

COMPARATIVE STUDY ON
IMPLEMENTATION SYSTEM OF MODERN VARIETIES:
NERICA IN CONTEMPORARY SUB-SAHARA AFRICA
AND MODERN VARIETY WHEAT DURING
GREEN REVOLUTION IN MEXICO, INDIA, AND PAKISTAN

Tamami ENDO, GPSS-GLI, 47-126840

Advisor: Professor Eiji Yamaji

Co-Advisor: Associate Professor Motoharu Onuki

ABSTRACT

Food security in Sub-Saharan Africa (SSA) is severely threatened. Historically, Latin America and Asia have experienced severe famine, however, Green Revolution (GR) and the development of modern variety grains dramatically improved the starvation, and such a successful story has motivated many researchers to achieve the eradication of hunger in SSA by introducing innovative scientific technologies in agriculture. New Rice for Africa (NERICA) is one representative outcome of the challenge, in the sense that it has high adaptability to the harsh environment in SSA. In 2001, NERICA was introduced in Guinea and Cote d'Ivoire and by 2009, NERICA has been adopted in more than 30 countries (Diagn et al, 2011). NERICA also shows higher yields than the traditional varieties, as well as positive economic impacts on farmers. However, when NERICA is compared to GR in the 20th century, the adoption rate is lower; NERICA took 8-10 years to achieve an increase of 5 percent coverage of the total rice-growing land in Africa, whereas the modern variety wheat

during GR achieved an increase of 50 percent coverage in Latin America and Asia (Evenson et al, 2003). Even though rice consumption in Africa has been increasing and 40 percent of rice is imported, why is NERICA adoption stagnated compared to the modern variety wheat that was developed during GR? My hypothetical answer is that GR achieved a higher adoption rate due to a better implementation system (which refers to the research, development, and expansion of MVs) which was supported by an efficient and focused international aid through a top-down approach. Contrarily, diverse stakeholders and the failure of a bottom-up approach lowered the efficiency of the implementation and caused a stagnation of NERICA adoption.

This research is conducted based on literature and document reviews. In chapter three and four, I analyze the similarities of the domestic social conditions of each country (India, Mexico, Pakistan, and SSA), and the differences in the condition of the international society during the time which the two different modern varieties were implemented (1940s-60s for GR and 1990s-present for NERICA) to identify if the implementation system is a key factor that affected adoption rate of each modern variety wheat and NERICA.

In chapter five, I describe comparative analysis that I conducted on the implementation system of both modern variety wheat and NERICA based on *Organization Theory* (Burns & Stalker, 1961). The theory's approach is descriptive and it indicates two different forms of organization: one is called *mechanistic* which is a form of bureaucratic organization, and the

other is *organic*, a non-bureaucratic organization. The representative features are: a vertical relationship and a rules and regulations bounded behavior of the members are found in a mechanistic organization, and a horizontal relationship and maximized personal discretion of the members are found in an organic organization. Based on the results of the comparative analysis, the descriptions about important stakeholders are determined to illustrate each implementation system: the organizations in the NERICA implementation could be described as mechanistic forms, although NERICA aims to realize organic forms to overcome the umpteenth historical failures in development aids. In fact, NERICA implementation has respected self-help effort of SSA countries and avoided hierarchical framework and relationship; the projects and programs have been formed under titles of ‘collaboration,’ ‘partnership,’ and ‘network’ among SSA countries, donor countries, and international agencies. However, In terms of behaviors of the stakeholders and organizational milieux, NERICA implementation demonstrates the mechanistic features, whereas semi-dwarf wheat during GR demonstrates the organic features though its systems and the relationships between donors and hosts were hierarchical and bureaucratic.

The last chapter concludes the research by showing unrestricted behaviors (i.e. maximized personal discretions and minimized rule bounded behaviors) of the stakeholders increase the efficiency of MVs’ implementation system. Therefore, what donors for research and development of modern varieties should do to improve the adoption rate of modern

variety agricultural product is to increase unrestricted grant and to maximize member's ability to use his on projects and program.

Key words: NERICA, Organization theory, Green Revolution, Modern varieties