An Inventory of Agricultural Water Technologies and Practices in LESOTHO

I. GENERAL	Technology 1= name	Technology 2 =name	Technology 3 = name	Technology 4 = name	Technology 5 = name	Technology 6 = name	Technology 7 = name	?	?
1. Name of water technology or practice	Low pressure gravity fed sprinkler system	Drip kits	Treadle pump	?	?	?	?		
1.0 Detailed description of technology or practice (give technical description, refer to Annexes 1 & 2; attach an illustation/picture if technology is not in the lists)	This is a semiportable low pressures overhead sprinkler system. Water is harnessed at a point of higher elevation than the point of use or pumped from the river then gravitated to the point of application. The supply lines have a fixed position and buried in the ground whlist the laterals from wchich the sprinklers are connected are laid on the ground surface and can be moved from one position to another.	The drip kits in Lesotho are supplied for 10 m by 10 m or 20 m by 20 m plots. The kits are low-cost, easy to assemble and operate. Water is supplied from a tank connected to a roof catchment and placed with its bottom at least a meter above ground to provide sufficient elevation head to drive the drip system. The homeowner's roof is used to capture rainfall and direct it to the irrigation tank through gutters.	A treadle pump is simply a water pump fixed on top of a borehole to draw water. But Unlike most manual pumps, which are operated by hand, the treadle pump is operated by repeatedly pressing levers with one's feet. The pumped water can then be fed directly to the plants through a series of plastic pipes be stored in an elevated tank before use.						
1.1 Source of technology (Indigenous or Imported)	Imported	Most drip kits in Lesotho are sourced from South Africa	Imported						
1.2 If imported, any modifications done (Yes or No)	No	No	No						
1.3 Provider of technology[b]	Local agents and government	World Vision, Lesotho	NGO's						
1.4 Who developed/designed the technology package[c]	Designed and packaged in South Africa		South Africa						
1.5 Who installed the technology package[c]	Normally done by the Ministry of Agriculture and Food Security.	NGOs (Mostly World Vision)	NGO's						
1.6 Source of water (surface, groundwater, harvested rainwater, wastewater, etc.)	Surface water, mostly run of river abstractions	Harvested water from roofs and ground water supplies	Ground Water						
1.7 Is the technology used for more than one use (multiple uses)? (Yes/No)	No, Only used for irrigation	No	Yes						
1.8 If yes, what are they?	na	N/A	Domestic and for irrigation of small vegetable gardens.						
1.9 If yes, how is the technical design adapted compared to the design for single use?	na	N/A	The human energy requirement is also high and most users complain that the use of the pump is very tiring for a single individual, as such the technology is better suited for domestic use other than medium to large scale productive uses.						
1.10 What is seen as advantages of multiple use systems as compared to the design for one single use?	na	Multiple use systems can meet the health and domestic needs of its consumers as well as provide water productive activities such as irrigation of farm produce.	The surplus from the produce could be used to meet other needs like health, education etc						
1.11 What are the disadvantages of multiple use systems?	na	Sources might not be sustainable through out the whole year	The technology is human powered and as such large scale irrigation will be too time consuming and might not be sustainable over a long period of time.						
2. Specific location/address & distance from main urban center (km)	The systems are promoted in the mountains and foothills of Lesotho were rivers are perenial	No special criteria was used to select beneficiaries	Promoted in all rural areas						
3. Main source(s) of income in site									
4. Other source(s) of income in site									
5. Type of user (community or individual households)		mixed but with special attention on ophans and vulnerable children and the rural poor in general.	Individual households						
6. No. of benefitted households; average size of households	20 to 60 households can be served by one scheme. Households sizes range between 6 and 10 people.	Over 200 households. Household size is between 6 and 10 people.	Total number of beneficiaries not clear. Average household sizes range from 6 to 10 people.						
7. Total size for all beneficiaries (ha) -note average size per beneficiary	0.02 to 5 ha.	n/a	between 0.02 and 0.1 ha						
8. Profile of beneficiaries (if mostly ultra poor, poor, non-poor or mixed)[a]	mixed. Scheme location is determined more byy the availability of water than by socio-economic status of the beneficiaries.	The poor and vulnerable groups in society, main focus is on children.	mixed						

