

Manual for Improving Rice Production in Africa

In Western African countries such as Nigeria and Ghana, a particular way of rice cultivation called the “Sawah” system, is being practiced on some rice fields. The “Sawah” system is technically defined as rice cultivation on a bunded, (i.e. leveed or embanked) well-leveled rice field with an inlet for irrigation and an outlet for drainage. Based on observations, the system reported remarkable results comparable to traditional rice cultivation (i.e. on rice paddies without levees).

JIRCAS saw the need to develop the inland-valley areas where grass-roots support can be readily harnessed and developed for the local farmers to become skilled practitioners of the “Sawah” system. JIRCAS started the study through the Development of Improved Infrastructure and Technologies for Rice Production in Africa (DIITRPA) program in 2008, with financial support provided by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan. The project was carried out by doing the following: (a) manual construction of the levee or embankment, (b) leveling the land using a power tiller, and (c) delivering irrigation water through manmade canals.

As one of the outputs of the study, JIRCAS published a technical manual, an index of which is listed on Table 1. It includes many findings acquired through four years of validation studies in Ghana and Ethiopia, including: (a) site selection, (b) organizing farmers' groups, (c) appropriate use of power-tiller or oxen (Fig. 1), (d) constructing small-scale irrigation facilities, irrigation canals and levees, (e) leveling, puddling and transplanting (Fig. 2), (f) adequate weeding and fertilizer application, and (g) post-harvesting techniques, among others.

On JIRCAS' recommendation, many charts and illustrations were used to make the manual easier to comprehend and help the target readers, particularly extension officials (EOs) and farmers, digest the contents easily. Any rice producer who uses the manual is expected to easily understand the steps to undertake on the first year and the following years (Fig. 3). Usually, the first year is most crucial as it is the time when land is initially developed for rice cultivation, with lighter work expected for the succeeding years.

Some difficulties were encountered during validation studies in Ghana due to the area's natural conditions (i.e. topography and precipitation). To address the issue, JIRCAS recommended and shared the cost of constructing canals on a case-to-case basis to enable conveyance of irrigation water to the field. The availability of several types of irrigation facilities such as: (1) dike and weir type, (2) canal type and (3) water-harvesting type in the capital city of Kumasi in the Ashanti Region allowed the study to overcome such difficulties. The validation studies showed that the proposed techniques are effective on paddy fields of bunded and leveled conditions similar to the traditionally-practiced paddy fields in Japan.

In addition, a guide for rehabilitating constructed irrigation facilities such as weirs and canals was also included in the technical manual for the first time—an invaluable information that was never contained in previous manuals .

JIRCAS recognized the importance to have the manual published in local language in order to reach the most number of its intended users. The first draft was compiled in 2009 and delivered to EOs as well as farmers within JIRCAS experimental plots to solicit comments and suggestions. The draft manual was then revised after further consultation with government officers, EOs and researchers.

In Ashanti Region, Ghana where the validation study by JIRCAS was conducted, some farmers have already enjoyed a twofold increase of rice yield to 4.2 ton/ha whereas traditional practice produced only 2.0 ton/ha (based on the Afari site, as reported by the Ministry of Food and Agriculture). Similar achievement can be expected in rain-fed inland valleys in Africa (around 4.5 million hectares, according to estimates by the Coalition for African Rice Development or CARD) if farmers practice rice cultivation with the aid of the manual.

The role of EOs is very important as they could serve as catalysts in achieving the goal of increasing rice yield through effective transfer of technological information to the farmers. Thus, enhancing their roles and getting them more involved would be greatly beneficial to the program. Mechanization, however, is not as easily achievable in the short term (i.e. within the next few years) because power tillers are operated continually in a particular site and these machines require regular maintenance. Maintenance of these machines entail procurement of spare parts that may not be readily available, not to mention the need to have a standby mechanic and blacksmith for occasional repairs.

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Fig. 1. Land leveling by a power tiller (Ghana)



Fig. 2. Transplanting (Ghana)

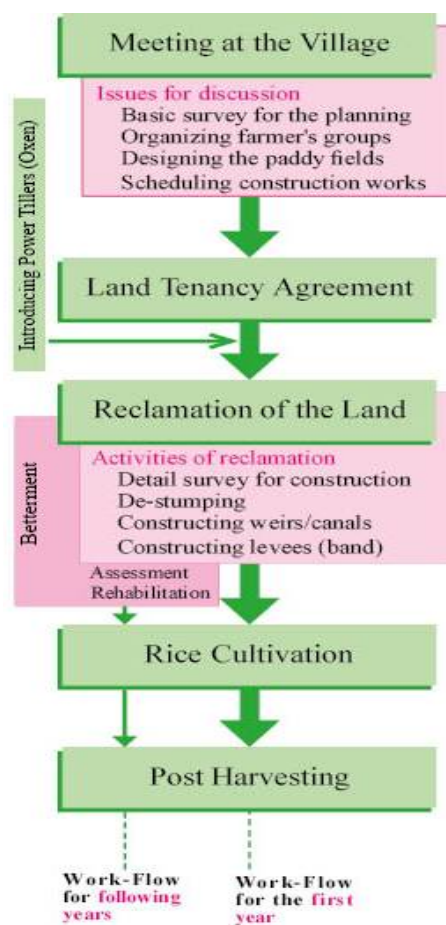


Fig. 3. Flow of Reclamation

Table 1: Chapters and Sections of Manual for Improving Rice Production in Africa.

Chapters	Sections
1. Introduction	(1) Background (2) Why JIRCAS Started the Study (3) The Study (4) Environmental Condition
2. Site Selection	(1) Feasibility (2) Planning
3. Farmers Organization	(1) Establishing Farmers' Organization (2) Advantages and Disadvantages of Group Activities, (3) Points of Concern for Group Activities (4) Land Tenancy
4. Land Development	(1) Clearing (2) Canal Construction (3) Effects of Slope Canal (4) Process of Canal Construction (5) Canal Construction Material (6) Plot-to-plot Irrigation (7) Drainage Canal (8) Intake (9) Division Work (10) Pond (11) Land Preparation (12) Maintenance of Irrigation Facilities (13) Repair of Broken Down Irrigation Facilities
5. Rice Farming	(1) Basic Knowledge of Rice Cultivation (2) Cropping Calendar (3) Paddy Field Preparation (4) Vegetative Stage (5) Reproductive Stage (6) Ripening Stage (7) Harvest (8) Post Harvest (9) Basic Rice Cultivation Problems
6. Power Tiller	(1) Advantages of Using the Power Tiller in Rice Cultivation (2) Operation of the Power Tiller (3) Maintenance of the Power Tiller (4) Common Usage of the Power Tiller by Farmer-Based Organization
7. ANNEXES	Land Tenancy Agreement, Power Tiller Lending Agreement, etc.