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## CHAPTER 5

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### ‘SAWAH’ SYSTEM DEVELOPMENT

In developing a Sawah system, several stages and processes need to be followed or adopted. However, depending upon prevailing conditions, several of such steps may be merged while others may be skipped. The guiding principle is what exist on the ground at the time of development. Common processes or steps include:

1. Brushing
2. De-stumping
3. Construction of water harvesting structures (Weir, Dykes, Canals)
4. Bond Construction
5. Puddling
6. Levelling (Micro and Macro)

Development cost should be minimal and materials used should be easily available and affordable.

## BRUSHING/LAND CLEARING



Site has to be first brushed of any thick vegetation



Too much trash or cut down vegetation should be partially gathered



**Dried thrush should be partially but not totally burnt to allow for quick or rapid organic matter buildup**



**Tree stumps and roots should be thoroughly removed (de-stumping) for smooth operations of machinery, safety of operators and creating more space for rice**





**Water harvesting can be done from several sources. For streams that flow, a location should be identified upstream and cleared for construction of a water harvesting structure for diversion onto rice fields**



**Select a point which is narrow across river/stream but at a good slope to allow free and easy water flow**





Wooden poles, harvested on or around the fields should be firmly fixed on the ground across the water sources (eg. Stream)



Empty polyethelene sacks may be filled with soil from adjacent high land/hill, preferably closed to source



Sand bags are then lined infront of wooden poles that have been firmly put into he ground



Water harvesting structure (weir) using local materials is ready and water impounded for diversion to rice fields



**Small ponds may be constructed by farmers to harvest water where no reliable spring/stream flow is available (e.g. Kodadwene, Ghana)**



**Canal Construction: Participating farmers should be thought how and where to construct canals for free flow of water after weirs/dykes/pond are in place**



**Canal construction by participating farmers to direct water into rice fields in Ghana**



**A farmer opening up a canal to direct water onto his field in Ghana**



**Water freely flowing from a constructed weir to rice fields in Ghana after being constructed by farmers with technical guidance from Sawah experts**



**A properly constructed canal by farmers to feed several hectares of rice fields can easily be done at minimum cost but with active farmer participation.**





Bund construction starts after the field is cleared and debris removed. Bunds can be constructed individually or by groups of people.



Bund construction is easier and faster when the soil is moist but not covered by water. However, bund construction is not advisable under very dry conditions





**Bunds should always be strong and should be directed across the direction of water flow**



**The interval between bunds is greatly influenced by the topography of the land. Intervals are wider and bunds longer when land is relatively flat ( $< 2\%$  slope).**



**Initial land levelling follows after bund construction when field is flooded with water to identify high/raised portions.**



**Training young Scientists under a United Nations University Program in using water levels for macro field levelling**





To create more space (flat land) for rice and for easy machinery work for increased efficiency, some trees should be roved from the field



For effective Sawah development, animal traction or small machinery (power tiller) is necessary, Kou valley, Burkina Faso





Office du Niger, 50,000ha irrigated sawah project (In addition to animal traction, farmers assist in manual land development of Sawah)



Ploughing using a Power Tiller can be done under wet or moist conditions. Avoid ploughing under dry conditions



**Power tiller ploughing is best when there is sufficient water on soil surface. Machinery movement is easier and efficiency is higher**



**For good quality land preparation and to maintain power tiller life, operators must be properly trained on power tiller handling. Training staff of Togo and Benin under the SMART-IV of AfricaRice.**





Experience operators can combine ploughing and puddling in a single operation depending on water availability and field conditions.



For effective crop establishment, the soil should be pulverised through puddling





Farmers should be thought the art of properly pulverishing the fields using the power tiller through field training and practice



Training both farmers and technical staff is a key component of on-the-job training under "Sawah" system development. Training of technical staff from Togo and Benin on power tiler handling and puddling



Simple tools (eg. wooden plank) can be designed to assist farmers carry out field levelling (micro) before transplanting.



Soil movement, puddling and levelling at Biemso No.1, Zongo site in Ghana in 2002





**Training field technical staff and farmers on how to mount and direct the leveller when attached to the power tiller is essential**



**Manual Leveling needs hard-works for Sawah system construction and this drudgery can be eliminated with mechanisation (eg. Use of of power tiller)**





**A training session for both farmers and field technical staff**



Where levelling using the power tiller leaves micro-spots such as wells, sinks, etc, such location can be manually levelled with simple tools like a hoe. Such areas are too soft or deep and can make tiller sink or get damaged.



A well levelled plot at Biemso in Ghana ready to be transplanted



Common field problems when using the power tiller include sinking into too soft lands or old sunk wells. As much as possible such situations should be avoided as they tend to damage machinery





**Power tiller operations need good skills. When it does sink, more hand, more energy and experience is required to move it out without causing any damage to the machine.**