Human Resource Development for Sustainable Agricultural Mechanization in MALAYSIA (Csam : 9-11 Dec. 2015)

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Overview of the Agricultural Sector in Malaysia

Scenario of the National Agricultural Sector

- Total land area - 33 million ha.
- Agricultural area - 7.9 million ha (24% of total area)
- Industrial crops - oil palm, rubber, cocoa, tobacco and pepper – cover about 77% of total agricultural land
- Other crops - paddy, fruits, vegetables & coconut cover 16% of total agricultural land

Contribution to GDP

- **Manufacturing sector accounts for 28%**
- **Service sector contributes 57%**
- **Agricultural sector at 7%**






MINISTRY OF AGRICULTURE & AGRO-BASED INDUSTRY

MINISTRY OF PRIMARY INDUSTRY & COMMODITIES

Agriculture Sector in MALAYSIA

1 **Food Subsector**

- Crop
- Livestock
- Fisheries

2 **Industrial Commodities**

- Palm Oil
- Rubber
- Cocoa
- Wood & Timber
- Pepper

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

KEMENTERIAN PERTANIAN & INDUSTRI ASAS TANI MALAYSIA

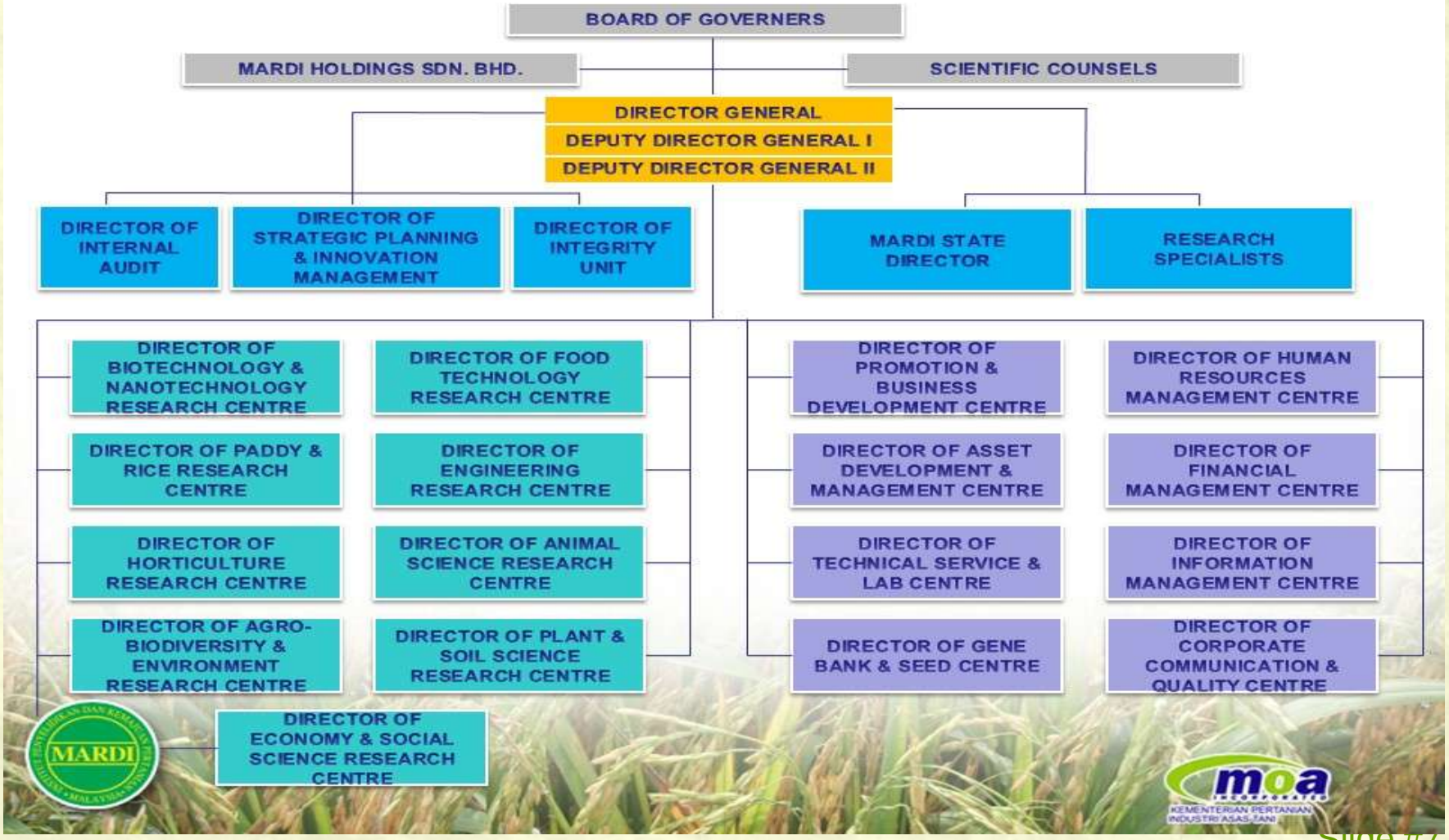
Ministry of Agriculture & Agro-based Industry, Malaysia

