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កម្ពុជា

KINGDOM OF CAMBODIA

Department of Agricultural Engineering, GDA (MAFF)

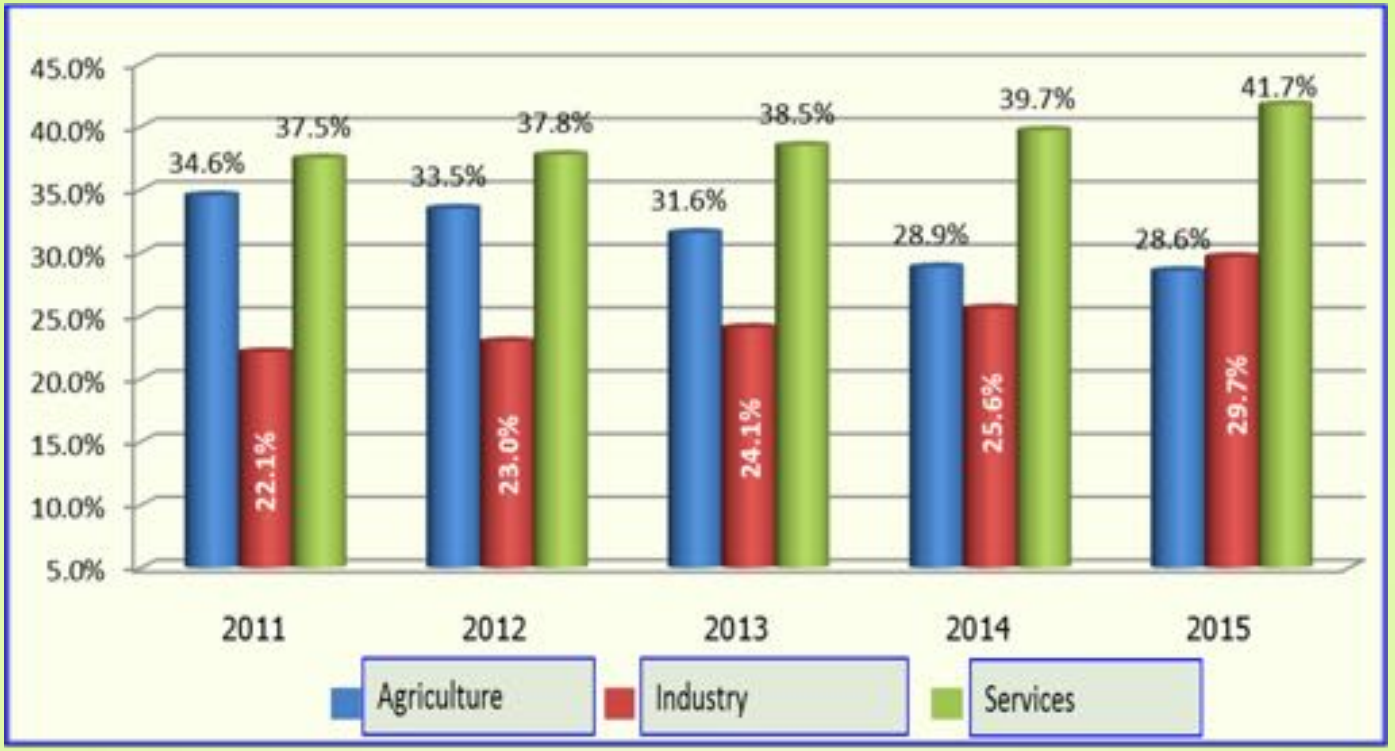
Training on Harvesting and Post-harvest Mechanization to Support Food Securities in Asia and Africa

