

An Inventory of Agricultural Water Technologies and Practices in MOZAMBIQUE

I. GENERAL	Technology 1= name	Technology 2 =name	Technology 3 = name
1. Water technology or practice & detailed description (give technical description, refer to Annexes 1 & 2; attach an illustration/picture if technology is not in the lists)	swamp irrigation/inland valley swamps	micro catchment systems	river flood plain irrigation/wet sea
1.1 Source of technology (Indigenous or Imported)	Imported	Indigenous	imported
1.2 If imported, any modifications done (Yes or No)	Yes	Na	Yes
1.3 Provider of technology ^b	Missionaires/Church	Indigenous knowledge	gov. agency
1.4 Who developed/designed the technology package ^c	Missionaires	Farmers themselves	gov. agency
1.5 Who installed the technology package ^c	Missionaires with students and farmers	Farmers themselves	gov. agency
1.6 Source of water (surface, groundwater, harvested rainwater, wastewater, etc.)	Combination of surface with harvested r	Harvested rainwater	surface water/groundwater
1.7 Is the technology used for more than one use (multiple uses)? (Yes/No)	Yes	No	No
1.8 If yes, what are they?	Crop production, aquaculture (earth tar	Na	Na
1.9 If yes, how is the technical design adapted compared to the design for single use?	Instead of having one main canal cross	Na	Na
1.10 What is seen as advantages of multiple use systems as compared to the design for one single use?	Better water harvesting and conservati	Na	Na
1.11 What are the disadvantages of multiple use systems?	Potential conflicts due to water shortagi	Na	Na
2. Specific location/address & distance from main urban center (km)	Common in High Regions of Zambezia, Village of Cabaceira Grande, M < 25 km from main towns; lower		
3. Main source(s) of income in site	Agriculture production	Agriculture	Agriculture
4. Other source(s) of income in site	Informal trade	Informal trade	Fish, informal trade
5. Type of user (community or individual households)	Both	Both	Both
6. No. of benefitted households; average size of households	NA/ < 1ha	250; 0.01 to 0.025 ha	> 1000; 0,025 to 1 ha
7. Total size for all beneficiaries (ha) -note average size per beneficiary	50 to 100 ha	300 ha	2500 to 3000 ha
8. Profile of beneficiaries (if mostly ultra poor, poor, non-poor or mixed) ^a	poor	poor	poor
8.1 Was project/program area selected based on available data on comparative incidence of poverty? (Yes/No)	No	No	No
8.2 If yes, indicate the poverty status of the project area relative to all other regions of the country	n.a	n.a.	n.a
8.3 Were particular populations or groups targeted within the project area (e.g., based on baseline socioeconomic surveys or participatory poverty assessment, etc)? (Yes/No)	No	No	n.a
8.4 If yes, indicate the poverty status of the beneficiaries relative to the non-beneficiaries in the project/programe area	n.a	n.a.	n.a
8.5 Indicate the proportion of women beneficiaries	n.a	60-80%	45-60%
9. Month & year technology was introduced	Before 1975	About century	middles 50s to early 70s
10. No. of years of adoption	30 o 40 years and more	Inheritance from forefathers	30 to 50 years
11. Is technology still in use (Yes or No)	Yes	Yes	Yes in some areas and no in oth
12. If not anymore, why? (STOP here for this technology)	n.a	n.a.	Just temporarily not in use once r
13. Type of technology (water capture such as small dams, rainwater harvesting OR distribution/water use such as treadle pumps, drips, etc.)	Surface and Rainwater harvesting	Small basins of low earth ridges controlling the rise in floodwater	
14. Describe the counterfactual or the old technology (practice) the new water management technology/practice replaces.	With construction of main and lateral ca	Na	natural river flooding and high tid
14.1 Is the change partial or complete?	Complete	Na	Partial
14.2 If the change is partial, describe the elements of the old system that were preserved and those that were discarded	Na	Na	Instead of having only drainage c
II. Profitability of the TECHNOLOGY			
a. The new technology or management practice (Note: prepare an enterprise or partial budget)			
15. What is the estimated and actual life of the technology? (in years)	10 to 25 years	Normally ridges are left at the e 25-50 years	
16. Was technology given out for free?	Yes	Na	Most of these systems were dev
17. If NOT totally free, what is the capital cost of technology (reference YEAR of cost estimate; separate costs for equipment/tool/parts, pipes for conveyance into farm, installation, water source development)	Na	Na	Na
18. Cost of operation & maintenance per ha (indicate what items are included-- cost of pumping in terms of fuel, energy/electricity, labor costs; maintenance and repair costs, etc.)	It involves labor costs (farmers) for mai	Just labor costs/farmers	Apart the participation of local cc
19. Crops produced (indicate main crops vs. secondary crops)	Paddy rice during the wet season and v	Paddy rice	Rice
20. Changes in crops grown (into what & when) & reason for new crops or switching	Even rice under appropriate water man	Na	Still rice
21. Indicate how many croppings per year (1, 2, or 3)	2, one of rice and 2nd vegetables	One single crop	In some places 2 rice crops
22. Increase in production (in kg/ha) due to technology (including amount used for own consumption & amount sold to market)	Na	0.7 to 1.0 t/ha; own consumptio	1.2 to 1.8 t/ha; own consumption
22. Increase in revenues (in local currency) due to technology (less amount used for own consumption)	Na	Na	na
23. Estimated & actual financial profits (gross revenues-costs of all cash inputs)	Na	Na	na
b. Old water management technology or practice (prepare an enterprise budget)			
24. What is the estimated and actual life of the technology? (in years)	Dependent on local environmental conc	5 to 10 years	30 to 50 years
25. What is the capital cost of technology?	Na	Local labor/farmer family memb	Na
26. Cost of operation & maintenance per ha (indicate what items are included-- cost of pumping in terms of fuel, energy/electricity, labor costs; maintenance and repair costs, etc.)	High intensive labor constructing low ea	Regular maintenance or repair (Construction of ditches, canals, s
27. Crops produced (indicate main crops vs. secondary crops)		Rice	Rice