- DEPARTMENT OF AGRICULTURE
- DEPARTMENT OF VETERINARY SERVICES
- DEPARTMENT OF FISHERIES
- MALAYSIA AGRICULTURE BANK (BPM)
- FARMERS' ORGANIZATION AUTHORITY (FOA)
- MALAYSIAN FISHERY DEVELOPMENT BOARD (LKIM)
- MALAYSIAN PINEAPPLE INDUSTRY DEVELOPMENT BOARD (MPIB)
- MALAYSIAN AGRI. RESEARCH & DEVELOPMENT INSTITUTE (MARDI)
- FEDERAL AGRI. MARKETING AUTHORITY (FAMA)
- MUDA AGRI. DEVELOPMENT AUTHORITY (MADA)
- KEMUBU AGRI. DEVELOPMENT AUTHORITY (KADA)






MARDI -Organizational Structure



Background

- Malaysian Agricultural Research and Development Institute (MARDI) is a statutory body under the Ministry of Agriculture and Agro-based Industry

- MARDI was established in 1969 with the objective of developing indigenous science and technology capabilities in support of the development of the food and agriculture sector

Corporate Vision

To be a world-renowned R&D organization & food, agriculture and bio-based industries

Corporate Mission

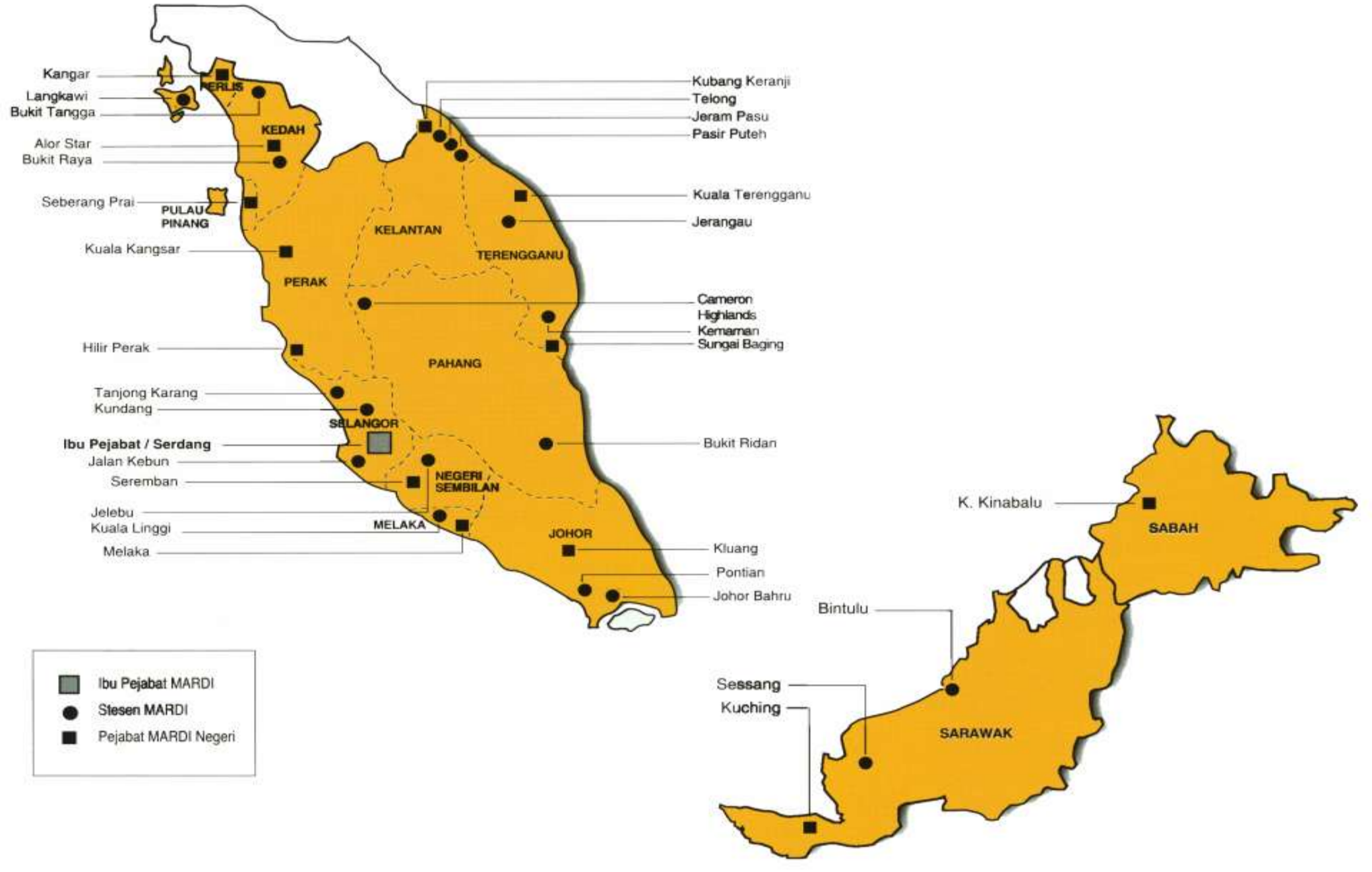
To create, innovate, transfer and apply knowledge, competencies and services

To transform the national agriculture, food and bio-based industries towards increased commercialization and competitiveness

Core Business

- To carry out contract research to generate innovative technologies for the development of the food and agriculture industries
- To provide consultancy and technical services to support the development of food and agriculture industries
- To offer joint ventures and licensing arrangements for the commercialization of research results

MARDI Stations



ENGINEERING RESEARCH CENTER – MARDI.

Sustainable Agricultural Mechanization

Serdang, Selangor

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

MARDI ENGINEERING RESEARCH CENTER

Engineering Research Center in MARDI was established

- To conduct R&D on topics related to mechanization and automation for agricultural and agro-based industries (crop production, food, non-food and biomaterials engineering) agricultural engineering, post-harvest processing engineering and food engineering.

MARDI ENGINEERING RESEARCH CENTER

The goals of Engineering research center are:-

- To provide research and development in post-harvest mechanization, primary processing and downstream processing of agricultural and food products.
- To develop research in areas of soil and water engineering, farms mechanization, bio energy and establish of the agricultural machinery testing center.
- To develop intelligent systems, semi-robotic, sensor detection measurement technology and intelligent controlled structure for agricultural production.

