



Regional Overview of Agricultural Mechanization

Centre for Sustainable Agricultural Mechanization
UNESCAP



UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific

CSAM

Outline

- I. Introduction**
- II. Background**
- III. Overview of Agricultural Mechanization**
- IV. Policies implemented in Member States**
- V. Challenges**
- VI. Future Trends and Outlook**
- VII. CSAM's Strategic Fit and Programmes**

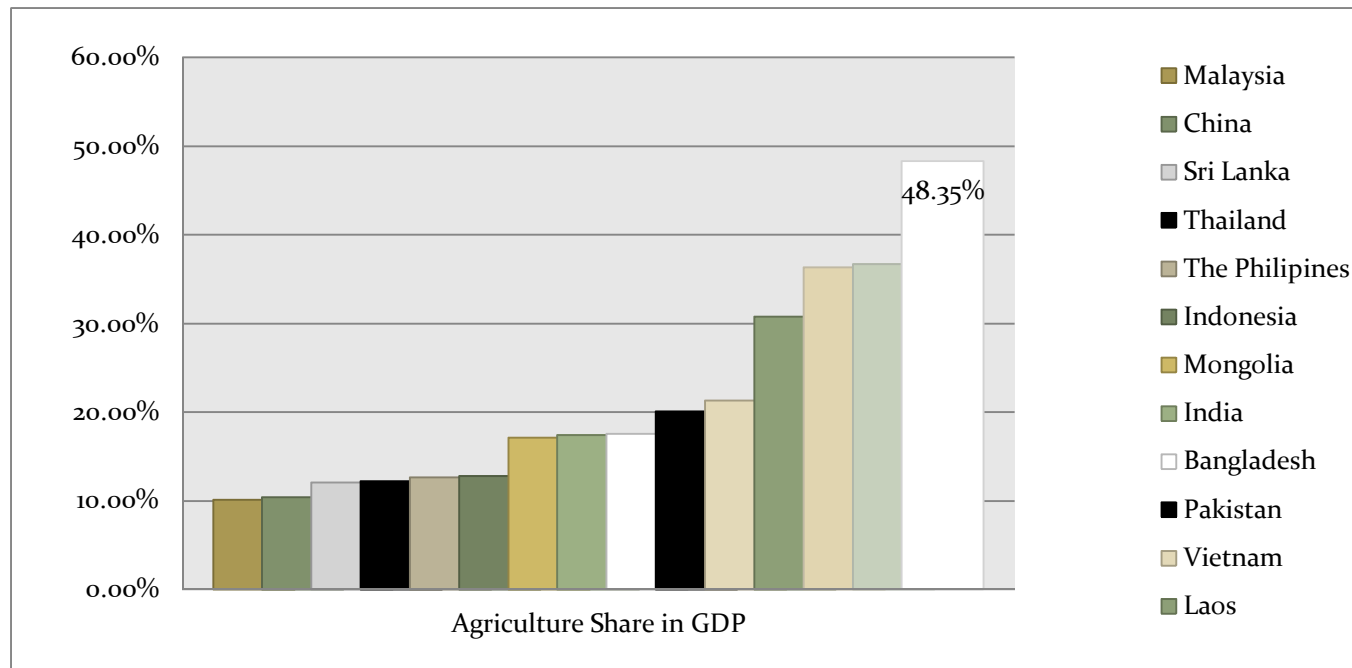
I. Introduction

Scope

- The focus of this overview is mostly on the active member countries (about 20) of the Centre for Sustainable Agricultural Mechanization, a group of countries of different nature but most of which are LIFDCs.

