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PEERAPAT KOSOLSAKSAKUL : CHANGES OF PADDY SOIL PROPERTIES IN CONSEQUENCE OF SHIFTING FROM CHEMICAL AGRICULTURE TO NATURAL FARMING. THESIS ADVISOR : SANSANEE CHOOWEAW, Ph.D., ANUCHAT POUNGSOMLEE, Ph.D., PICHAI WICHAIDIT, M.Sc. 174 p. ISBN 974-589-033-2

This study was aimed at analyzing the changes of paddy soil properties and their physical, chemical and biological characteristics in consequence of shifting from chemical agriculture to natural farming over time periods. The Roi-Et soil series was a control condition for the study areas which consisted of more than 10-year chemical paddy field (10-CF), 3-year natural paddy field (3-NF) and 5-year natural paddy field (5-NF). The study areas were located in Baan Nown Ka-woah, Tambon Donmon, Satuk District, Burirum Province. Data collection was carried out from mid 1994 to the end of 1995.

The results showed that while 10-CF lost the organic horizon in its top soil layer, soil structure of 3-NF and 5-NF had the organic horizon (OA horizon) on the soil surface at the level of 2 and 4 cm., respectively. For the physical properties, at the level of 15 and 30 cm. from soil surface, both 3-NF and 5-NF had more water content and soil porosity than 10-CF. No significant difference was detected in the chemical properties between these 3 study fields. The maximum number, density and the amount of soil macro fauna Family had been found in 5-NF, 3-NF and 10-CF, respectively. Moreover, the biological properties had a positive correlation with the soil cover residue such as weeds and rice straw. However, the Species (Family) Diversity Index did not show any difference among these study fields.

For yield and production cost, in the cultivating years having a normal or higher rainfall, 10-CF, 3-NF and 5-NF had closely high yield but it was noteworthy to stress that the production cost of chemical agriculture was double that of natural farming.

Two significant problems of natural farming were firstly, inconsistency of rainfall distribution and repeated drought and secondly, the poor natural soil fertility in Northeastern Thailand. These impacts were the main obstacles to natural farming management. Thus, the suggestions for more productive natural farming are (1) adopting integral production in order to decrease any risk from unexpected climate changes (2) preparing in-farm water storage (3) increasing organic matter for soil improvement using several methods such as legume bush planting on paddy dike and planting legume as a soil cover to control weed, soil moisture and temperature.