21-27 May 2018 in Nanjing, China

I. Introduction

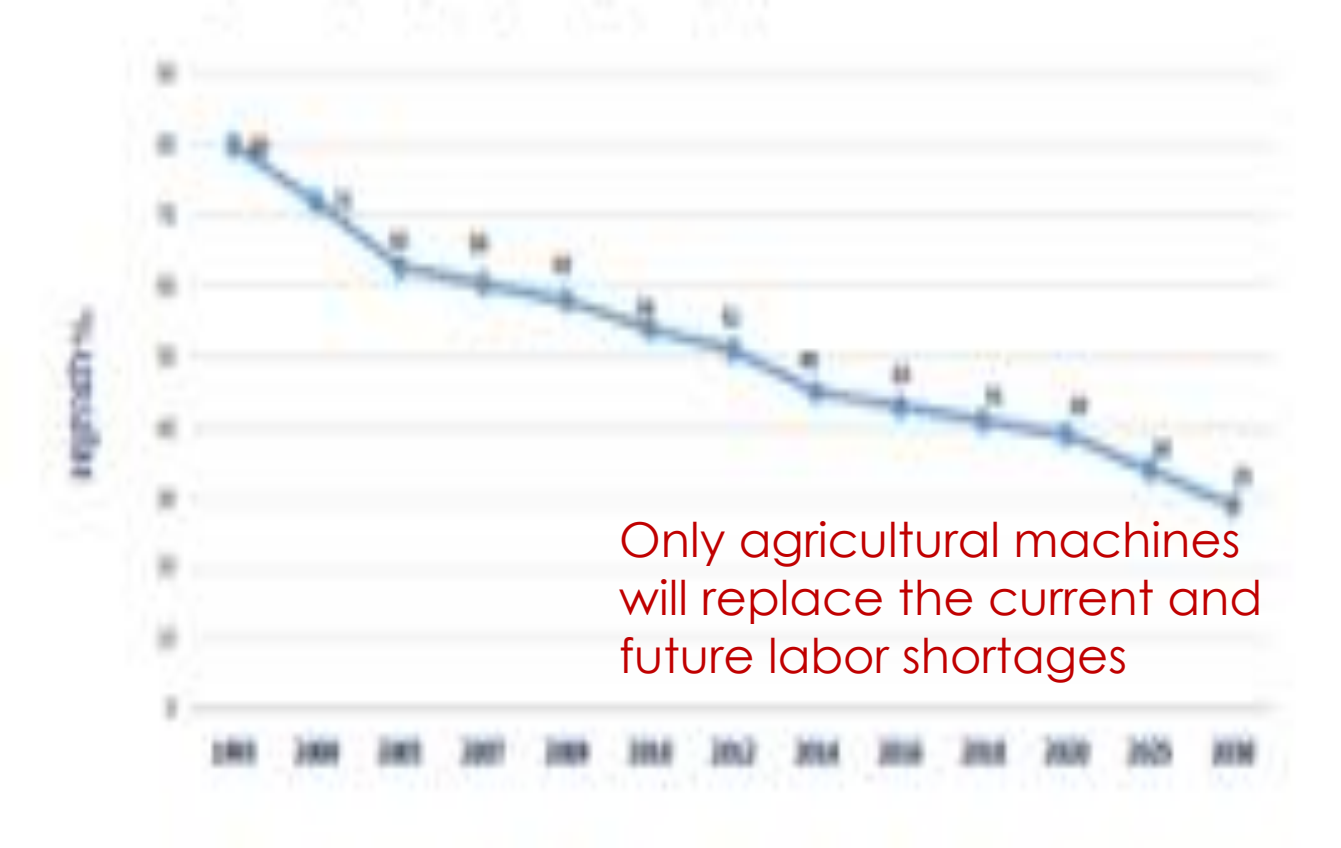
- **Agriculture remains one of the most important sectors in Cambodia**
  - Main source of income for rural households
  - Employs 49% of total labour force
  - Contributed 28.6% to GDP in 2015 (decreasing from 34.6% in 2011)
- **Total cultivated area of** 4,505,267 **ha in 2013**
  - Rice: 68 %
  - Subsidiary and industrial crops: 21 %
  - Permanent crop: 4 %
  - Rubber plantation: 7 %
- **Employment in agriculture**: approximately 70% of population

2.1 Share of Agriculture sector in GDP



- The agriculture sector contribute to the GDP is about 28.6% in 2015, while industry sector is about 29.7% and services sector is about 41.7%. While in 2011, agriculture sector contribute to about 34.6%, industry sector is about 22.1% and services sector is about 37.5%.

1.2 Labor force in agriculture from 1993 to 2030



Source: MAFF, 2017

1.3 Prime mover of agricultural mechanization in Cambodia

- At present, more farmers are using agricultural machineries in farming. However, the use of traditional tools and local made machineries and equipment 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. These farmers cannot afford to use expensive machines and cannot use them to their full capacities.

1.3 Prime mover of agricultural mechanization in Cambodia – *Cont'd*

- Agricultural mechanization in Cambodia has been increasing widely since 1990s especially in land preparation, irrigation, threshing and recently harvesting. The numbers of tractors increase repeatedly in the last 10 years (3,857 units in 2004 and 9,467units in 2013).
- The provinces around Tonle Sap Lake and dry season rice areas in the south have higher growing rate. The number of power tiller significantly increased from 77,421 units in 2011 to 366,195 units in 2017.

1.4 Statistical data of ag machinery from 2011 to 2016

Year	Tractors	Power Tillers	Engine Pumps	Harvesters	Threshers	Dryings	Millings
2011	6,786	77,421	183,502	1,548	15,210		48,7
2012	8,961	128,806	231,942	4,820	16,146		54,328
2013	9,466	151,698	255,955	4,598	17,067	94	55,270
2014	11,940	228,456	326,832	5,503	17,532	178	54,062
2015	13,701	266,004	344,633	5,893	17,169	180	55,364
2016	18,317	343,764	352,240	6,605	13,765	216	54,965

Remarks:

- From 2015 to 2016 the number of Tractors, Power Tillers Engine pumps and Harvesters increased while the number of Threshers and other machines decreased.