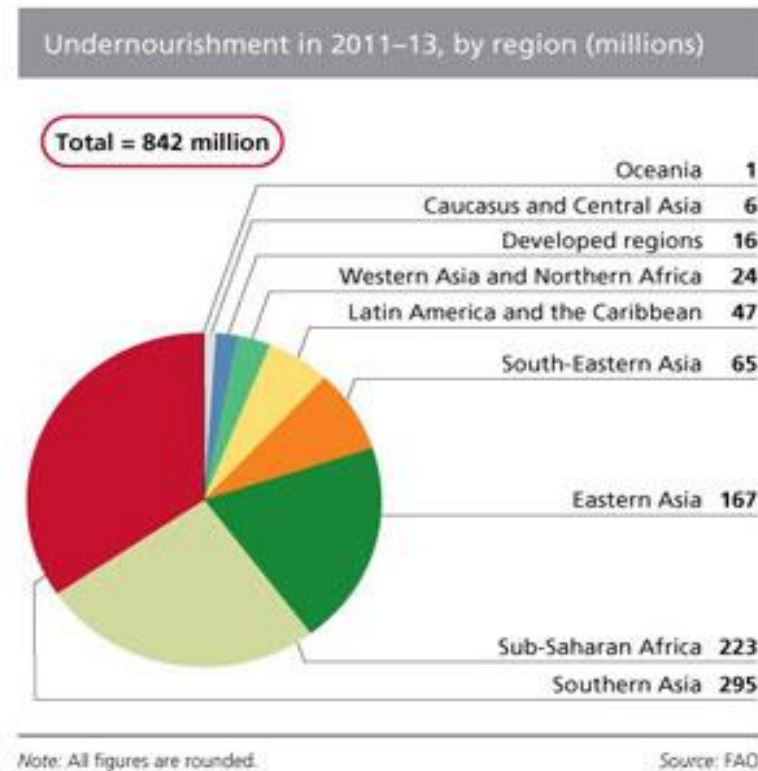
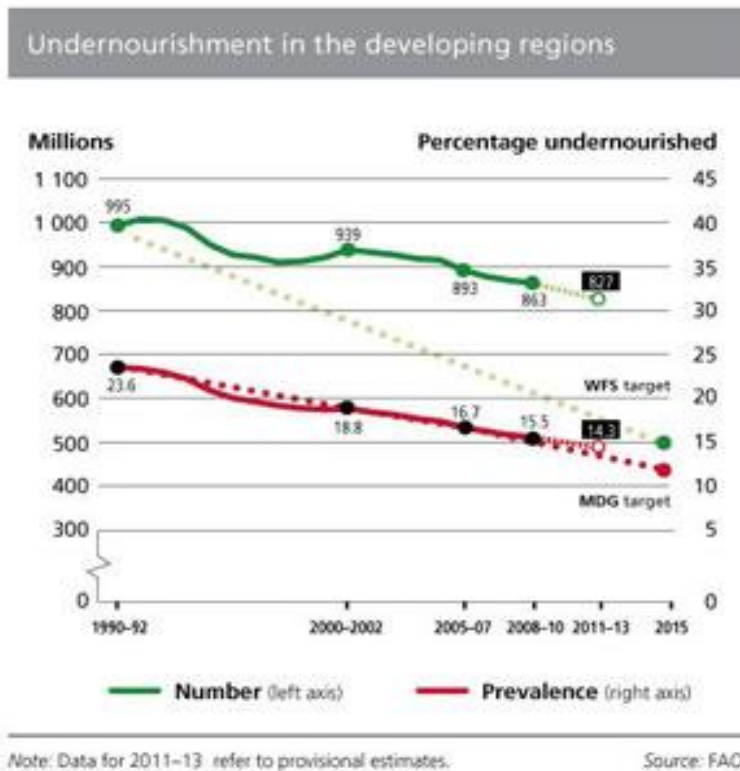
II. Background

Traditionally agricultural countries, though agriculture's share in their GDPs showing a decreasing trend, it still represents important part of national economies.



