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SUMMARY OF DOCTORAL THESIS

Name: ALARIMA CORNELIUS IDOWU

Title: LAND TENURE SYSTEM AND SOIL FERTILITY STATUS FOR ADOPTION
OF SAWAH TECHNOLOGY IN NIGERIA AND GHANA

(ナイジェリアとガーナにおける Sawah 技術採用のための、土地保有制と
土壌肥沃度状態に関する研究)

This study examined the socio-economic factors and soil fertility status affecting the adoption and dissemination of sawah technology in Nigeria. This study further evaluated the factors responsible for the adoption of sawah technology in Ghana and the degree of soil property changes in Ghana with a decade of adoption of sawah technology.

The study revealed that high yield from sawah, good tillering, water management, fertilizer management and weed control and other characteristics of sawah technology were the major reasons why farmers adopted sawah technology. Adoption of sawah technology was influenced positively by awareness, attitude of farmers, attributes of sawah technology, access to contact farmers and household size and negatively influenced by age of farmers and the constraints faced by farmers.

Study on land tenure brought to the fore the fact that land tenure arrangements significantly affect the adoption of sawah technology by farmers in Nigeria. Security of land determined the level of adoption of sawah technology among the farmers. Ensuring high levels of tenure security is important for sustainable adoption of sawah technology. Success of sawah technology adoption based on the findings of this study centers on land availability to the farmers with long-term security. The likelihood for farmers to make medium to long-term land improvement investments tends to be high if their tenure is secured, they will be more likely to benefit from whatever investment they might go into. The study also revealed that access and control over use of land varied among land owners and tenants which invariably influence their adoption of sawah technology. Control over the land rests solely with the landlords. Landlords decide the size of the land to be cultivated by tenants and may prevent tenants from expanding the size of their sawah farms. Transfer rights related to the land also rest solely with the landlords, allowing them to rent it out, share its usage, leave it fallow, bequeath it, or sell it. Land tenants have only the right to use the land, and restrictions are imposed by landlords.

Major constraints to adoption of sawah technology were identified. The constraints, covering a wide array of issues included land acquisition and tenure, economic, information, communication and training, technical and mechanical constraints. The most severe constraints related to land acquisition and tenure were poor fertility of the soil, poor road network from their farms to city centre, and rough topography of the

farm need to be leveled , which results in high cost for adoption of sawah technology and rice cultivation. Economic constraints faced by sawah farmers are lack of viable financial agencies to support their production, poor capital base for farming and non-availability of loan to support farming. Technical and mechanical constraints confronted by sawah farmers include non availability of power tillers for land preparation activities, lack of skill for land and site selection, and complexity of water management.

The areas of priority for training among the farmers are water management, power tiller operation and management, and sawah plot layout. Farmers are willing to attend on-the-job training if given the opportunity. Technical areas of sawah technology such as sawah layout and design, site selection for sawah rice production, power tiller operation and management are the areas of training needs of extension agents. In addition, attention should also be given to improvement of the professional competencies of extension agents in the areas such as conducting demonstrations, farmers training and communication skill for effective dissemination of sawah technology.

The study on the fertility status of sawah soil in Nigeria found that sawah soils in Nigeria are low in major soil fertility parameters. The study revealed that sawah soils in Nigeria are predominantly sand. The study further revealed that sawah soils are acidic and lacking in basic fertility parameters such as exchangeable bases, TC, TN, avail. S avail. P and avail. SiO₂. The results further showed that sawah soils in Nigeria are deficient in avail. Zn, moderate in avail. Cu, Ni and Mn. Available Fe was found to be moderate with minor avail. Fe toxicity. The results of total elemental analysis showed that sawah soils in Nigeria exhibited intermediated to extreme weathering rate with majority of the soil sampled falling into the category of extreme weathering rate.

Experience from Ghana revealed that sawah technology adoption was influenced by age, education in addition to year of experience in rice production, contact with extension agents and attendance in previous trainings, land tenure arrangements and yield. The study also showed a decline in soil fertility of farm lands during a decade of sawah development in Ghana with a great potential for soil degradation. Despite the significant decline of TC and TN contents by 30 to 40% in traditional rice field or cacao plantation, it was observed that those in sawah plot were kept in the same level as well as fallow land use did. This indicates soil fertility could be maintained by sawah technology adoption, which contributes to the achievement of sustainable rice production in this region.