

## Indonesia

# Indonesia Agricultural Mechanization Strategy

### Dr. Astu Unadi

Director, Indonesian Center for Agricultural Engineering Research and Development, Agency for Agricultural Research and Development, Ministry of Agriculture, Indonesia



Dr. Astu Undadi obtained Ph. D. degree in Civil and Environmental Engineering at Melbourne University, in Australia in 2000; Master degree in Agricultural Mechanization and Management at Asian Institute of Technology in Bangkok, Thailand, in 1990; Master degree in Agricultural Engineering at Universitas Gadjah Mada in Yogyakarta in 1981, and Bachelor in Agricultural Engineering at Universitas Gadjah Mada in Yogyakarta in 1980. From 1991 to 2006, he was the Researcher/Head of Program Division at Center for Agricultural Engineering Research and Development, Agency for Agricultural Research and Development, Ministry of Agriculture, Indonesia. From 2006 to 2010, he was the Director of Indonesian Agroclimate and Hydrology Research Institute, Agency for Agricultural Research and Development, Ministry of Agriculture; and from 2010 to present, he is the Director of Indonesian Center for Agricultural Engineering Research and Development, Agency for Agricultural Research and Development, Ministry of Agriculture, Indonesia.

The strategic roles of agriculture in Indonesia are: 1) providing food for 245 million people; 2) providing 87% of raw material for small and medium scale industry; 3) contributing 14.7% of Gross Domestic Product; 4) making foreign exchange income (US\$ 43,37 M); 5) providing 28.3% employment; and 6) constituting 70% source of income for rural people.

The 4 targets of Indonesia agricultural development cover achieving sustainable food self sufficiency, increasing food diversification, increasing added value, competitiveness and export, and increasing farmer

welfare. Below are the targets of production by 2014 of 5 main food commodities in Indonesia:

COMMODITY	TARGET OF PRODUCTION 2014 (Million ton)
<b>Rough rice</b>	76,57
<b>Maize</b>	29,00
<b>Soybean</b>	2,70
<b>Sugar cane</b>	3,1
<b>Beef meat</b>	0,51

Problem and strategy of agriculture development between 2010 and 2014 in Indonesia is illustrated in the diagram below:



Agricultural mechanization in Indonesia plays important roles on agricultural production, which include contributing to production through increasing cropping intensity and reducing post harvest losses, improving quality of product, increasing added value and competitiveness of agricultural products, reducing cost of production by increasing labor efficiency, increasing farmers' income, and attracting young generation work in agricultural sector.

The diagram below illustrates the mechanization utilization index for rice production in Indonesia in percentage:

Activity	Year			
	2004	2009	2010	2011
<b>Land preparation</b>	48	55	60	65
<b>Seeding</b>	0	1	2	4
<b>Planting</b>	04	5	6	7
<b>Weeding</b>	02	5	8	12
<b>Pest control</b>	100	100	100	100
<b>Harvesting</b>	5	10	18	26
<b>Threshing</b>	45	55	60	65
<b>Drying</b>	25	30	34	38
<b>Milling</b>	100	100	100	100

Source: ICAERD, 2009

While the number of agricultural machinery used in Indonesia is showed below:

Sources: BPS-Statistics Indonesia, 2007; dan Direktorat Alsintan, 2010)

NO.	Type of Agric. Machinery	2006(Unit)	2010(Unit)
1	<b>Pump irrigation</b>	185.322	187.801
2	<b>Tractor 2-wheels</b>	116.016	126.453
3	<b>Tractor 4-wheels</b>	2.853	2.969
4	<b>Thresher (manual)</b>	150.224	151.284
5	<b>Power thresher</b>	41.192	49.957
	<b>Box Dryer</b>	1.416	1.436
6	<b>Continuous Dryer</b>	1.388	1.421
7	<b>Mini RMU</b>	58.512	68.386
8	<b>Stationer RMU</b>	39.267	40.495

Indonesia is also facing various problems and constraints on agricultural mechanization development, for example poor skill of operator for operation, maintenance and management of agricultural machinery, poor capability of farmer institution, lack number of extension worker, high cost of farm machinery & equipments and difficult to access credit; lack of machinery suitable for specific agro ecosystem; need R&D, short life time of agricultural machinery, poor farm road facility, poor irrigation and drainage facility, and lack of rural workshop facilities and spare parts.

For achieving the big potential and addressing the constraints faced, Indonesia applied a series of strategy promoting the development of agricultural mechanization including agricultural machinery grand and loan from government to farmer groups, improving access to credit/ bank (credit for rural business), strengthening Agricultural Machinery

Business Service Unit, training for agricultural machinery operator, establishing demonstration plot of farming using agricultural machinery, capacity building for extension worker, establishment of mechanization center at provincial and district level, strengthening R&D on agricultural engineering, and strengthening partnership between R&D, agricultural machinery industry/trader and user/farmer.

In summary, although utilization index of agricultural machinery in Indonesia is low, agricultural machinery have been used widely and significantly increased yield and quality of agricultural product. Indonesian strategy to develop mechanization has been set up to increase crop production, quality and added value of agricultural product. And synergy between government, research institution, university, business, industry is essentially needed to support the development of mechanization in Indonesia.