II. Background

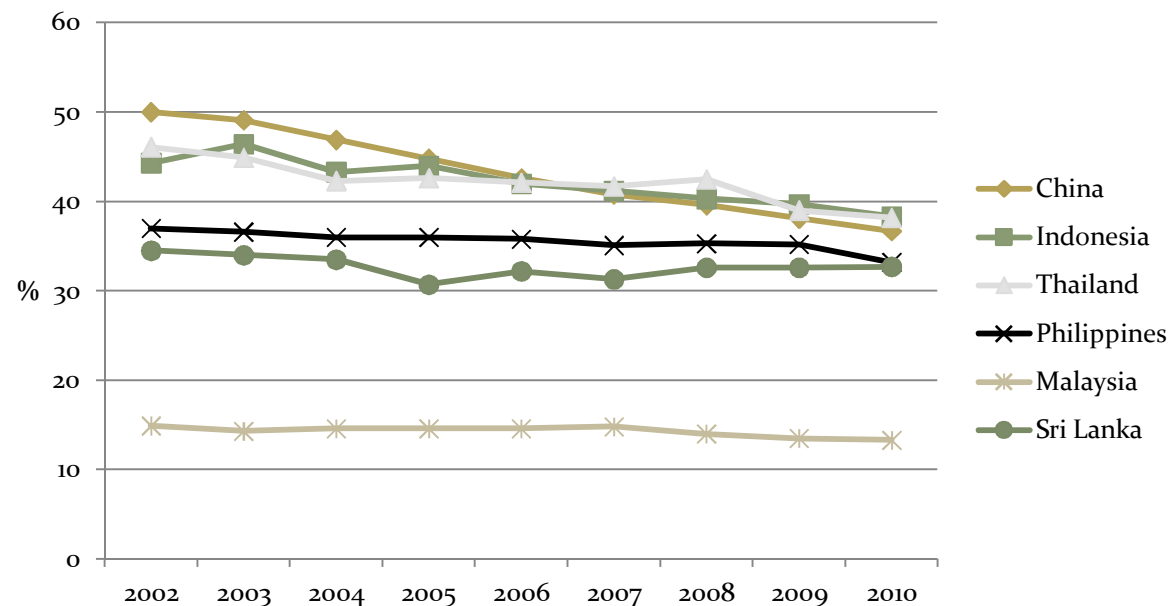
Food security remains a major concern of many countries.



II. Background

Increasing urbanization and decreasing share of rural labour amid dynamic social-economic development.

Employment in agriculture (% of total employment)



III. Overview



III. Overview

1. Generally increased mechanization levels...

Many countries witnessed remarkable growth in mechanization. For example:

- China's power availability per hector reached 3.56 Kw in 2011 and its 'overall mechanization rate' raised from 35% in 2004 to 59% in 2013.

Year	1978	1995	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Overall Mechanization Rate	19.7 %	31.9%	34.3%	36.0 %	39.3%	42.5 %	45.8 %	49.1%	52.3%	54.8 %	57.0 %	59%

III. Overview

1. Generally increased mechanization levels...

- *India's power availability has also achieved steady growth from 0.92 Kw/ha in 1995/96 to 1.84 Kw/ha in 2012.*

Year	1971-72	1975-76	1981-82	1985-86	1991-92	1995-96	2001-02	2005-06	2011-12	2012-13
Total power, kW/ha	0.293	0.358	0.467	0.578	0.76	0.918	1.175	1.5	1.698	1.841

- *The power availability in Bangladesh increased from 0.4 Kw/ha in 1990 to around 1.4 Kw/ha in 2011.*

