AGRICULTURAL MACHINERY MAPPING

*Dares Kittiyopas[1] Prachak Sapmanee[1] Sirorat Suphasa[1]

[1]*Thai Society of Agricultural Engineering Agricultural Engineering Promotion Division*
Phaholyothin Rd., Chatuchak, Bangkok 10900, THAILAND.

Corresponding author: *Dares KITTIYOPAS, Prachak SAPMANEE, Sirorat SUPHASA

E-mail: dares.doae@gmail.com, sapmanee@gmail.com, aimrpp@hotmail.com

ABSTRACT

This Agricultural Machinery Mapping is a part of Machinery Industry Map (MIM) Project organized by Thailand Board of Investment (BOI) by investigation. Which aim (1) to develop a map of Thailand's industrial machines and machinery industry depicting the industrial structure and linkages in the supply chain production process (2) to conduct a needs assessment of machinery parts in the domestic assembly process The goal is to provide a Machinery Industry Map (MIM) which showcases the structure of Agricultural Machinery industry as well as information regarding manufacturers of machine parts and their manufacturing capabilities.

The scope of this study is limited to Agricultural Machinery only, which includes the machines used in industrial production and their components. The study has classified industrial machines and machine parts according to their core function. This would help to cover supply chain and production processes in various industries; thus, making it coherent to develop a clear map. Agricultural Machinery parts are classified into two categories: (1) Machines : in this study, machines refer to the complete and functional industrial machines which can perform certain duties on its own or can be put together with other devices in the system to ensure the system is working as intended. (2) Parts: in this study, parts refer to the parts and components of industrial machines which cannot perform certain duties on its own, but needs to be put together with other parts or machines in order to create a working system. The steps of the study are as follows: (1) classification of Agricultural Machinery according to its function. (2) Survey the names, contact information, and current status of the suppliers and manufacturers of machine parts from reliable sources. The list of 1,007 contacts were screened and organized in the form of Agricultural Machinery Directory. (3) Analysis of the supply chain of each category of machinery industry, including the status of the component usage in the manufacture of Machine Tools and Agricultural Machinery. (4) Evaluate the production status, the capability of manufacturers, and assess the needs of Agricultural Machinery and machine parts (5) select the machine parts that are in high demand in the industry.

According to the survey and analysis of the data, Agricultural Machinery, together with existing Industrial Machinery, can be classified by its function into 35 groups as follows: (1) Engine and Motor (2) Conveyor Crane Elevator (3) Pump and Blower (4) Hydraulic and Pneumatic (5) Heater Burner, Furnace, Heat Exchanger (6) Boiler and Steam (7) Cutting and Grinding (8) Separation and Extraction (9) Gas Generation (10) Mechanical Control Unit (11) Electronic Control Unit (12) Electric (13) Transmission System (14) Cooling System (15) Sewing and Knitting (16) Packing and Weighting (17) Printing, Coating, Spraying and Labeling (18) Dig, Drill, Hammer and pouring (19) Pressing and Rolling (20) Mixer (21) Supporting Parts: Container (22) Supporting Parts: Joint, Jig & Fixture, Machine-Structure (23) Supporting Parts: Valve, Fitting, Wheel (24) Supporting Parts: Bearing, Roller, and Bush (25) Supporting Parts: Propeller (26) Supporting Parts: Magnetic (27) Agricultural tractors and tillers.(28) the accessories of Agricultural tractors (29) Combine harvester (30) Dehumidifier (31) Agricultural trucks. (32) Agricultural hand tools (33) hand tools. (34) Coating machines (35) the mold and die

From the survey, a sample of 1007 machine and machinery parts manufacturers, covering all 35 categories, were selected to represent the industries in order to explore the demand for parts in the agricultural machinery and machine tools manufacturing and assembling process. The data will be used to conclude the linkage of the supply chain in the form of maps. The sampling method is based on the registered capital, for each industrial category, manufacturers with the top 80th percentile of the total registered capital were selected to represent their category.

The researchers interviewed 181 samples via one-to-one, telephone interviews and using questionnaires. The data obtained regarding status of agricultural machinery industries were analyzed and processed to create Agricultural Machinery Map which shows a diagram of the supply chain linkage for each category as well as the dependency relationships between components of Agricultural Machineries. It is found that there are 84 items which are the core components used in both machine industries. The next step was to analyze the demand for parts that play important roles in the Agricultural Machinery industries of Thailand by analyzing international trade demand for machinery, their revealed comparative advantages (RCA), and capabilities within the organization. The steps of this study is as follows: (1) Find the import-export data using Harmonized System Code (HS 2007) to group the machines according to 35 functional categories. (2) Find the manufacturing value of agricultural machinery and machine tools including parts from the data acquired from National Statistical Office of Thailand. (3) Analyze the domestic demand for machines. Evaluate the manufacturing value of agricultural machineries including parts of 5 ASEAN countries, i.e. Singapore, Indonesia, Malaysia, Vietnam and the Philippines, using the data acquired from UNIDO. Analyze the import-export and demand for agricultural machineries including parts in these 5 ASEAN countries using the data acquired from UN COMTRADE and UNIDO.