Mission & Vision - ENGINEERING RESEARCH CENTER

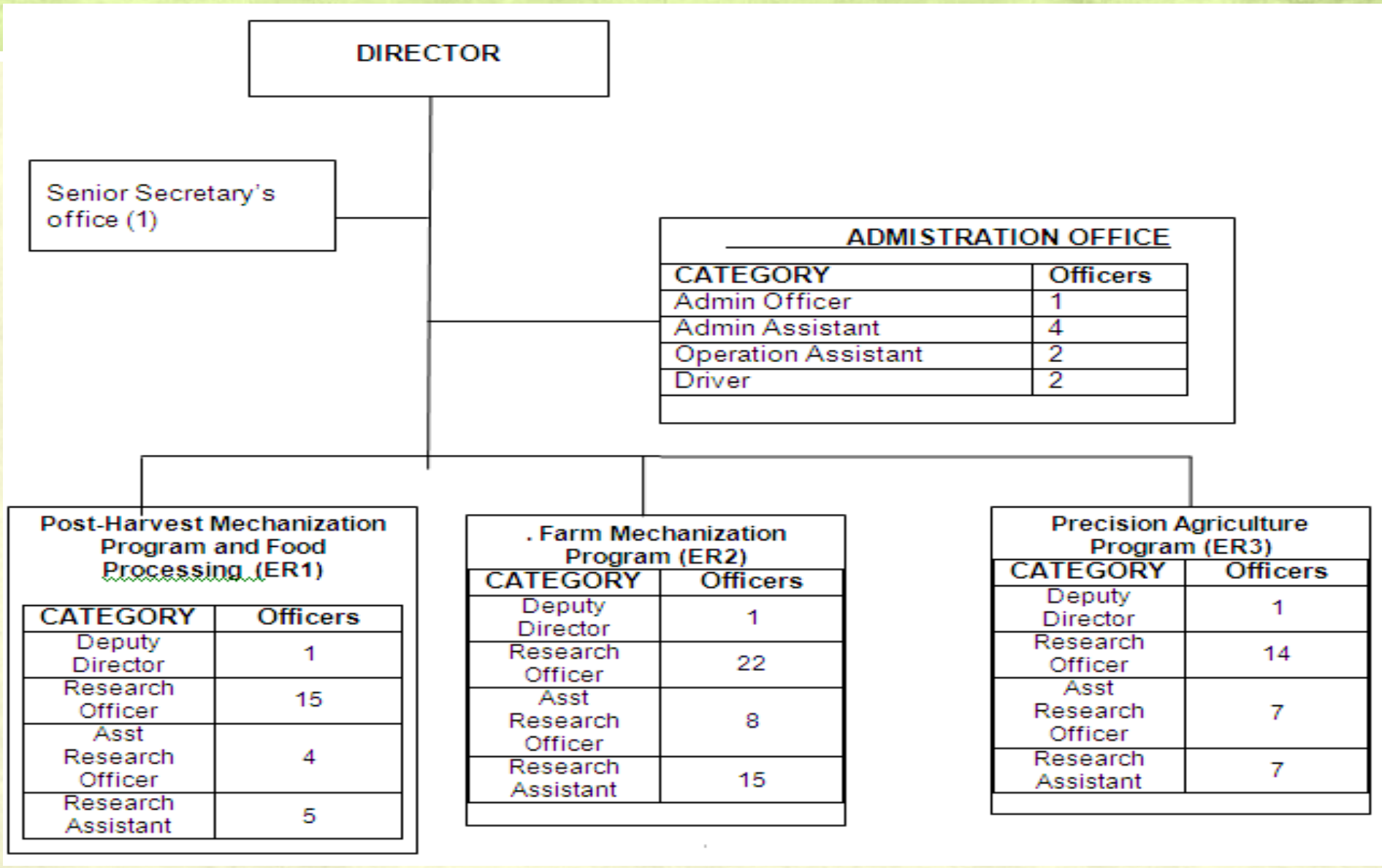
Mission

- To accelerate the transformation of the agriculture and food industry towards effective world producers through the application of technology / mechanization and automation system at cost effective by 2020.

Vision

- To perform research and development of technology / mechanization and automation systems to support sustainable and competitive manufacturing productivity continues to stabilize the country's agriculture and food industry in the global economy.

ORGANIZATION STRUCTURE OF ENGINEERING RESEARCH CENTRE MARDI



1.0 Administrative Office (ERO)

- Assist the Director, Deputy Directors and employees of the Engineering Research Center for managing all affairs related to administration, finance and accounts.

1.1 Post-Harvest Mechanization and Food Processing Program (ER1)

- Mechanization of post-harvest handling system for agricultural production
- Mechanization of primary processing system for agricultural products.
- Develop machine prototypes for food processing system.
- Mechanization systems of high-tech food processing chain.

CHILLI SEED SEPARATION SYSTEM

RAMBUTAN SKIN SLITTER AND SEED CORER

Single corer

Multiple corer

CONTINUOUS FRYER FOR STACKABLE CRACKERS

FRUIT PUREE PROCESSING SYSTEM

MULTI-FRUIT JUICE EXTRACTION AND SEED SEPARATION MACHINE

REMPEYEK & KUH ROS – TECHNOLOGY TRANSFER ACTIVITIES

Wak Tunot Enterprise, Kluang

SHMZ Enterprise, Masjid Tanah

REMPEYEK & KUIH ROS– TECHNOLOGY TRANSFER ACTIVITIES (cont.)