III. Overview

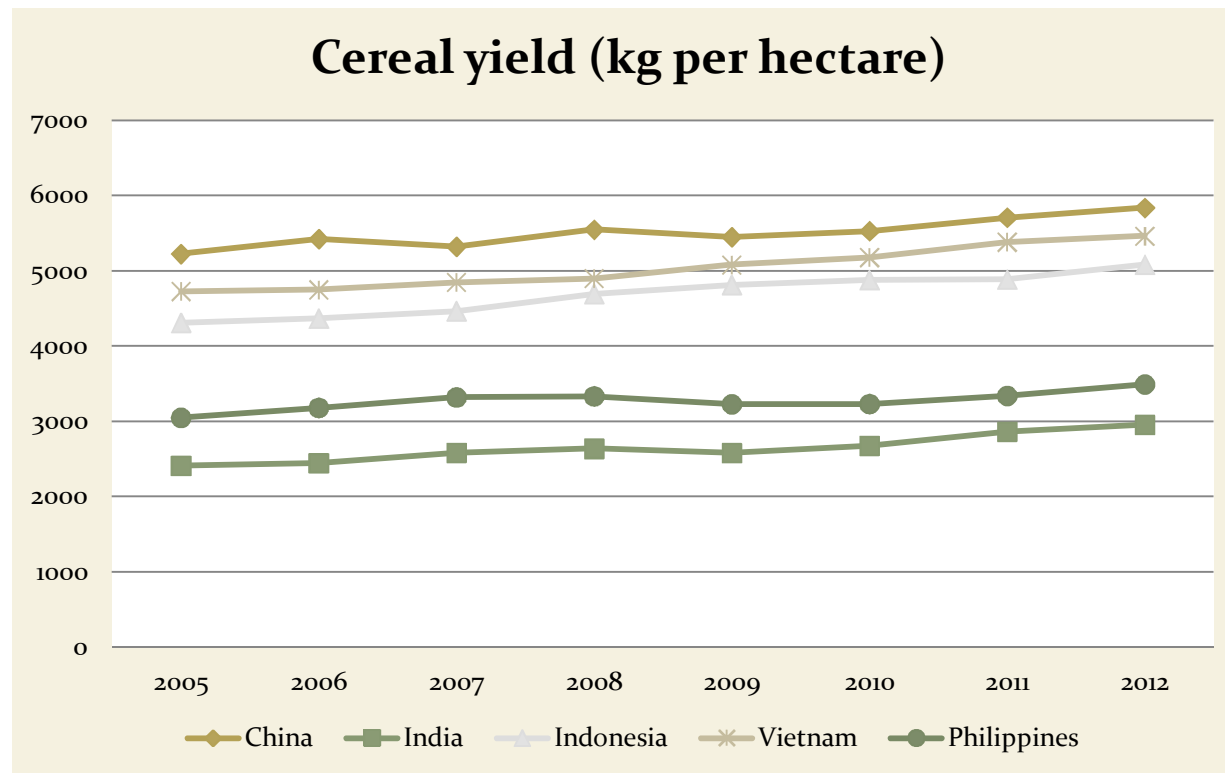
1. Generally increased mechanization levels...

- *In Cambodia, the number of tractors increased more than 2 folds during 2006 to 2012, its harvesters increased fifteen folds.*
- *And total tractors registered in Nepal increased from around 30,000 units in 2003 to nearly 70,000 in 2012.*
- *Vietnam's total agricultural horsepower more than doubled during the first decade of this century.*

III. Overview

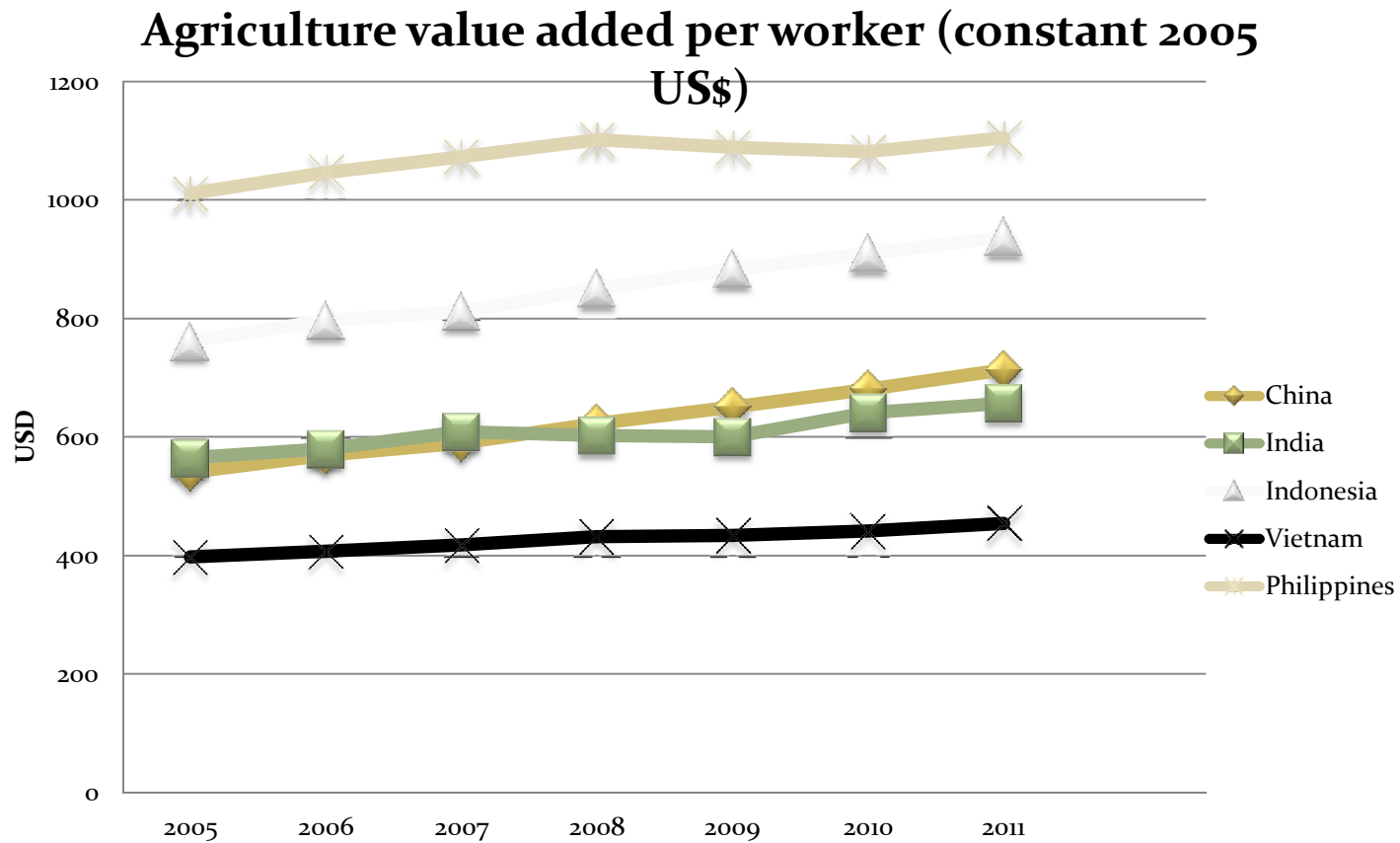
1. Generally increased mechanization levels...

