BUND CONSTRUCTION

Bunds should be firm, strong and sufficiently high to be able to contain The require amounts of water

PLOUGHING
using a power tiller

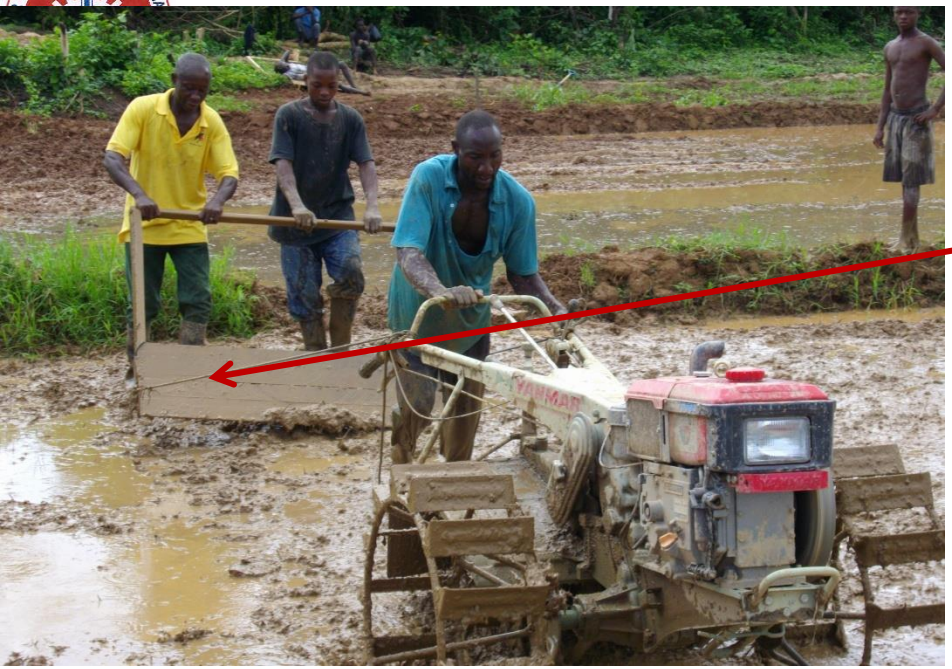
Can be done under moist conditions.

Can be done under wet conditions.

Avoid ploughing under dry conditions

PUDDLING

Process of breaking up bigger soil lumps into a fine medium for easy water and nutrient management



LEVELLING
using a wooden plank that requires no spare parts nor foreign exchange

Process of creating a micro-environment for

i.easy plant establishment

ii.easy water management

iii.easy fertilizer management

iv.easy weed management

CONSTRUCTION OF WATER WAYS
e.g. Canals

Construction of water ways for easy water management to and out of rice fields

Cut strong sticks and line them along the rope. Put sand bags along sticks to block water

A weir is ready and water can be diverted into a rice field through a canal

Farmers/Extension are taken through the ff:

1.how to establish a good nursery

2.what quantity of seed to nurse

3.when to start transplanting

4.when a nursery should not be used

Farmers and extension are taught:

a.how to transplant in rows using twine/ropes

b.how to manage water during transplanting

FERTILIZER MANAGEMENT

- ❖Recommendation rates
- ❖Calculation of fertilizer quantities
- ❖ How to apply
- ❖When to apply
- ❖Water management during fertilization

FARM SANITATION

Importance of keeping bunds and fields clean to prevent:

1. insect attack ,
2. diseases attack,
3. rodents attack,
4. Production of clean grain

Comparison of paddy grain and dry matter yield (t ha^{-1}) between Improved and traditional system

	Improved system				Traditional system	
	Jusmine 85		Sikamo		Lapers	
Location	Paddy grain	Stover	Paddy grain	Stover	Paddy grain	Stover
Nsutem	5.4	13.8	6.7	16.5	2.6	14.6
Baniekrom	6.4	18.2	6.1	15.0	2.6	18.0
Mean	5.9	16.0	6.4	15.8	2.6	16.3