KPW Kuala Pilah

KPW Jengka

Penggambaran Agrotek

ACTIVITIES IN MARDI'S TEST-BED, BUKIT RAYA

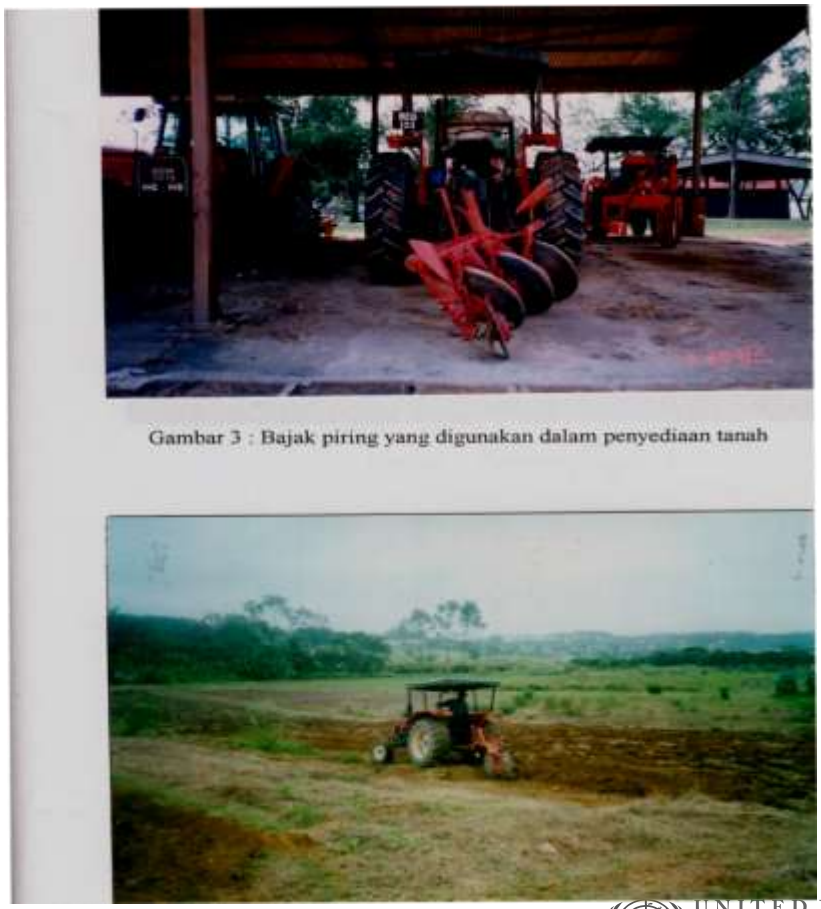
REMPEYEK FORMING MACHINE

1.2. Farm Mechanization Program (ER2)

- Mechanization of irrigation and drainage system for agriculture.
- The layout of the farm infrastructure and structural improvements on problem soils for the mobility of machinery.
- Develop machinery and implement prototypes for farm mechanization.
- Mechanization of the use bio-resources for the production of bio-value added products and renewable energy.
- To establish a central testing and certification of agricultural machinery.

Land preparation

Disk plough (Rotor + ridger)



Gambar 3 : Bajak piring yang digunakan dalam penyediaan tanah

Double &Single row transplanter

Sweet potato harvester

Coconut dehusker

Kenaf sowing & Weeding between row

RICE MECHANIZATION

High clearance prime mover for rice mechanization

Paddy Row Seeder

PINEAPPLE MECHANIZATION

Pineapple transplanter

Boom Sprayer

Boom Harvester

Ginger Mechanization System

Ginger Planter

Ginger Harvester

Kenaf Stem and Seed Harvesters

Development of sustainable aerobic rice production system through improved water productivity

