



# Human Resource Development for Sustainable Agricultural Mechanization in the Asia-Pacific Region

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# Introduction

- Despite remarkable progress in reducing the prevalence of undernourishment in the Asia-Pacific during the cycle of MDGs, in 2015 the region is still home to two thirds of the world's hungry people
- The efforts and ability of the region to provide sufficient food for all and eliminate rural poverty sustainably are further complicated by socioeconomic dynamics, such as:
  - Population growth
  - Urbanization and industrialization
  - Climate change
  - Resource and environment constraints such as water scarcity, land degradation and pollution

- **Role of Agricultural Mechanization (AM) Technologies is crucial for Sustainable Intensification of:**
  - Agricultural production
  - Improved rural income and livelihoods
  - Sustainable and efficient use, and stewardship of natural resources
  - Protection of environment and resilience to climate change
- **Sustainable AM – A Precursor to Sustainable and Inclusive Agricultural Development by:**
  - Increasing productivity and production
  - Reducing human drudgery
  - Optimizing resource and input use
  - Addressing rural labour shortfalls, cutting food loss and waste
  - Providing employment and business opportunities and,
  - Creating efficient food value chains

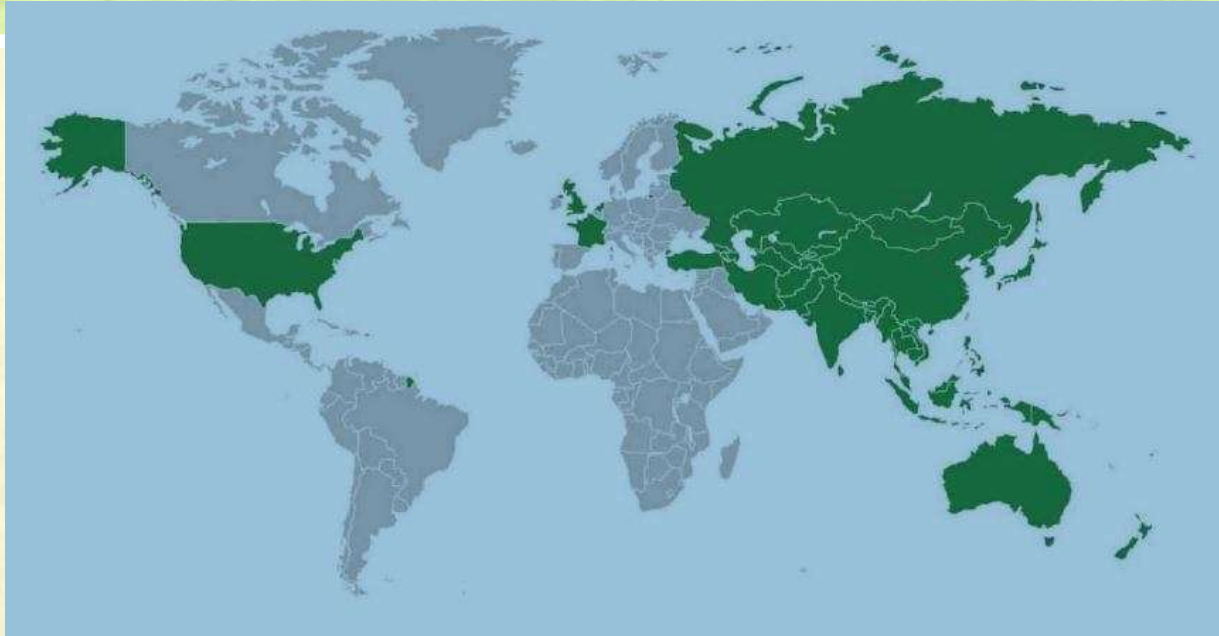
# Agriculture for Equitable Growth

- One \$ generated through Agriculture is more effective in eradication of poverty than 2 – 3 \$ earned from other sectors
- When the rural area's income increases by 5% the income of urban areas automatically increased by 8%

