



Sustainable Mechanization for Smallholder Farmers in Cambodia in Support of the Sustainable Development Goals

*Presented by
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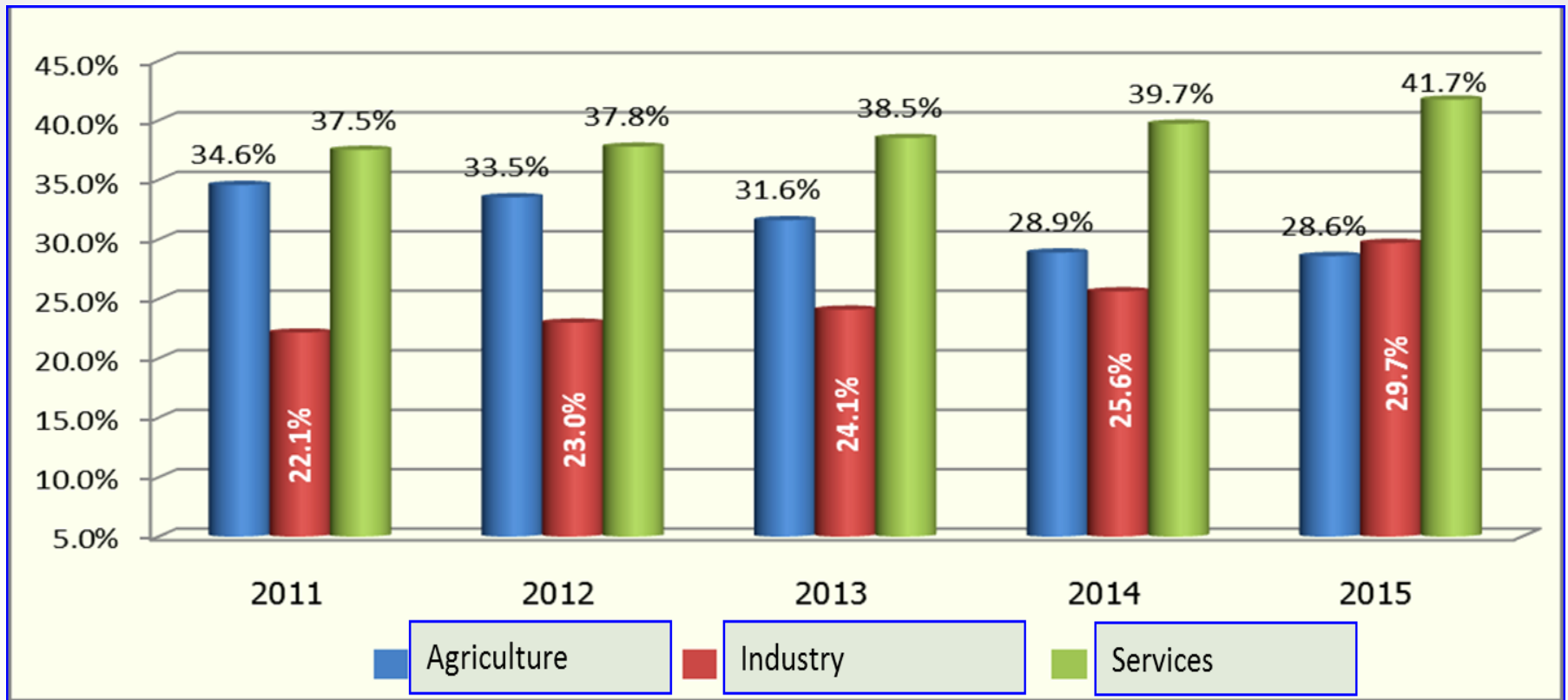
*Training Workshop on Sustainable Mechanization for Smallholder Farmers in
Asia and Africa
in Support of the Sustainable Development Goals
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I. Introduction

- **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

1.1 Share of Agricultural 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.
- 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 2017

Year	Tractors	Power Tillers	Engine Pumps	Harvesters	Threshers	Dryings	Millings
2011	6,786	77,421	183,502	1,548	15,210	-	48,753
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	18,442	34,7203
2017	20,046	366,195	367,117	6,905	52,612	20046	36,6195