28. Indicate how many croppings per year (1, 2, or 3)	Usually one		1	1
29. Estimated & actual financial profits (gross revenues-costs of all cash inputs)	Na	Na	Na	
III. ROLE OF INSTITUTIONS/ORGANIZATIONS				
30. Support by NGOs (specify the NGO & indicate if international or local)	No, it is government supported	Na	Yes, ORAM, local NGO	
30.1 Indicate the total value of the support (in Dollars or local currency)	Na	Na	Na	
30.2 Is the support still on-going or withdrawn?	Yes	Na	Yes	
30.3 If the institutional support is withdrawn, is the system still functioning?	Yes, with need for annual maintenance	Na	Na	
30.4 If the system is still functioning, is the pace of technology/practice uptake continuing at the same or better pace than when there was NGO institutional support? (Yes/No)	There was no NGO support in this case	Na	Na	
30.5 Give reasons for the response to 30.4	Na	Na	Na	
31. Specific support provided ^d	Na	Na	2, 3, 4 and 6	
32. Support by government extension workers & other government agency (specify which agency & whether local or national government) (yes or no)	Yes	Na	Yes, district agric. extension dep	
32.1 Indicate the total value of the support (in Dollars or local currency)	Local participation	Na	Na	
32.2 Is the support still on-going or withdrawn?	Yes	Na	Yes, district agric.extens. Dep. A	
32.3 If the institutional support is withdrawn, is the system still functioning?	Yes	Na	Few chances unless farmer assc	
32.4 If the system is still functioning, is the pace of technology/practice uptake continuing at the same or better pace than when there was Government institutional support? (Yes/No)	Yes	Na	Yes, where there is strong local I	
32.5 Give reasons for the response to 32.4	It is already part of the system	Na	Most of farmer associaions have	
33. Specific support provided ^d	2 and 6	Na	2, 3, 4, 5 and 6	
34. Support by private enterprises (specify enterprise)	No	Na	Some Church/religious groups	
35. Specific support provided ^d	Na	Na	2,3,4 and 6	
36. Support by other organization (specify organization - e.g. community organization) or private sector service provider (e.g. manufacturers/dealers/retailers)	No	NO	Na	
36.1 Indicate the total value of the support (in Dollars or local currency)	Na	Na	Very occasional and not continuc	
36.2 Is the support still on-going or withdrawn?	Na	Na	In some cases withdrawn but stil	
36.3 If the institutional support is withdrawn, is the system still functioning?	Na	Na	yes but at very low pace and with	
36.4 If the system is still functioning, is the pace of technology/practice uptake continuing at the same or better pace than when there was private institutional support? (Yes/No)	Na	Na	At very low pace with lot of probl	
36.5 Give reasons for the response to 36.4	Na	Na	Problems with serious soil toxicit	
37. Specific support provided ^d	Na	Na	2, 3, 4 and 6	
IV. FACTORS CONTRIBUTING TO PROFITABILITY & SUSTAINABILITY OF TECHNOLOGY (see Annex 3 for sample answers #40-45)				
38. Ease in implementation (Yes & No)	Yes	Yes	No	
39. Ease in O&M (Yes & No)	Yes	Yes	No	
40. Suitability of technology/ How adapted to local conditions (well, not so well, etc.)	Well	Well	Moderate to marginal	
41. Cultural acceptability	Normal	High	Normal	
42. Effectiveness	Good, control of drainage and conserv	Good, prevents runoff	Intermediate	
42. Environmental impact	Low	Low	Moderate to high	
43. Other advantages (factors contributing to profitability & Suitability)	Low cost and using local resources, no	Easy to operate and maintain, l	Major advantage is the source of	
44. Other disadvantages (factors constraining profitability & sustainability-- e.g. lack of specific support services or supplies of specific inputs, etc.-- be very specific)	Market access and roads, normaly are	Poorly developed infrastrucure	Poor access to credit facilities, fr	

