodia have less trained at any vocational training institution. Normally, most of the users get little training from the seller of agricultural machinery shop after buying agricultural machine or equipment, and some have learned from friend or other people who have experiences on that particular machine or equipment.

II. Overview of human resource development work in the field of agricultural mechanization in Cambodia – *cont'd*

As results, most of the agricultural machinery users are facing many problems, such as agricultural machine is more broken at the field and less effectively make agricultural machinery users spend more money on maintenance and repair for agricultural machinery.

Beside this, local manufacturers, normally, produce thresher, water pump, local-made truck for transportation, trailer, implements and spare parts. threshers, which can be trailer or self-propelled types, are produced by local manufacturers in several provinces. Due to their technological capacities, they can manufacture only simple machines which do not required sophisticated production process or tools. Normally, they are small-scale or family-owned manufacturers.

Meanwhile, the statistical data on agricultural mechanization workforce is not available in Cambodia.

II. Overview of human resource development work in the field of agricultural mechanization in Cambodia – *cont'd*

2.2 Institutions involved in agricultural mechanization human resource development

There are several institutions are involved in agricultural mechanization human resource development activities in Cambodia as below:

- Department of Agricultural Engineering of the General Directorate of Agriculture;**
- Agricultural Engineering Division of the Cambodia Agricultural Research and Development Institute;**
- Provincial Office of Agricultural Engineering of the Provincial Department of Agriculture;**
- Faculty of Agricultural Engineering of the Royal University of Agriculture;**
- Faculty of Agriculture and Food Processing of the Meanchey University;**
- Agricultural Mechanization Division of Preah Leap Agricultural School; and**
- Several organizations from NGOs and private companies provided short courses training on repair and maintenance of agricultural machinery and equipment.**

II. Overview of human resource development work in the field of agricultural mechanization in Cambodia – *cont'd*

2.2.1 Department of Agricultural Engineering

The Department of Agricultural Engineering (DAEng) is supervised by the General Directorate of Agriculture (GDA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF).

This department is mainly responsible for management, research and development, capacity building, and monitoring and evaluation in the field of agricultural mechanization in Cambodia and has its specific mandate as follows:

- Research on farm machinery & equipment and identified zoning for using agricultural equipment and machinery based on the classification of soils and type of crops in order to develop agriculture sector;
- Research on appropriate pre and post-harvest technologies and value chains for agricultural production;
- Formulate guidelines and regulations on the utilization of farm machinery for agricultural production; and
- Make recommendations and provide technical extension on the utilization of farm equipment and machinery to users and relevant stakeholders.

II. Overview of human resource development work in the field of agricultural mechanization in Cambodia – *cont'd*

The Department of Agricultural Engineering consists of 8 offices and 2 agricultural engineering centers listed below:

1. Administration, Planning, Accounting and International Cooperation Office;
2. Agricultural Pre-harvest Technologies Office;
3. Agricultural Post-harvest Technologies Office;
4. Agricultural Engineering & Agricultural Land Reform Office;
5. On-farm Irrigation Office;
6. Training & Community Development Office;
7. Toul Samrong Agricultural Engineering Center, Battambang province; and
8. Kbal Po Agricultural Engineering Center, Takeo province.

The main research and development activities on agricultural mechanization have been collaborated with provincial department of agriculture, farmers and community in the provinces.

II. Overview of human resource development work in the field of agricultural mechanization in Cambodia – *cont'd*

2.2.2 Division of Agricultural Engineering of CARDI

The Division of Agricultural Engineering (DAE) is supervised by the Cambodian Agricultural Research and Development Institute (CARDI) of the Ministry of Agriculture, Forestry and Fisheries.

The DAE aims to increase the productivity and quality of agricultural crops through improving pre and post harvest operation technologies including development of prototypes. This DAE has conducted several experiments for pre and post harvest research activities focusing on cereal, legume and vegetables.

The DAE program undertook a research and development program that help farmers to improve the efficiency and sustainability of rice and non rice crop production.

The Cambodian Agricultural Research and Development Institute (CARDI) is a semi-autonomous institution which is governed by a board of directors. It was established in 1999 and inherited from a research program called CIAP, mainly concerned with rice production.

II. Overview of human resource development work in the field of agricultural mechanization in Cambodia – *cont'd*

2.2.3 Agricultural Universities and School

At present, there are several agricultural universities and school offered bachelor degree for students who study at the field of agricultural engineering/mechanization.

Due to shortage of machines and equipments, most of Universities given more lectures than practices. As results, students are not capable of producing enough to test a machine or equipment by themselves.

2.2.4 Provincial Office of Agricultural Engineering

The Provincial Office of Agricultural Engineering (POAE) is supervised by the Provincial Department of Agriculture. The main activities of this provincial office is to apply and demonstrate agricultural machinery and equipment to farmers and community in the province. Beside this, POAE also provides short courses training to farmers and ended user on repair and maintenance of agricultural machinery.

2.2.5 Vocational training on agricultural machinery

There are several public, private and NGO organizations offered vocational or short courses training to students who prefer to study in short-term and can find a job with private companies or open its agricultural machinery repairing shop by themselves at their communes.