Productivity gains in line with increased mechanization



III. Overview

1. Generally increased mechanization levels...



III. Overview

2. ...but the growth has been unevenly distributed.

- *For instance, the mechanized rice harvesting is rather uncommon in Indonesia, while the mechanization rate of rice production has reached 99% and 97% respectively in Japan and South Korea in 1998;*
- *Yet the unbalance is not only across border but also among different districts within the same country, like in India, the power availability in Orissa was only 0.60 kw/ha in 2001, compared with 3.5 kw/ha in Punjab...*

III. Overview

2. ...but the growth has been unevenly distributed.

- *Big gaps also exist among different crops, for example wheat harvesting in China was 91% mechanized while that of cotton only 8.3% in 2012;*
- *and among different stages of production too, for example close to 71% of rice is harvested by machines in 2012 in China while the mechanization rate of rice planting is only 31.7% in the same year.*

III. Overview

3. Major breakthroughs in agricultural machinery manufacturing capacities.

- *India has been a tractor exporting country since 1980s and now about 10% of its tractors are exported;*
- *China claimed to have become the world leading agricultural machinery producer in 2012, producing over 2 million tractors and 1 million harvesting machinery per year;*
- *Local production of power tillers, seeders, hand and foot sprayers, threshers and millers, among other more sophisticated machines and implements, is becoming very common in most countries.*

III. Overview

4. Increased volume of trade and investment in the agricultural machinery industry

III. Overview

Contributing factors to increased levels of mechanization:

- Policies and strategies implemented;
- Subsidies/credit/taxation (import duties, tax on industry);
- Research and development efforts;
- Targeted extension service;
- Larger holdings in some countries (cooperatives and land lease);
and
- Specialized services (more accessibility and affordability to farmers through custom hiring/leasing).

IV. Policies implemented in Member States

China

- In 2004, China enacted the *Law on the Promotion of Agricultural Mechanization*;
- Since then, China began to subsidize the purchase of agricultural machinery, which is increased from 70 million yuan in 2004 to 21.75 billion yuan in 2013;
- Currently, China is conducting mid-term review of the implementation of its 12th Five-Year Plan of Agricultural Mechanization Development (2011-2015).

IV. Policies implemented in Member States

India

- *India has launched a Sub-Mission on Agricultural Mechanization (SMAM) for their 12th Five Year Plan (2012-17) with an estimated outlay of US\$ 350 million for the plan period by Machinery & Technology Division (M&T), Department of Agriculture and Cooperation, Ministry of Agriculture of Government of India.*
- The Operational Guidelines of the SMAM was released in 2014.