^a 1: ultra poor - extremely poor or most vulnerable engaged in rainfed cereal production, no potential to diversify because of lack of land, no livestock, limited available labor, no off-farm incomes/remitt

^b 1: indigenous knowledge; 2: NGO (specify); 3: government agency/extension worker; 4: private enterprises; 5: other (specify)

^c 1: government agency (extension agency/irrigation advisory services/University); 2: representative/authorized dealers of manufacturers; 3: private consultant; 4: farmers themselves; 5: other (specify)

^d 1: introduction of technology; 2: facilitated access to inputs; 3: facilitated access to output markets; 4: provision of (or facilitated access to) credit; 5: capacity building such as training (specify what); 6:

Technology 4 = name	Technology 5 = name	Technology 6 = name	Technology 6 = name	Technology 7 =
swamp irrigation/fresh water swam	River Floodplain Irrigation/di	River Floodplain Irrigation/di	Hill irrigation	Treadle pumps
Indigenous	Indigenous	Imported	Indigenous and imported	Imported
Na	Na	Mainly adaptations to suit loc:	Yes, like improvements on the water	ε No
Indigenous knowledge	Indigenous knowledge	Commercial farmers; gov. a	Commercial farmers; gov. agricult. De	NGOs, Private Companies, gov. depart.
Farmers and gover. Agencies		1, 2, 3 and 4	Gov. irrigation depart.; commercial far	Private companies, consultants
Farmers and gover. Agencies	Farmers themselves	2, 3, 4	Commercial farmers; farmers associa	Farmers themselves, Extension, NGOS
Comb. Of seepage water and surfa	Surface and groundwater	Surface; small dams	Surface waters; water springs; small c	Rivers, seepage/drains, shallow ground water/wells
No	No	Yes	Yes	Yes
Na	Na	Domestic uses; rural constr	Domestic use; fish pounds; livestock;	Domestic use, livestock
Na	Na	No differences	Apart fish pounds where water used is	ε No differences
Na	Na	Just depends on the opport	Most times acts as decreasing potenti	Better use of existing opportunities
Na	Requires more labor, and w	May conflat calendar, for the	Disadvantages occur on the presence	Increases maintenance needs; may conflict with other farm activities
Most in the southern part of the cou	Gurue district in Zambezia,	Throughout the country, on	Difficult to limit because in central par	Rural areas, and within green belt of major urban centres
Agriculture	Agriculture	Agriculture	Agriculture	Horticulture
Fishing, informal trade, employes	Informal trade	All sorts once most of these	Fishing, fuelwood and charcoal produ	Livestock, trade
Both	Both	Commercial farmers; farmer	Individual households, farmers associa	Individual households
250 000 to 350 000; 0.5 to 1.0 ha	150; 0.25 ha to 0.5 ha	Na	8.500 HH;	500 - 1000 HH; 5 people/HH
465 000 ha	150 to 200 ha; 0.25 ha	About 10.000 ha; mainly froi	2.100 ha; 0.25 to 0.5 ha	200 - 300 ha; 0.25-0.5;
poor and mixed	poor and mixed	business, household-comm	mixed; non-poor;	Mixed
No	No	No	No	No
Na	Na	Na	Na	No
Na	Na	Na	Na	In some areas baseline surveys carried out
Na	Na	Na	Na	Still no data available to compare both groups
	60% 30 to 45%	25 to 30%	30 to 40%	40-60%
middles 50s to early 70s	Technology in place for 4 ge	Back to colonial time, late 4l	Colonial time; most areas abandoned	1999-2000
30 to 50 years	50 to 75 years	40 o 50 years	30 to 40 years	5 years or so
Yes	Yes	Yes	Yes	Yes
Normally just during the wet season	Na	Na	Na	Na
Management of water table (combi	Normally systems are near t	Water is capture by water pi	Water captured and stored in small dε	Distribution/water use
Normally these areas without imprc	Na	Previous and described tect	Storage facilities improved with solid ε	Use of buckets
Partial	Na	Partial	Partial	Complete
Because this system is also supplie	Na	Because sometimes and in	Mostly of the storages facilities improv	Na
Needs permanent cleaning and ma	5 to 10 years	5 to 10 years	25 to 50 years	10 years
Yes	Na	No	Yes, through government agencies, in	No
Na	People harvest material fron	Na; Costs involved consider	Na	\$80,00-100,00
Farmer labor on an annual base	Na	Na;	Na	Labor, replacing rubbers, hose; app. \$20,00/year
Rice and vegetables	Vegetables	Sugar cane and rice; vegeta	Vegetables, maize, beans, tobacco, w	Vegetables; nurseries.
Vegetables mainly for market	Na	Mainly following domestic, r	Mainly market opportunities lead crop	No changes
3 cropping	If onion up to 3 crops; other	In case of rice is one, sugar	Vegetables 2 to 3 crops year, 2 maize	2 - 3 crops
1.9 to 2.8 t/ha (rice); 20 t ha-1 for le	Vegetables for market about 75% of production; remainir	Substantial almost double at smallhc	Mainly cash crops produced, i.e. paprika	yield increases in 100%, and about 50% for veges
Na	Na	Na	Not much once most of the profit is us	Na
Na	Na	Na	Na	Na
Depends on severity of inundation/	50 - 75 years	Average 25 years	5 to 10 years	5 years or so
Farmer labor on an annual base	Na	Na	Na	Na
Cleaning and maintenance of drain	No significant costs involved, may need to replace bucke	Na	Na	Na
Rice, maize, sweet potato and vegi	Vegetables	Rice and vegetables	Vegetables; maize and beans	Vegetables; nurseries.