II. Situation analysis on ag mechanization in Cambodia

2.1 General Information of ag mechanization

- In Cambodia, rice is the main crop and farm mechanization is also mainly for rice. Agricultural machines are also used for others crops such as corn, cassava, bean, rubber, sugarcane and fruit tree for land preparation, transportation and planting.
- For rice, farm operation which are significantly mechanized are land preparation, spraying, weeding, threshing, and milling. Other farmer operation such as transplanting, fertilizing, etc. are still done manually because they are complicated to be mechanized.
- The government agencies have introduced rice transplanting and direct seedling machine in order to improve efficiency of sowing. However, its adoption is still not clear since majority of rice fields are rainfed ones which are difficult to manage water and not leveled.
- In some region, animals are still used for land preparation and transportation, especially in those regions where farm infrastructures are not well developed and small farm size (less than 0.5ha per household) which is not suitable for use machines and difficult to access by road because they are located far from main roads.

2.1 General Information of ag mechanization-con

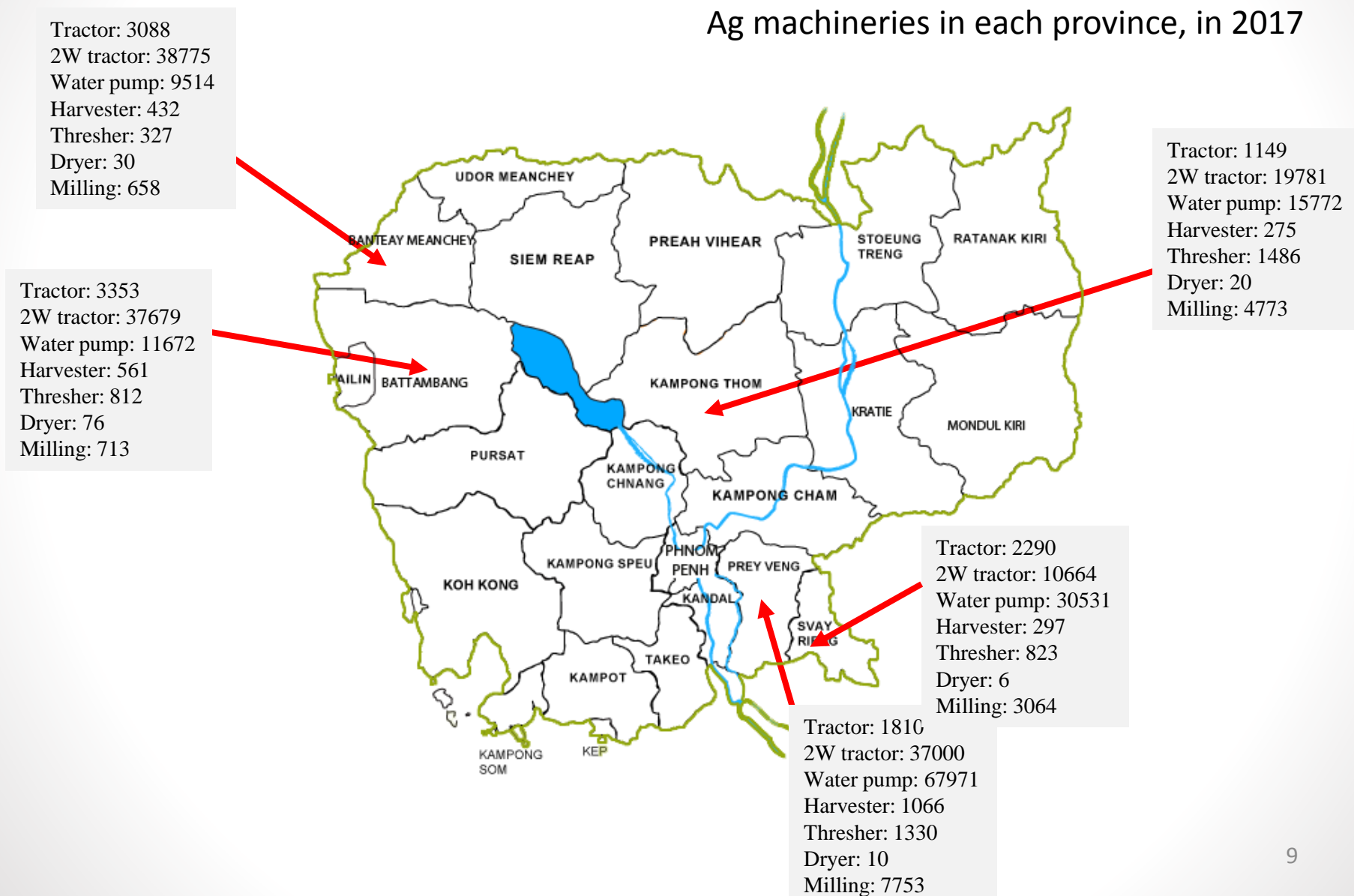
➤ Percentage of rice operations vs. source of power