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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	Difficult to determine	na	na						
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	na						
8.4 If yes, indicate the poverty status of the beneficiaries relative to the non-beneficiaries in the project/programme area	na	na	na						
8.5 Indicate the proportion of women beneficiaries	Most schemes are dominated by man headed households. Ownership is by the husband (who is registered) and operation by the wife (who works/manages the field)	not clear	not clear						
9. Month & year technology was introduced	Since the late 1980s	Since 2000	Late 1990s						
10. No. of years of adoption	over 20 yrs	5 years	At most ten years. Individual pumps have hardily lasted more than 5 years.						
11. Is technology still in use (Yes or No)	Yes	Yes	Yes						
12. If not anymore, why? (STOP here for this technology)		N/A							
13. Type of technology (water capture such as small dams, rainwater harvesting OR distribution/water use such as treadle pumps, drips, etc.)	Water capture is by standard run of river diversion works.	No alternative system used	Water use						
14. Describe the counterfactual or the old technology (practice) the new water management technology/practice replaces.	Dry land farming		Buckets (alternatively rope and bucket for deeper wells)						
14.1 Is the change partial or complete?	Complete		Partial						
14.2 If the change is partial, describe the elements of the old system that were preserved and those that were discarded	na		The bucket still remains popular for shallower wells (depth < 1.0 m)						
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)	Estimated life is about 10 yrs. Actual life ranges between 8 and 15 yrs depending on the O&M								
16. Was technology given out for free?	Government grants and subsidies up to 50% of cost are available for aquiring the sprinklers and water supply sytem.	Yes	Free						
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)	A 50 ha scheme would cost M62 000 to develop including pump, main line and pipes.	N/A	N/A						

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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.)	Field rental = M1000/farmer/yr. Water = M10/scheme/3yrs. Labour is variable. Total O&M = approx. M10 000-15 000/ha	Negligible since everything is provided	na						
18.1. Does the new technology reqiure more or less labour than the old technology?									
19. Crops produced (indicate main crops vs. secondary crops)	Cabbages, green maize, paprika, green beans	Vegetables (cabbages, tomatoes, etc)	vegetables (cabbages, tomatoes, rape, onions)						
20. Changes in crops grown (into what & when) & reason for new crops or switching		na							
21. Indicate how many croppings per year (1, 2, or 3)		2 - 3	2 - 3						
22. Increase in production (in kg/ha) due to technology (including amount used for own consumption & amount sold to market)	produce is mostly for the local market and/or nearby towns	not assesed	not determined						
22. Increase in revenues (in local currency) due to technology (less amount used for own consumption)	A farmer can realise M30 000 per annum.	Drip kits are promoted for household nutrition and little or no produce is sold at the market.	not clear						
23. Estimated & actual financial profits (gross revenues-costs of all cash inputs)	no proper accounts are kept, so not easy to determine actual profit.	na							
b. Old water management technology or practice (prepare an enterprise budget) LEAVE OUT QUESTION 24-29 IF NO OLD TECHNOLOGY WAS REPLACED	Dry land farming	na							
24. What is the estimated and actual life of the technology? (in years)		It was difficult to ascertain costs of the system in Lesotho. The main promoter of the system, World Vision, orders bulk kits with other humanitarian aid materials which makes it difficulty for them to determine the cost of individual kits.	The system costs between USD200 and USD370 for irrigation areas of 0.6 to 1.8 ha per pump in Lesotho. Operation costs are minimal.						
25. What is the capital cost of technology?	FAO estimates that the costs of running such as system in Lesotho excluding main line and storage reservoirs (if needed) is between USD1 950 to USD 2 750 per ha.	na	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.A61)	Estimated at M 10 080 per hectare per month.	na							
27. Crops produced (indicate main crops vs. secondary crops)		na	na						
28. Indicate how many croppings per year (1, 2, or 3)	2 - 3	na							
29. Estimated & actual financial profits (gross revenues-costs of all cash inputs)	Not clear	na	na						