IV. Policies implemented in Member States

Other countries

- In Cambodia, a National Strategy on Agricultural Mechanization Development is in place as a milestone;
- The National Agro-food Policy (2011-2020) was approved in Sept 2011 in Malaysia with component to promote continuous adoption and utilization of mechanization in agricultural production;
- A Farm Machinery Act is being drafted in Sri Lanka;
- The Law on Agriculture and Fishery Mechanization (AFMech Law) is newly enacted in 2013 in the Philippines;

V. Challenges

Small land holding

- The average size of land holding in Asia is only about 1 hectare against an average overall size of 5.5 hectare for 114 FAO member countries

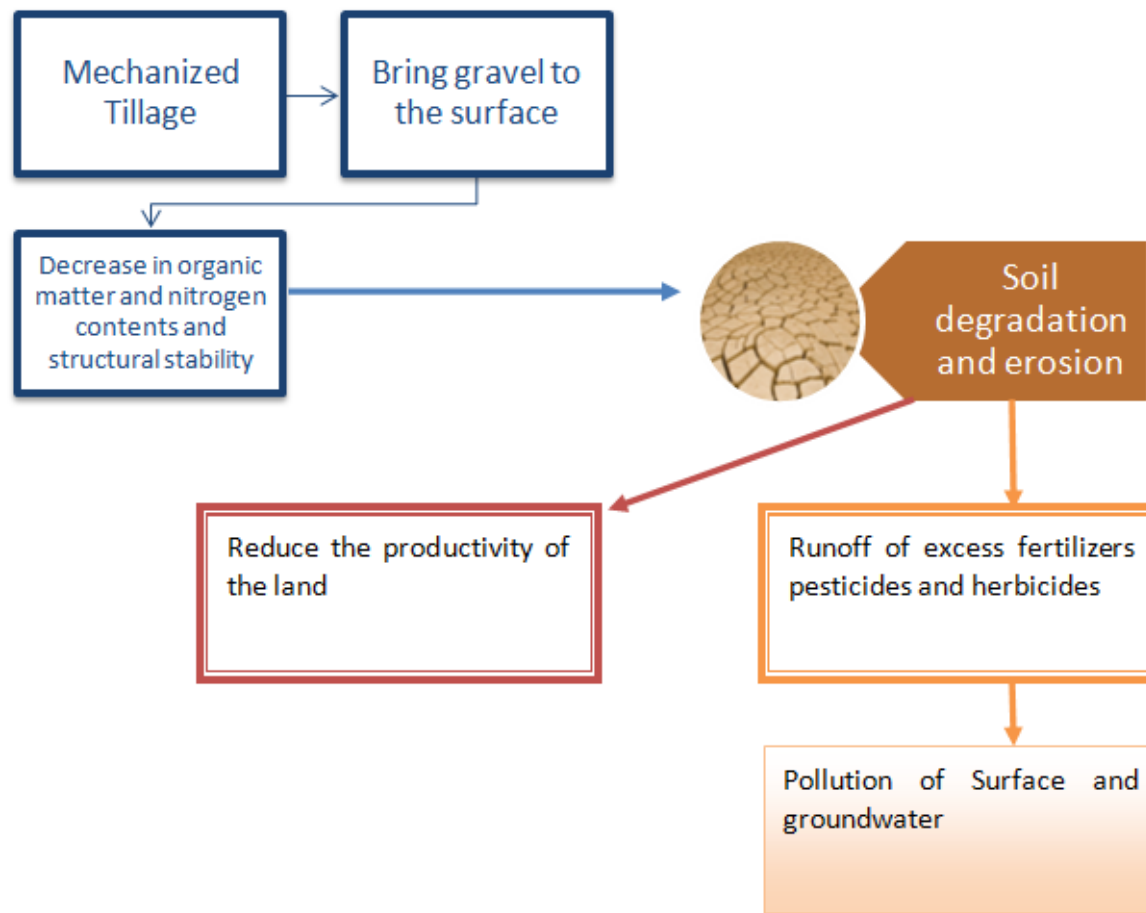
Low investment capacity of farmers

- 57% of the 1 billion world poor living on less than \$1 a day is in Asia and the Pacific, and the majority of which are in rural areas.