II. Harvesting and Post-harvest Mechanization

2.1 Harvesting

- Before harvesting, farmer observe the panicle (should be bend) grain in straw color 80-85% and hardness of grain (by teeth), field should be dries.
- Manual harvesting (Cutting by circle) 30-40 per./ha
- Harvesting by harvester (just some part of the country)
- Combine harvester 3-4 hr/ha

2.1 Harvesting – *Cont'd*

Combine Harvester

2.2 Transportation

- Farmers haul their harvested paddy from field to house by carrying or transport by ox cart or power tiller.

2.3 Threshing

-Pedal threshing- Use the rotary drum teeth to separate rice grain from paddy‘s bundle.
-Mechanical threshing- Use mechanical thresher power by engine.

2.4 Drying

-Sun drying- traditional method and low cost compared to mechanical drying normally this method is use mat or blue tarp or plastic net or concrete floor for drying rice.

2.4 Drying – *Cont'd*

-Flatbed dryer: use only in some part of B.Bang Kampong Thom Takeo and Prey Veng provinces. The higher the air temperature, the more the grain was damaged, temperature should not more than 41c

2.4 Drying – *Cont'd*

This type of dryer is use in some of small commercial rice milling.

2.5 Storage



-Store rice grain in big bamboo basket by traditional way that can store in 1 year

-Store rice grain in close timber sheet that way is more secure of rice grain than above.

-In general poor storage facilities reduce the germination of seed and expected life to less than 8 months after harvest.

2.5 Storage – *Cont'd*

Store in good condition

In Battam Bang in rice milling storage

Volcanic cub storage is not many in Cambodia

2.5 Storage – *Cont'd*

- Some of milling store rice in the cool room (5℃ to 10 ℃) and in silo.

2.6 Milling

Traditional way

Village rice miller

Commercial rice miller

III. Training on Rice Post-harvest Technologies



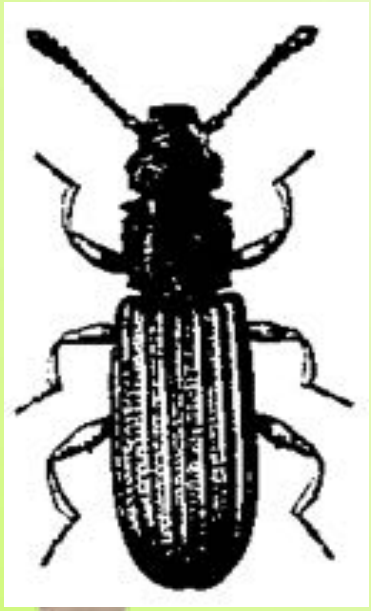
- Cambodia government have 4 training on rice post-harvest mechanization to train farmers every year in Takoe, Pausat , Battambang and Bonteay Meanchey province.

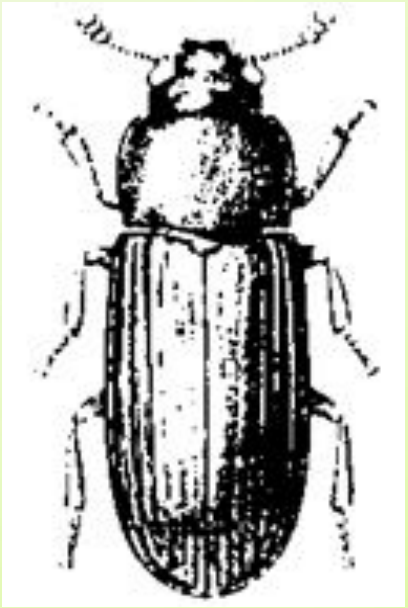
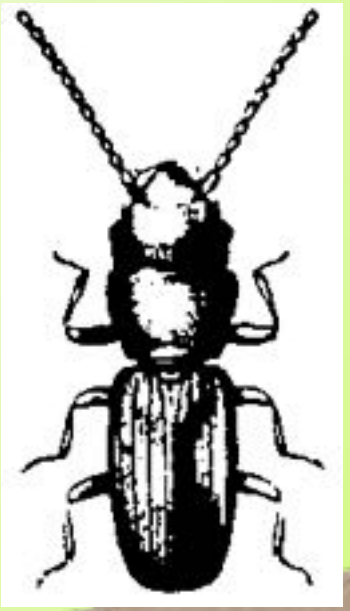
IV. Problems and Issues on Rice Post-harvest

- Labor shortage in countryside
- Bad relationship from Researchers extension workers and farmers
- Lack of credit for farm mechanization and milling
- Lack training on harvesting and post-harvest mechanization
- Non uniform ripening

IV. Problems and Issues on Rice Post-harvest – *Cont'd*

- Insufficient and non-uniform dried paddy causes mass losses due to respiration, mold growth and insect propagation during storage and leads to low quality milled rice

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