# Role of UNESCAP

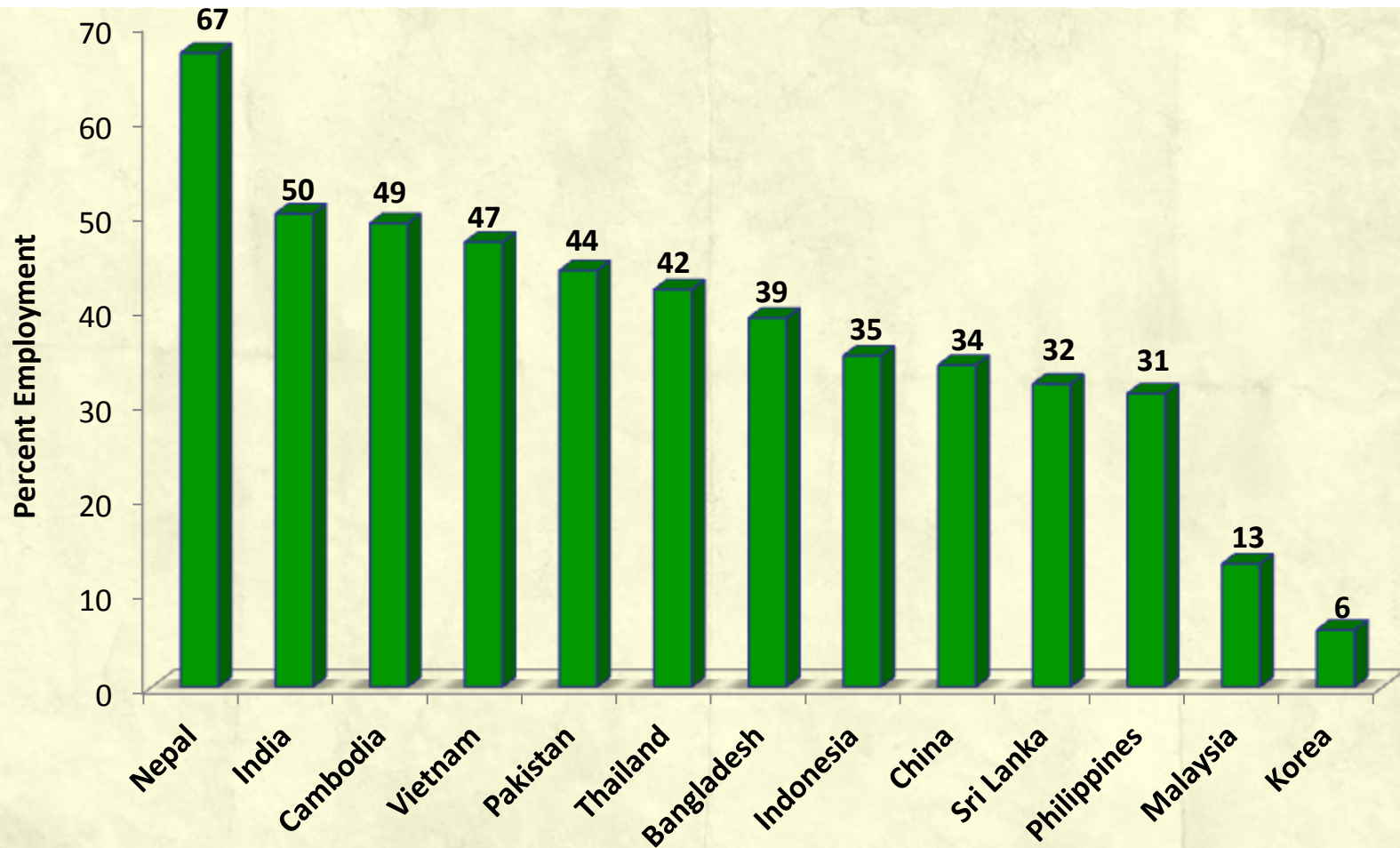
- **UNESCAP through CSAM is making every effort to promote sustainable agricultural mechanization across the region in support of:**
  - Sustainable agriculture and rural development, especially among the member countries
- **Centre's mandate has been re-strategized to serve UNESCAP members by facilitating:**
  - Knowledge management and information sharing
  - Promoting capacity building and
  - Fostering regional cooperation and networking in the field of agricultural engineering

# United Nation Economic and Social Commission for the Asia and Pacific Region (UNESCAP)



Member States	:	53
Associate Members	:	9
Region Population	:	4.1 billion people or two thirds of the world's population
Geographical Spread	:	Turkey in the west, Kiribati in the east Russian Federation in the north and New Zealand in the south

# Employment in Agriculture Sector in the Asia-Pacific Region



Source: Prof. Gajendra Singh: *Innovations in Agricultural Mechanization for Food Security in Asia*, Open Meeting of Club of Bologna, Farm Machinery to Feed the World, September 21, 2015 Teatro della Terra, Biodiversity Park, EXPO Milano 2015