Combination of mechanization and agronomy

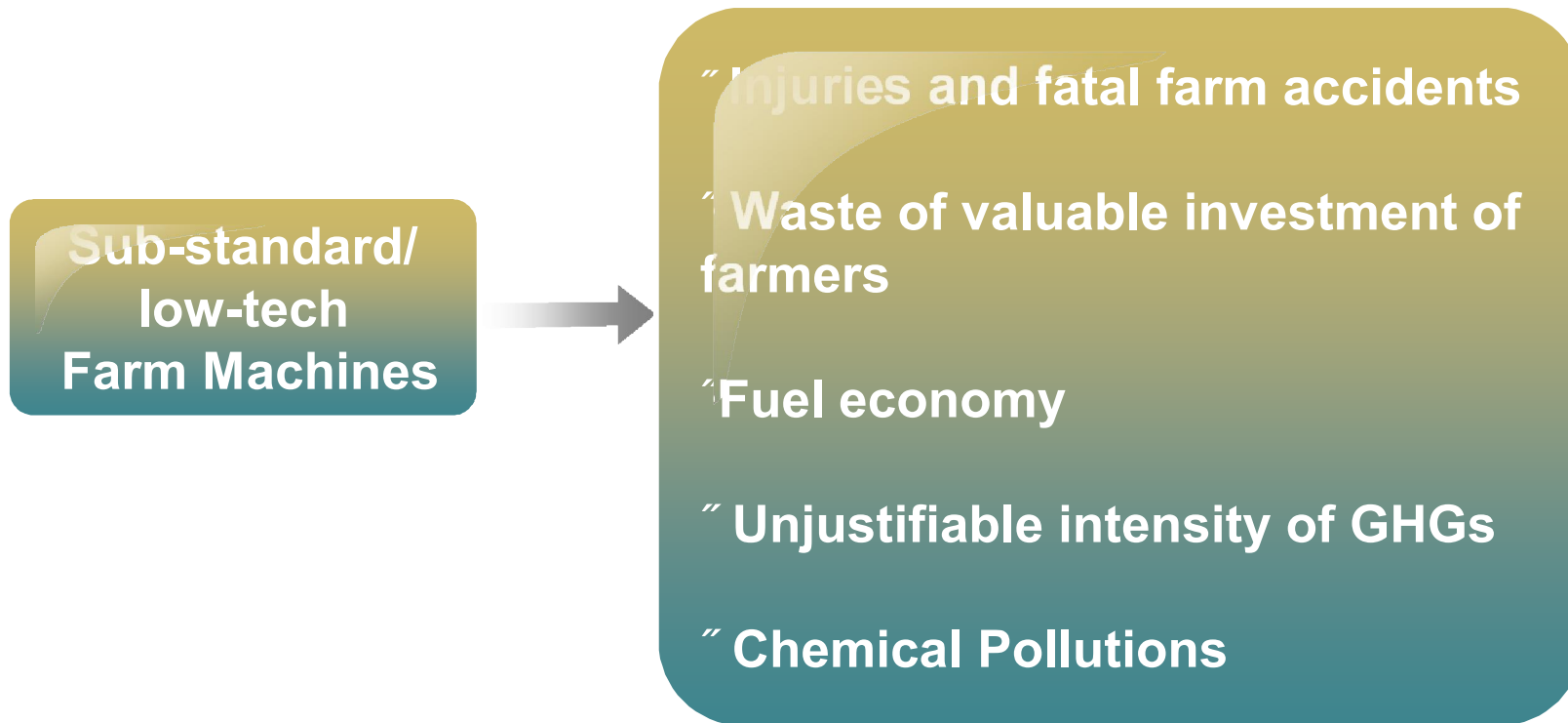
V. Challenges

Emerging negative environmental impacts



V. Challenges

Need for Better R&D and Manufacturing



VI. Future Trends and Outlook



VI. Future Trends and Outlook

- Comparatively low level of mechanization implies great potentials and opportunities in the region;
- Favourable government strategies and policies are indispensable;
- International/regional strategies necessary and related discussion will increase;
- Greater need for adaptable machinery and implements for diversified agro-climate zones and topographies;
- Better trade-off of safety, quality and affordability;
- Improved efficiency of utilization, for example through custom hiring or larger holdings;

VI. Future Trends and Outlook

- The need to tackle environmental concerns, including through conservation agriculture, low energy consumption machinery;
- Stronger public-private partnership;
- Greater scope for regional cooperation in policy assistance, information sharing, collaborative R&D, harmonization of standards, capacity building and trade and investment facilitation; and
- Contributing to the Post-2015 Sustainable Development Goals (SDGs).

