Agricultural Engineering Development to Promote Sustainable Agricultural Development in Indonesia

Agung Hendriadi and Trip Alihamsyah

Indonesian Agricultural Engineering Research and Development
An integrated system of plant and animal production practices having a site-specific application that will:

- Satisfy human food and fiber needs
- Enhance environmental quality and natural resources
- Make the most efficient use of farm resources
- Sustain the economic viability of farm operations
- Enhance the quality of society

(Farm Bill, 1990)
General Figure of Indonesia

- Location: South East Asia
- Area: 1,904,443 km²
- Population: 242 million
- # Island: 17,508 islands
- GDP: US$ 267.8 billion
- Agric. Contribution: 17%

High variation in socio-economic and ecosystem conditions
Declining of soil productivity
Increasing of farm land pollutions
Decreasing of water resources
Increasing of environmental destruction
The change of global and local climate
Problems Related to Specific Situations

- Agricultural land holding and conversion
- Agricultural infrastructures
- Agricultural institutions
- Financial/capital
- Human resource capability
- Information and technology
- Marketing of farm inputs and products
Policies toward Sustainable Agricultural Development

- Increase land productivity and its production sustainability
- Improve agricultural infrastructures and farmer’s institution
- Promote integrated farming practices and renewable energy sources
- Improve innovation and dissemination system of technology
- Increase promotion and protection of agricultural commodities
- Reduce agricultural land conversion
- Improve coordination among related institutions
The Role of Agricultural Engineering in Sustaining Agricultural Development

- Improving of soil productivity and yield quality
- Increasing of production efficiency and added value
- Providing renewable energy sources
- Reducing of pollution effect to agricultural land
- Increasing of water availability and utilization efficiency
Technology for improving soil productivity

- Soil tillage conservation techniques
- Agricultural wastes processing for organic fertilizer
- Organic fertilizer management
Technology for reducing farm land pollution

- Agricultural waste management
- Water management system
Technology for increasing water availability and utilization efficiency

- Many types of water pump
- Irrigation water management systems
- Low cost green house
Technology Need from Agricultural Engineering R & D

Technology for improving quality and added value

- Post harvest management ➔ improve quality & yield
- Processing technology ➔ added value & product diversification
- Storage and packaging ➔ maintain quality & better price
Technology for renewable energy sources

- Processing of agricultural production and wastes
- Drying and storage with multi-sources of energy
Development Approaches and Strategies

- **Selective**: technology selected based on local conditions
- **Progressive**: level of technology is gradually improved
- **Participative**: development implementation involves active participation of agribusiness society
Action Programs

- Increasing promotion of farm machinery utilization
- Facilitating of farm machinery ownership
- Promoting rental and leasing system of farm machineries
- Improvement of human resources capability
- Improvement of extension service capability
- Improvement of local farm machinery industries
- Improvement of Agric. Engineering R & D capabilities
- Improvement of agricultural infrastructures
- Improvement of testing and evaluation procedures
- Strengthening collaboration among related institutions