# **HRD in the Asia-Pacific Region**



# Educational Development

## Vocational Education

- Professional Diploma Courses (1–3 yeas duration)
- Certificate Courses (1–3 months)

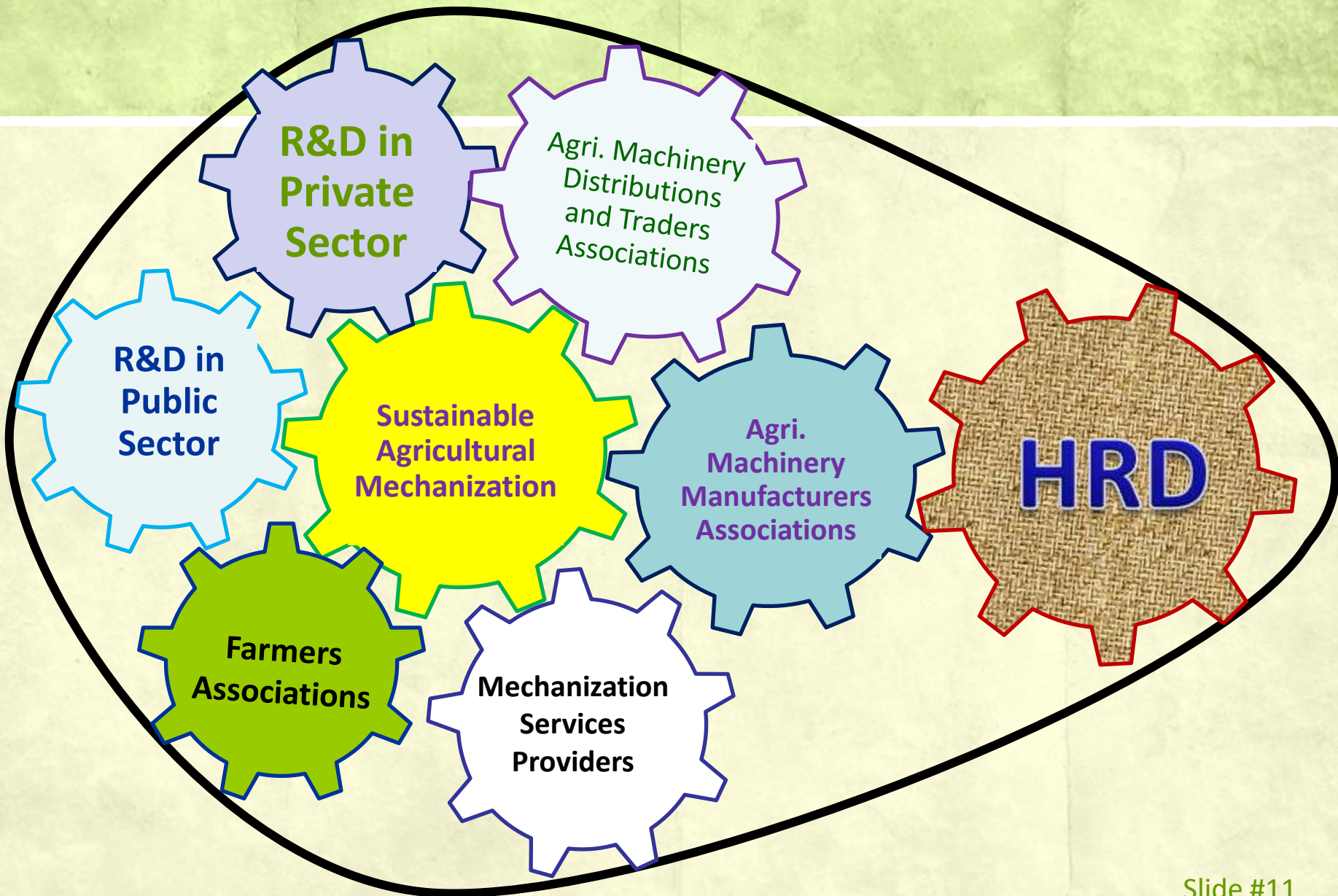
## Higher Education

- Asian Institute of Technology, Bangkok – Thailand
- Agricultural Universities/Colleges of the region
  - Under graduate degree programs (Bachelors of Agricultural Engineering, Food Engineering, and Post-Harvest Technology)
  - Post graduate degree programs (M.Phil., PhD) and Post-Doc