Buri et al., 2010

National Average (2009) for Ghana = 2.4 t ha^{-1} (Source: MoFA☺

Rice Grain Yield (t/ha) of farmers groups under “Sawah” System

Farmer Group	2001	2002	2003	2004	2005	2006	2007	2008	2009
Adugyama A	4.0	4.7	3.8*	5.0	4.5	5.6	5.6	5.8	6.1
Adugyama B	4.4	4.8	5.5	5.5	4.8*	5.7	5.6	6.0	6.2
Biemso A	4.8	4.7	4.8	5.5	-	-	-	-	-
Biemso B	4.7	5.7	5.9	6.5	5.4*	-	-	-	-
Biemso C	-	4.5	5.4	5.5	5.5	5.8	6.0	6.2	6.0
Mean	4.5	4.9	5.1	5.6	5.0	5.7	5.7	6.0	6.1

Buri et al, 2010 * Affected by late floods

Cost of Production and Net Returns from operating on ”Sawah” System

Adugyama	Grain Yield (t/ha)	Gross Revenue (US $)	Production cost (US $)	Net Revenue Range (US$)
2004	4.3	1712	428	1284 - 1460
2005	3.9*	988	460	528 - 850
2006	5.7	1383	300	1083 - 1545
2007	5.6	1730	500	1086 - 1450
2008	6.0	1700	510	1185- 1800
2009	6.2	2800	600	2200 - 3000
Biemso C				
2004	4.7	1847	349	1498 - 1674
2005	5.5	1363	360	1003 - 1400
2006	5.8	1396	362	1034 - 1496
2007	6.0	1854	412	1442 - 1810
2008	6.2	1756	450	1306 - 1921
2009	6.0	2700	550	2150 - 2950

Buri et al., 2010

Effect of soil and water management on rice grain yield (t/ha)

jement dugyama	Bou. 189	Jas. 85	Sikamo	Wita 7	Mean
Year 1					
Farmer Practice	3.9	3.8	3.2	3.3	3.6
Only Bunded	5.1	4.9	5.1	5.3	5.1
Bunded and puddled	6.8	5.5	6.5	6.2	6.3
Bunded, puddled, levelled	8.2	6.5	7.8	7.6	7.5
Mean	6.0	5.2	5.7	5.6	
Year 2					
Farmer Practice	3.5	3.7	2.2	3.3	3.2
Only Bunded	4.2	4.0	3.2	4.5	4.0
Bunded and puddled	4.8	4.5	4.3	4.9	4.6
Bunded, puddled, levelled	6.2	5.5	5.6	5.4	5.7
Mean	4.7	4.4	3.8	4.5	
S. E for each year	1.12				

Issaka et al, 2005

Changes (%) in topsoil (0-30cm) fertility levels (2001 – 2008)

Parameter	Adugyama	Biemso	Mean
Total Carbon	3.5	3.0	3.25
Total Nitrogen	- 3.4	- 4.0	- 3.7
Available Phosphorus	10	- 30	- 10
Exchangeable K	32	35	33.5
Exchangeable Ca	37	15	26
Exchangeable Mg	10	12	11

Buri et al., 2010

Recommendations

1. (a)Promote and encourage the development and adoption of improved" technologies that are eco-friendly (e.g. "Sawah") and
   (b) Develop site specific nutrient management options for various agro-ecologies including rice specific fertilizer formulations

2. Encourage/promote the use of fertilizers including RP (subsidies may be a necessary evil here) and cropping systems that enhance soil nutrient build-up /maintenance

3. Develop a sub-regional soil fertility management data-base for rice. This may enhance the development of improved technologies for effective soil fertility management

4. Modernize our land tenure systems as they are currently a disincentive to rice farmers

Thank You for Your Attention