III. Strategies, policies, and national programmes/initiatives of human resource development of agricultural mechanization

The Royal Government of Cambodia (RGC) has set up the policy for promoting the rice production and exportation. Besides this, the RGC has set up recently the action plan for implementing policy paper on the promotion of paddy production and rice export. The RGC has set the year 2015 as the target year to: (1) achieve paddy surplus of more than 4 million tons and achieve rice export of at least 1 million ton; (2) ensure the international recognition of Cambodian rice. There are 2 approaches had been defined by the Ministry of Agriculture, Forestry and Fisheries as follows:

- For the short and immediate term, promoting paddy production to meet market demand and promote rice export by shifting from the informal export to the formal rice export; and
- For the medium and long term, to focus on enhancing competitiveness in rice export through promotion of production technology, quality improvement, processing capacity, development of physical infrastructure, credit, trade facilitation and exploring market opportunities.

III. Strategies, policies, and national programmes/initiatives of human resource development of agricultural mechanization – *cont'd*

Regarding to the Government policy for promoting the rice production and exportation, the strategic plan on agricultural mechanization was prepared by the Department of Agricultural Engineering since 2011. This strategic plan aims at enabling access to mechanization, skill development, strengthening of commodity chains, and improving policy, legal and regulatory environment. It will serve as the four key drivers in promoting agricultural mechanization.

1. Enabling Access to Mechanization

- Field Mechanization Options for Cambodia**
- Improving Supply Chain**
- Financing**
- Support Services**
- Enabling Designs**
- Alternative Energy for Farm Production**

2. Skill Development

- Technical skills**
- Knowledge Creation**

III. Strategies, policies, and national programmes/initiatives of human resource development of agricultural mechanization – *cont'd*

3. Commercialization of Agriculture

- Pre-harvest Technologies**
- Post-harvest Technologies**

4. Better Policy, Legal and Regulatory Environment

- Formulation of Farm Machinery Laws and Regulations**
- Cooperation between Public, Private Sector and Farmers**
- Gender Mainstreaming**
- Environmental Protection and Climate Change**

However, the strategic plan on agricultural mechanization is not functioning and lack of funded support to make it works.

In order to address on human resource development of agricultural mechanization in Cambodia, the Department of Agricultural Engineering has initiated and planned to establish agricultural mechanization services through entrepreneurial farmers. At the beginning, government could help these farmers to establish the required services and step by step empower these farmers to provide the services by themselves.

IV. Challenges and constraints faced for Human Resource Development on agricultural mechanization in Cambodia

- **Lack of HRD strategy in agricultural mechanization:** HRD strategy on agricultural mechanization has not yet prepared;
- **Limited human resource:** The skilled workforce is still inadequate in agricultural mechanization at both national and provincial levels. Structure of the Provincial Office of Agricultural Engineering is still weak. There is no staff responsible for agricultural mechanization below provincial level;
- **Limited financial resource:** The annual budget allocated by the government for the implementation of agricultural mechanization activities fails to cover nationwide. External support for the development and the promotion of farm mechanization are still inadequate;
- **Insufficient training and field demonstrations:** Due to limited budget support and lack of human resources, short courses training and field demonstrations on agricultural machinery are limited;
- **Weak extension worker:** Most of agricultural extension workers have no background on agricultural mechanization, and
- **Lack of collaboration:** It is a gap in cooperation with universities, private sector and development partners dealing with agricultural machinery.

V. Conclusion

- **Farmers have started to use more and more agricultural machineries since 2009 for their farm lands because of migration of young people move out of rural areas to work in urban areas for garment factory, shoe factory, construction or migrate to work abroad, as well as climate change and demand for food is increasing as population grows.**
- **The majority of agricultural machinery users in Cambodia have less trained at any vocational training institution. Normally, most of the users get little training from the seller of agricultural machinery shop after buying agricultural machine or equipment, and some have learned from friend or other people who have experiences on that particular machine or equipment.**
- **Local manufacturers on agricultural machines has limited technological capacities, they can manufacture only simple machines which do not required sophisticated production process or tools;**
- **Short training courses and field demonstrations on agricultural machinery for farmers at the commune level are limited and weak due to limited budget support and lack of human resources;**

V. Conclusion – *cont'd*

- The strategic plan on agricultural mechanization had prepared by the Department of Agricultural Engineering in order to serve as the four key drivers in promoting agricultural mechanization. However, the strategic plan on agricultural mechanization is not functioning and lack of funded support to make it works; and
- There are several institutions are involved in agricultural mechanization human resource development activities such as department of agricultural engineering, educational and research institutions, provincial office of agricultural engineering, and several organizations from NGOs and private companies.

VI. Suggestions for human resource development for sustainable agricultural mechanization

There are some key driving factors should be considered as below:

- **Develop a HRD strategy to enhance agricultural mechanization sub-sector in Cambodia;**
- **Provide human and financial resources support on education, training and R & D for agricultural mechanization activities;**
- **Develop curriculum to meet the current development of agricultural machinery in the country;**
- **Conduct training need assessment in agricultural mechanization for all levels to support agricultural mechanization activities;**
- **Provide in-service training for extension officers and workers to improve their knowledge and skills on agricultural mechanization; and**
- **Improve collaboration with public, private sectors and development partners as well as agricultural universities in order to develop agricultural mechanization in Cambodia; and**
- **Better information sharing and extension of the technology through national and regional workshops on the benefits of agricultural mechanization.**



Thank you for your attention