The information above together with the costs of 51 agricultural machine parts were analyzed and screened in order to select 10 items that have the highest importance for most industries. The items are as follows (1) Structure (2) Motor (3) Engine (4) Gear (5) Shaft (6) Hydraulic Set (7) Iron Pipe (8) Iron Sheet (9) Crawler System (10) Gear Box.

แผนที่ห่วงโซ่ความต้องการใช้ชิ้นส่วนของเครื่องจักรกลการเกษตร
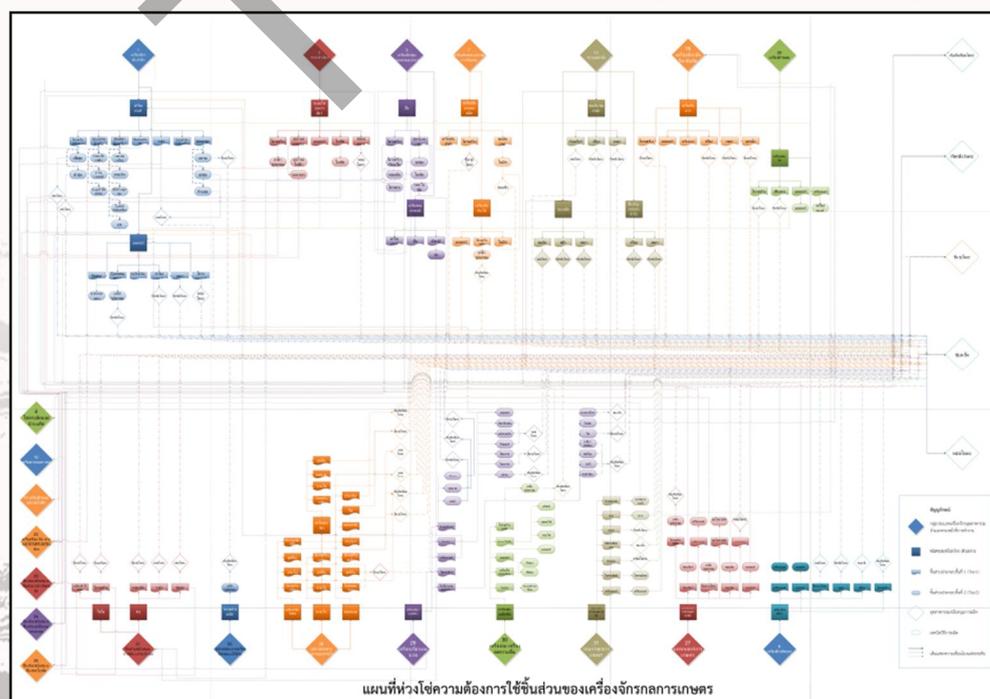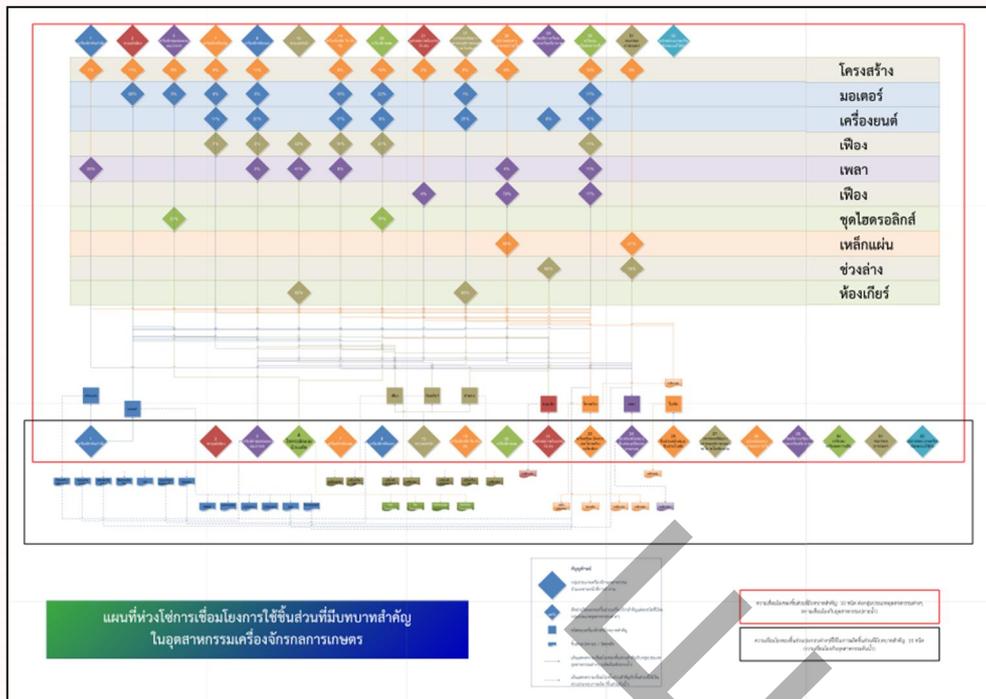
Keywords: Agricultural Machinery Mapping; Agricultural Machinery and machine parts; Costs of agricultural machine parts