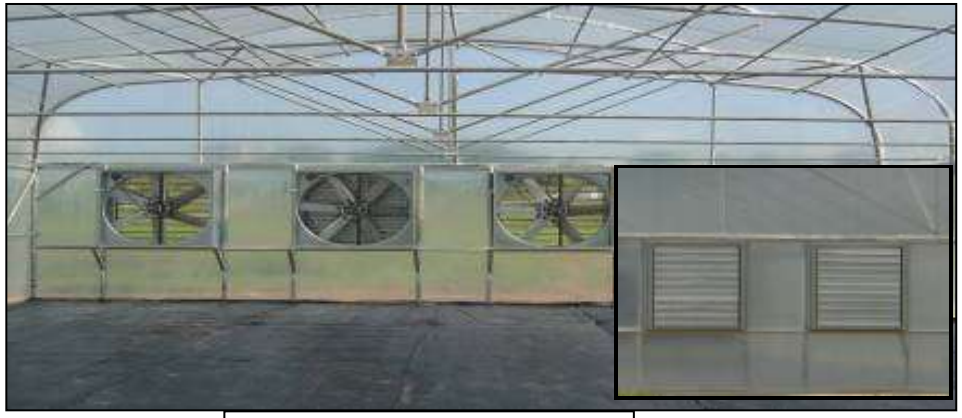
Surface irrigation
alternate wetting & drying
Furrow & basin

1.3. Precision Agriculture Program (ER3)

- Intelligent systems for crop management.
- Detection and measurement technology for agriculture production automation system.
- Semi-robotics in agricultural production.
- Structure and intelligent control systems viable for the production of upland crops in the lowlands.

CONTROLLED ENVIRONMENT PROTECTED STRUCTURE

FAN ATOMIZER SYSTEM EVAPORATIVE PAD AND EVAPORATIVE PAD COOLING



Pad Cooling System

Fan atomizer cooling System

Greenhouse on slope land

Precision Land Leveling

Source: IRRI

TECHNOLOGY TRANSFER AND COMMERCIALIZATION

Challenges and constraints faced for human resource development of agricultural mechanization in MALAYSIA

- Several factors has been identified as major constraints in human resource development for mechanization and automation in Malaysia mainly:
  - Duplication of training by various departments and agencies
  - Facilities and resources for the purpose of learning is incomplete
  - The lack of skilled teaching
  - The recognition of teaching standards are not uniform
  - The lack of skilled labor in agriculture mechanization and automation
  - Limited transfer of technology
  - Young generation are not interested in agriculture

Solutions for human resource development of agricultural mechanization in Malaysia

1. Technology incubator

- MARDI Technology incubator is defined as a new technology pilot plant equipped with latest machinery and equipment on a commercial scale.
- MARDI Technology Incubator aims to produce graduates established (incubatees) to the business aspects of a viable / competitive in terms of financial, has a strong market and technical skills who are able to grow.

Solutions for human resource development of agricultural mechanization in Malaysia

2. Training and Courses

- MARDI Training Programme provides training and training consultancy services in the agricultural and food sector.
- MARDI has a staff of more than 400 researchers from various science and technical disciplines and expertise.
- This is supported by a relatively complete infrastructure and networking with experts at the national and international levels. The institute is able to provide training and training consultancy services of high quality to clients locally, nationally and regionally.

Solutions for human resource development of agricultural mechanization in Malaysia

3. MARDI Industrial Training

- As a government agency entrusted with the role of generating technologies on agriculture and agro-based industry as well as the promotion and commercialization of these technologies, MARDI is now the focus of both Public and Private Institutions of Higher Learning within and outside the country to provide industrial training to their students.
- In order to realize its corporate social responsibility to the nation, MARDI provides the opportunity and facilities for industrial training to students of Public and Private Institutions of Higher Learning to apply the knowledge, skills and experience learned within a real working environment as well as increasing their marketability for employment.

Suggestions for regional cooperation of human resource development of agricultural mechanization

- Training of new and suitable machineries in Malaysia.
- Inter-regional training for testing of agricultural machinery
- Inter-regional training of agricultural machinery from research output
- Information sharing of expertise of agricultural machinery through regional network
- Establish SOP for training of operators
- A regional training module should also be made available so that ideal training programs can be strategized to meet industrial requirements.

THANK YOU

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