VII. CSAM's Strategic Fit and Programmes

CSAM

“ a regional institution of UNESCAP

“ operational in Beijing since 2003



VII. CSAM's Strategic Fit and Programmes

CSAM's Vision

- “achieve production gains, improved rural livelihood and poverty alleviation through sustainable agricultural mechanization for a more resilient, inclusive and sustainable Asia and the Pacific.”

VII. CSAM's Strategic Fit and Programmes

CSAM's Strategic Functions:

1. Serving as a regional forum for regular policy dialogues;
2. Becoming a data and information hub;
3. Serving as a recognized reference point for standards and protocols;
4. Strengthening its role as the center for capacity building;
5. Facilitating intra-regional agro-business development and trade.

VII. CSAM's Strategic Fit and Programmes

Current and Up-coming Programmes/Initiatives

Programme Framework:

- Result 1: Enhanced capacity and technologies of member countries via targeted demand-driven capacity building and technical/policy assistance
 - – for more sustainable policies and technologies
- Result 2: Enhanced regional mechanisms and platforms improving mutual understanding and cooperation among member countries
 - – for regional cooperation and integration
- Result 3: Improved awareness and knowledge of the member countries through research and analysis, information/data collection and distribution
 - – for evidence-based decision making

VII. CSAM's Strategic Fit and Programmes

Current and Up-coming Programmes/Initiatives

Result 1: Enhanced capacity and technologies of member countries via targeted demand-driven capacity building and technical/policy assistance

- Sustainable Agricultural Mechanization Strategy (SAMS)
- Promoting Conservation Agriculture, post-harvest, water- and resources-saving technologies as well as other technologies to reduce loss and use agricultural wastes and residues;
- Trainings;
- Machinery and technology demonstrations

VII. CSAM's Strategic Fit and Programmes

Current and Up-coming Programmes/Initiatives

Result 2: Enhanced regional mechanisms and platforms improving mutual understanding and cooperation among member countries

- Regional Forum on Sustainable Agricultural Mechanization
- Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM)
- Proposed Asian and Pacific Network of Agricultural Mechanization Associations

VII. CSAM's Strategic Fit and Programmes

Current and Up-coming Programmes/Initiatives

Result 3: Improved awareness and knowledge of the member countries through research and analysis, information/data collection and distribution

- Regional database of agricultural mechanization in Asia and the Pacific
- Publication on the overall status of agricultural mechanization in Asia and the Pacific
- Regular Policy Briefs and newsletters

VII. CSAM's Strategic Fit and Programmes

Activities planned for 2014

1. High-level Multi-stakeholder Consultation on SAMS with FAO-RAP (June 26-27, Bangkok)
2. ANTAM annual meeting (September 16-19, Beijing)
3. 2nd Regional Forum in Indonesia + demonstration (September 9-11, Jakarta) . Theme: Enabling Environment for Customs Hiring of Agricultural Machinery
4. Regional Workshop of Agricultural Machinery Associations (October 28-29, Wuhan)
5. DPRK training (October, Beijing)
6. Workshop on statistics and data (November, Siem Reap)
7. LIFT Myanmar.

VII. CSAM's Strategic Fit and Programmes

ANTAM (Asian and Pacific Network for Testing of Agricultural Machinery)

- *The ANTAM network has been launched in November 2013 as a result of multi-rounds of discussions over the past years*
- *The ANTAM network has the aim to provide safe and quality machines to farmers in the Asia and Pacific region by harmonizing testing codes and procedures and linking the testing stations in the region;*
- *It will collaborate with FAO, UNIDO, OECD Tractor Codes and will be connected closely with ENTAM network in Europe as well as to other networks.*
- *The 1st Annual Meeting will define a roadmap and the role of the different organisation levels in order to provide for a successful initiative offering benefits to all stakeholders including farmers.*



Thank you.

Zhao Bing
bing.zhao@un-csam.org