# Future Focus

- Precision Agriculture
- Post-harvest Technologies and Value Addition in Fruits, Vegetables & Medicinal Herbs
- Food Processing (grading, packaging etc.)
- Milk and Meat Processing
- Livestock/Dairy Mechanization
- Aquaculture Mechanization
- Standardization of Agricultural Machinery

# Boosting of Agricultural Mechanization in the Asia-Pacific Region



# Public Sector Institutions

- Professional Development
  - Technical
  - Managerial
  - Financial
- Development Professionals Networking
- Patent Development and Registration
- Standardization of Agricultural Machinery

# Private Sector Institutions

- Quality Improvement of Products
  - Material Selection
  - Pattern Designing
  - Jigs & Fixtures
  - Foundry
  - Material Testing
  - Design & development
  - Fabrication (cutting, welding, milling, forging etc..)
  - Heat Treatment
  - Machinery Testing
- Marketing and Distribution System
- After Sale Services

# Agricultural Machinery Distributors and Traders Associations

Create awareness among end-users about their products through:

- Profiles and Product Catalogues  
(English and Regional Languages)
- Operator Manuals
- Online Information
- Product Displaying and Machinery Exhibitions

# Farmers Associations

## Access to information:

- R&D Institutions
- Manufacturers Websites
- Machinery Distributors and Traders Websites

# Agricultural Machinery Manufacturers Associations

## The Capacity Building through:

- Training of existing Technical Staff
- Raw material bank
- Foundry establishment
- Heat treatment facility
- Awareness about machinery Standards
- Production of machinery and equipment as per standards
- Development of leaflets, brochures, and operator manuals
- Website development, and
- End-users access to the information about products and their technical specs



# Mechanization Services Providers

- Facilitation for establishment of rental service centres
- Awareness and management of potential business avenues
- Development of entrepreneurs skills
- Service providers Networking (National & Regional)
- Capacity building of field staff

# Recommendations/Suggestions

- Facilitation for establishment of rental service centres
- Production of machinery and equipment as per standards
- Establishment of raw material bank
- Facilitation for displaying the new mechanized technologies in machinery exhibitions (National and Regional)
- Financial and consultation facilitation for the establishment of machinery testing centres
- Establishment of professional institutional linkages (National and Regional)
- Donors participation in boosting up the sustainable agricultural mechanization



