

学 位 論 文 要 旨

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題 目	Principles in the Indigenous Agricultural Techniques and Management in Sri Lanka: A Historical-Comparative Analysis スリランカにおける土着の農業技術とその管理の原理 －歴史的な比較分析－

Technological change in agriculture during the 19th and 20th centuries in Sri Lanka is considered the most debatable effort in enhancing the food production in Sri Lankan agricultural history. It neglected the farm-level indigenous techniques and management practices. Today, there is contentious academic discussion on the disastrous outcome of the technological changes. First, the emerging health issues in the main agriculture regions of the country are likely due to the long-term use of agrochemicals by the farmers (WHO, 2012). More than 15% of the populations aged 15–70 years in the North Central province of Sri Lanka, the main agricultural region, are affected with chronic kidney disease (CKD) (WHO, 2012). Farmers over the age of 40 years who have been engaged in farming for more than 10 years are at higher risk of developing this disease (WHO, 2012). Second, modern technology has resulted in a severe farm management problem. Although modern technology led to a doubling in rice production, the real agricultural income for farmers has declined by 16% during the last four decades. As a result, the government has to provide a significant amount of agricultural subsidies to sustain the country's food supply. In 2009, the cost of fertilizer subsidies was Rs. 24,705 million, which represented 3% of government expenditures (DCS, 2010). Third, modern technology has resulted in significant environmental problems, mainly the pollution of water, the decline in natural soil fertility, the imbalance of biodiversity, etc. Fourth, heavy socio-cultural problems in the agrarian structures, such as indebtedness, led to farmers' committing suicide. The experiments have revealed that most of the drinking water contains medium to high levels of fluoride in the CKD areas.

Despite these facts, no adequate focus has been given to learn lessons from indigenous agricultural technology and management to tackle the contemporary problems in agriculture. Thus, this PhD thesis attempts to provide an alternative perspective on the long-term history of technological change in agriculture and find sustainable principles of farm-level indigenous technology and management adopted by the farmers over the centuries.

Firstly, this thesis critically reviews historical facts used in justifying the agricultural technological change in agricultural history in Sri Lanka and the Third World countries at large. First, the review viewed the technological change in agriculture in the 19th and 20th centuries as a new step of Western ethnocentric imperialism in moving from colonial imperialism to economic imperialism with liberal economic values and principles. Second, the review showed the introduction of the monoculture agricultural system during the colonial period, and modern techniques during the post-colonial period in Sri Lanka corresponded with the global objectives of the industrialized nations in promoting the capitalist agriculture in the world.

Secondly, this thesis evaluates the long-term consequences of the technology of the Green Revolution (GR). First, the study provided counterevidence to the low-yield and food-insecurity arguments against indigenous agriculture in Sri Lanka. The data showed that diversified cropping techniques used in indigenous agriculture were able to maintain higher crop land productivity. The modern technology led to higher yields for several specific crops, particularly rice and maize, but the increased yield was not substantial enough to ensure long-term food security of the farm household due to increased market dependency, the abolished diversified crop structure, and changed household dietary patterns. Second, the results indicated that the social capital assets and mutual labor exchange systems used in indigenous agriculture have become impractical due to technological changes. A significant polarization of cultural norms, values, and practices attached to agriculture was also revealed. Third, marginalization and displacement of the farmers on their own lands and increased social and economic inequality were reported.

Thirdly, this thesis examines farm-level indigenous technology applied by the farmers in rice and *Chena* cultivations (shifting cultivation) to identify the sustainable principles of those techniques. The indigenous techniques of both systems correspond with the natural features of the region, including the rainfall patterns, soil conditions, temperature, and humidity, and they are dependent on the local resources. Cultivation techniques on rainfall patterns and the lunar calendar and the adopted techniques of soil fertility management, seed selection, seed treatment, water utilization, and pest and disease control provide alternatives to the modern, highly external, input-based techniques. The *Chena* study found the important techniques in avoiding the use of agrochemicals when farming. Specifically, the farmers take into account the direction of sunrays, lunar calendar, and rainy calendar for vigorous plant growth. The diversified crop technique is used to control pests and diseases. These techniques have ensured food safety and food security among the farm households throughout the year. This has supported the households' requirements for dietary intake and nutritional condition and balance. Indeed, these indigenous techniques in rice and *Chena* cultivations are not harmful to the environment and thus can help to maintain the long-term production sustainability. The results revealed the significance of the indigenous technology to address contemporary agricultural problems.

These findings are novel in the field of agricultural historical science. Thus, this thesis acknowledges the sustainable principles of indigenous agricultural techniques and management in each country.