2 2 to 3

1 of rice and 1 to 2 veges

2 02-Jan

Na Na Na Na NA

No Na Yes, Caritas, Oram, some C Most systems supported through gov. NGOs and government agencies

Na Na Na Na Na

Na Na Yes, Caritas, Oram, some C Yes Yes

Maintained by community and farm Self sustainable With constraints for operatio Yes but may face constraints Na

Yes Yes In some cases yes but for m Good performance of some systems ε Na

it is well known by farmers and wid Farmers used to the system Problem of sustainability Accessibility to irrigation areas quite p Na
6 2, 3 and 6 All items 1, 2, 3, 4, 5 and 6 Introduction of technology, access to imputs, training users and local manufacturers

district extension officers No District Agric. Depart./Exens Provincial Dep. Agriculture/Irrigation a Yes, local extension staff

Na Na Na Na Na

yes Na Going Yes Na

Na Na Yes, with up and downs Yes Na

Na NA Not always Yes but some of the areas lack of owr No

Na Na Several factors influence, la Food aid and other kinds of technical Access to spare parts and labor limit use

Na Na 1, 2, 3, 5, 6 2, 3 and 6 2, 3 and 6

Na Na Na Na Na

2, 3, 4 and 6 Na Na Na Na Na

Na Na Na Na Na

Na Na Na Na Na

Na Na Na Na Na

Na Na Na Na Na

Na Na Na Na Na

Na Na Na Na Na

Na Na Na Na Na

Yes Yes Yes Yes Yes

yes Yes No Yes Yes

High High High High Well

Good High High High Not full accept.

High Normal Low to intermediate Intermediate Intermediate

Low Low Low to intermediate Low to moderate Low

Low cost echnology, no major shor Made of local available mate Serves large areas in a affoi Low cost technology Low cost technology

Potential acidity and salinity hazarc Uses small amount of water Organization among farmer: Accessibility, poor market infrastrucl Very intensive labor, and needs some local innovations to improve effectiveness and accep

ances, or without access to land and resources at all 2: ; 3: extension worker; 4: private enterprises; 5: other (specify)

formation of association (specify: water user assoc., producers association, etc.) ; 7: other (specify)

stability