# Thanks



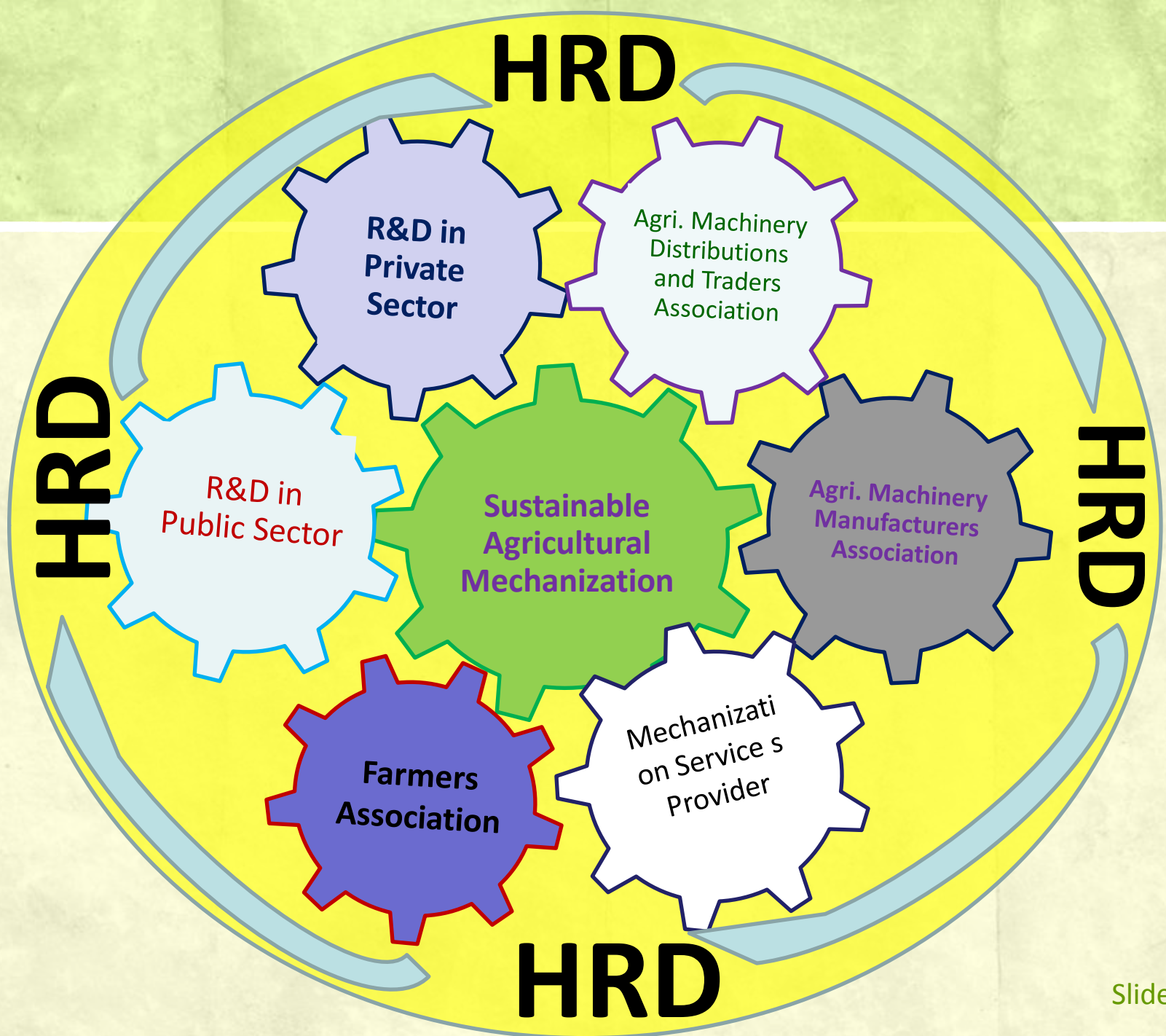
Country	Percent GDP			Percent Employment			Value Added per Person, \$	
	Agriculture	Industry	Services	Agriculture	Industry	Services	All workers	Agriculture
Bangladesh	17	29	54	39	21	40	829	505
Cambodia	36	24	40	49	20	31	1008	524
China	10	44	46	34	30	36	6807	785
India	18	25	57	50	21	29	1504	697
Indonesia	14	46	40	35	20	45	3500	1018
Korea	2	39	59	6	24	70	25977	27097
Malaysia	9	41	50	13	28	59	10514	9687
Nepal	35	16	49	67	11	22	694	265
Pakistan	25	22	53	44	22	34	1300	1080
Philippines	12	31	57	31	16	53	2765	1129
Sri Lanka	11	32	57	32	26	42	3280	1041
Thailand	12	43	45	42	20	38	5780	1160
Vietnam	18	38	44	47	21	32	1911	476
Japan	1	26	73	5*	25	70	40000	46000
U.S.A.	1	20	79	1	17	74	50000	50000

**Table 3 - GDP, Employment and Value Added per Person in Agriculture, Industry and Service Sectors of Selected Countries.**  
*Source: World Bank (2014)*



Country	4W Tractors (000's)		2W Tractors (000's)		Irrigation pumps (000's)		Combine harvesters (Units)		Power kW/ha	
	1990	2013	1990	2013	1990	2013	1990	2013	1990	2013
Bangladesh	5	60	10	700	220	1729	Nil	130	0.3	1.83
Cambodia	0.3	9.5	0.5	152	1.0	256	Nil	4580		1.32
China	814	5270	6981	17523	7255	22068	39588	1421000	2.0	5.7
India	1200	5430	31	440	12900	28000	4500	38000	0.75	2.02
Indonesia	4	2.8	17	71					0.3	
Rep. Korea	31	278	739	640	326	350	32900	78854		10.6
Malaysia	2.5	8	2.1	35	70	N/A	44	1700	0.24	0.2
Nepal	6	30	1	12	23	550	Nil		0.22	
Pakistan	231	573	5	2	288	1050	1300	9000	0.75	1.1
Philippines	6		32		107				0.39	
Russia	1366	260	N/A	N/A	79.4	5.2	407800	67900	2.67	1.48
Sri Lanka	15	1.5	24	2.8	52			1099	0.43	
Thailand	45	334	583	1750	851	2320	2250	15000	0.89	2.5
Vietnam	5.2	170	20	380	168	2170	0	20000	0.61	1.7

**Table 5:** Number of 4W Tractors, 2W Tractors, Irrigation Pumps and Combine Harvesters and Power Available in Selected Countries. Source: Participants to Regional Meetings organized by CSAM-UNESCAP.



# Boosting of Agricultural Mechanization in the Asia-Pacific Region

