Farmers' personal irrigated Sawah systems to realize green revolution and Africa’s rice potential

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African farmers can develop their personal irrigated sawah systems by themselves to realize green revolution and Africa’s rice potential

June 99, JICA Sawah project

Aug 00

Aug 09

Jan 10

(1) Skills for Site Selection and Sawah system design

(a) Water sources & quality: (>10 L/s, >5 months/year)
   Stream/River, Spring, Seepage, Flood, Rain-fed

(b) Topography and soil
   Ongoing & potential rice area >10ha, Slope <3-2%, surface roughness, Soil texture, Soil fertility

(c) Socio-economics
   Strong will, Market access, to road access in case of demonstration
   Land tenure, Secured lent

(d) Sawah system design
   Sawah layout and total potential area
   Shape & Sawah size
   Water intake, distribution using canal
   Spring, area sawah to sawah, and diversion canal
   Stream/seepage
   Simple dyke & diversion canal
   Weir and Canal
   Fish pond, dam lake
   Pump irrigation
   Interceptor canal, Contour bund system
   Flood control by drainage or dam
   Drought control by pond/water-harvest
   Soil movement and quality of leveling
   Bund layout and quality

Collaboration between farmers & scientists, engineers, and extension officer

Farmers know site specific hydrological conditions which are the most important for site selection

Sand bag and Wooden Weir, because of farmers’ self-support management (1999)

Toposurvey
Sand bag weir by farmers and SRI Sawah team, Aug 2009, Noustem, Ghana

Partially intercepted irrigation canal at Gadabiu, FCT FadamaIII, 26 Sep 10

On the job training Sawah bunding

River

FadamaIII Sawah Demonstrations that, sawah can be made from spring water using Adugyama site, Mr. Tawiah's site, Lower 2 May 2010

Restoration measure destroyed by IVRDP to connect spring water and sawah by irrigation canal and syphon pipes at Adugyama, Mr. Tawiah's site, August 2011

Just before IVRDP destruction: Rice growing at Mr. Tawiah's sawah to secure 5t/ha, 2009

The same site of the left, August 2011. After the disruption by IVRDP, without restore the bunding, leveling and proper irrigation, yield will be <3t/ha

Mr. Tawiah trained another farmer to develop 3ha of sawah using small spring water source. Only local farmers know such water source.
Nigeria Nupe’s rudimentary Sawah system

Traditional, Bida, Sep10

Sawah, Sep10

Jega, farmers rice fields: 3 September 2011

Kebbi, Jega demonstration site, Farmers' fields: 3 May 2011

Kebbi, demonstration site, Farmers' fields: 3 May 2011

Jega, farmers rice fields: 3 September 2011
(2) Efficient and Low cost awah Development: Skill & Technology

(a) Skills for development
- Skill for power-tiller operations
- Plowing and Puddling
- Soil Moving
- Surface leveling & smoothing
- Powertiller management

(b) Cost
- Power-tiller for development (10ha /powertiller)
- Power-tiller spare parts
- Fuel for development
- Bush clearing, destumping
- Bunding and surface treatment
- Canal construction
- Additional hired labors
- Tools and materials
- Scientist & engineers cost
- Extension officer cost
- Farmers’ training cost

Target cost:
- $1000-3000/ha
- Target speed of development: >3ha/year/powertiller

Innovative Action research & on-the-job training on site-specific sawah development & management

Sawah development: at least 10ha per one Powertiller

Sawah construction can be done by participated farmers’ self-support efforts

Manual Leveling needs hard-works for Sawah system construction
(4) Sawah based rice farming
Management of water control facilities:
- water sources, intakes, and distributions
- water equity and canal management
Sawah water control: Leveling, smoothing
- Bunding, Puddling skills
Nursery and trans-planting
- Weed, pests, and birds management
- Carbon sequestration and organic matter management
Fertilization and nutrient management
- Variety election
Yield target
- Cost effective sawah based farming
Mono, two, double, & other cropping
Advanced sawah-based farming

Target: Sustainable sawah development through the Income Increase

Income = (Sustainable Yield) x (Cultivation area)
(1) Immediate target: >20ton paddy/year/powertiller
- Paddy yield >4t/ha and Sawah area >5ha
- Total paddy selling price = $10,000
- Powertiller cost = $5000, 5-7 years use
- Yearly cost = ($1000 x 700) + ($200 parts) + ($500 running
(2) Accelerate target: >50t paddy/year/powertiller
- Paddy yield >4t/ha & Sawah area >10ha, or >5ha double cropping
- Total paddy selling price = $25,000
- Powertiller cost = $5000, 5-7 years use
- Yearly cost = ($1000 x 700) + ($200 parts) + ($1000 running
(3) Basic research both on sustainable paddy yield increase, such as >10t/ha, and to increase the speed of sawah development, >5ha/year, are important

Minimization of outside funds is key for sustainable and endogenous development:
- farmers to farmers technology transfer sites
- sites of extension officers
- researchers’ demonstration sites