Operation	Power sources (%)		
	Manual	Man-Animal	Mechanical
Land preparation	0	12.22	88
Planting	99	0	1
Weeding	90	0	10
Fertilizer application	99	0	1
Spraying	0	0	100
Harvesting	30	0	70
Threshing	1	1	98
Drying	80	0	20
Milling	0	0	100
Average	44.33	1.47	54.22

Source: Department of Agricultural Engineering, 2015

2.2 The prioritized development areas of ag mechanization

Ag machineries in each province, in 2017



2.3 The future technical demand of ag mechanization in CAM

For future technical demand for Cambodia are

- 1). Experts to provide technical training.
- 2). Places and implements to work in technical workshop, such as CNC machine, lathe machine, 3D printing, or casting metal, Aluminum and plastic casting process.
- 3). Smart programming to develop smart devices. Automatic steering system, Smart farming system. IOT, Precision Agricultural System.

III. Constraints and Challenges in ag mechanization

There are a number of Constraints and challenges in ag mechanization in Cambodia. as below:

1. Scattered policies and strategies : there is still lack of clear policy and development plan of ag mechanization.
2. Human resources in demand: skilled workforce is still inadequate in both national and provincial levels. Provincial office have no responsible staff. Experts in this field has been shortage from time by time
3. Limited operational and maintenance skills: the repair & maintenance are one of the major constraints in promotion farm machinery.
4. Missing link between actors: the relationship between public and private sector has yet been strong.
5. Short of funding: DAEng or provincial office attempt to work hard. But this effort is limited. Have no financial support to finish works. There is no credit scheme from government for buying farm machinery.

III. Constraints and Challenges in ag mechanization

There are a number of Constraints and challenges in ag mechanization in Cambodia. as below:

6. High cost of machines and equipment: Farmers sell agricultural products with cheap price, they cannot buy machines through selling products. But they can buy ag machines from selling properties.
7. Accessing information: we don't have TV to advertise or extend technology for farmers but we have TVs to advertise Alcohol products.
8. Research and Testing: most of research on ag mechanization are limited, without testing, no accreditation on quality.
9. On farm infrastructure is low level: rice field cannot harvest on time through damaging road from field to main road.

IV. Good practices and experiences in ag mechanization

4.1 Keep R & D new implement, Creatives

- DAEng try to propose project to have tools in technical workshop
- Some artisans try create new implement by own



IV. Good practices and experiences in ag mechanization

Some institutions try to cooperate each



Battery-powered broadcaster



Small roller



Roller with cutting disc



Chisel-plough



Versatile no-till planter



NT planter, broadcaster & roller crimper

IV. Good practices and experiences in ag mechanization

Cooperate with NGOs to have project to develop new implement



V. Recommendation

- Awareness raising activities on various machines and equipment used for conservation agriculture with relevant stakeholders including Agricultural Educational Institutions are needed;
- Better information sharing and extension of the technology through national and regional workshops on the benefits of agricultural machinery.
- In close cooperation with development partners and private sector on R & D of machines and equipment for conservation agriculture that required to practice conservation agriculture can be reasonable price and affordable for individual smallholder farmers, and
- Introduce various machines and equipment with several crops through training workshop and field demonstration to farmers and relevant stakeholders.

VI. Conclusion

- Agricultural Mechanization is a good way to achieve increased land and labor productivity while preserving natural resources.
- Well-trained and equipped, service provision entrepreneurs, as well as farmers themselves, are a promising way forward to put agricultural mechanization within the reach of smallholders,
- The research and development of agricultural machines used for conservation agriculture should be adapted with local condition in order to make sure the user could afford to use it.
- Agricultural mechanization has been piloted in Cambodia for more than 10 years to contribute improving soil structure and maintain water conservation in soil; and
- Agricultural machines and equipment used for activities have been introduced and piloted in several places in Cambodia.

Thank you for your attention