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III. ROLE OF INSTITUTIONS/ORGANIZATIONS									
30. Support by NGOs (specify the NGO & indicate if international or local)		World Vision	World Vision (international)						
30.1 Indicate the total value of the support (in Dollars or local currency)		Not provided							
30.2 Is the support still on-going or withdrawn? (1. Ongoing; 2. Withdrawn)		On going	No						
30.3 If the institutional support is withdrawn, is the system still functioning?		N/A	Was not taken up on a large scale						
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? (1. Same pace; 2. Better pace; 3. Slowed down)		N/A	No						
30.5 Give reasons for the response to 30.4		N/A	Was not promoted extensively in Lesotho						
31. Specific support provided[d]			Provision of drip kits and maintenace of the kits						
32. Support by government extension workers & other government agency (specify which agency & whether local or national government) (yes or no)		N/A	No						
32.1 Indicate the total value of the support (in Dollars or local currency)		N/A	N/A						
32.2 Is the support still on-going or withdrawn? (1. Ongoing; 2. Withdrawn)		N/A	N/A						
32.3 If the institutional support is withdrawn, is the system still functioning?		N/A	Only small perches of the community						
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? (1. Same pace; 2. Better pace; 3. Slowed down)		N/A	No						
32.5 Give reasons for the response to 32.4		N/A	The technology was not promoted on a massive scale in the country.						
33. Specific support provided[d]		N/A	Just the equipment. There hasn't been backup services provided.						
34. Support by private enterprises (specify enterprise)		No	No						
35. Specific support provided[d]		N/A	N/A						
36. Support by other organization (specify organization - e.g. community organization) or private sector service provider (e.g. manufacturers/dealers/retailers)		N/A	No						
36.1 Indicate the total value of the support (in Dollars or local currency)		N/A	N/A						
36.2 Is the support still on-going or withdrawn? (1. Ongoing; 2. Withdrawn)		N/A	N/A						
36.3 If the institutional support is withdrawn, is the system still functioning?		N/A	N/A						

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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 institutional support? (1. Same pace; 2. Better pace; 3. Slowed down)		N/A	N/A						
36.5 Give reasons for the response to 36.4		N/A	N/A						
37. Specific support provided[d]		N/A	N/A						
IV. FACTORS CONTRIBUTING TO PROFITABILITY & SUSTAINABILITY OF TECHNOLOGY (see Annex 3 for sample answers #40-45)									
38. Ease in implementation (Yes & No)	Yes	Yes	Yes						
39. Ease in O&M (Yes & No)	Yes	NGO is providing this service	No						
40. Suitability of technology/How adapted to local conditions (well, not so well, etc.)	The system is suitable in areas were heads of 5 m to 20 m can easily be achieved. The system is ideal for the highlands and foothills of Lesotho.	The technology is suitable for much of Lesotho and can be used by all socio-economic groups. Rainfall is not a constraint in the country and the system can be used for much of the year. During the dry months groundwater supplies can augment the harvested rainfall.	The treadle pump technology is ideal for the rural poor communities, but has not been widely distributed in Lesotho.						
41. Cultural acceptability	The system has been well received by the communities that have used it.	It is reported that the communities have no objections to the technology	As yet no major complaints have been received in Lesotho about the treadle pump.						
42. Effectiveness	The system has been highly effective in the schemes where it has been used	The drip kits are a relatively recent phenomenon in Lesotho such that their effectiveness cannot be conclusively stated.	Treadle pump technology is not well established in Lesotho and its efficacy is still to be evaluated						
42. Environmental impact	The system does not require alterations to topography and the water used for irrigation is released back to the river channel from which it was abstracted.	Drip kits result in less water being used for irrigation thus more water is available for the environment.	not evaluated yet						
43. Other advantages (factors contributing to profitability & Suitability)	The system does not require energy to run and it can easily be adopted for the terrain in the highlands and foothills of Lesotho. There are also numerous springs in these areas of Lesotho and spring water can be harnessed for the gravity fed sprinkler irrigation systems with the added advantage that spring water has very low turbidity.	The observable advantage is that rainfall is harvested and used productively and that no energy is needed for watering gardens. As nutrition vegetables are grown at the household level food security and health is supported.	Treadle pumps are mostly used for irrigation of small vegetable gardens thereby improving food security and nutrition. The second advantage is that no energy source is required. Children can use it as a game and still meet the irrigation objective.						

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44. Other disadvantages (factors constraining profitability & sustainability-- e.g. lack of specific support services or supplies of specific inputs, etc.-- be very specific)	The required pressure for efficient irrigation is not always met. Compared to drag-line systems and drip kits, the gravity fed system has a longer design life. This gives farmers a more sustainable income source as well allow investors to recover their investment costs.	The gutter and collector tanks significantly increase the installation costs of the system.	The command area for a single pump is limited and the operational head for the pump may not exceed 10 m. the human energy requirement is also high and most users complain that the use of the pump is very tiring for a single individual.						

KEY:

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[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/remittances, or without access to land and resources at all 2: poor; 3: non-poor; 4:

[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: formation of association (specify: water user assoc., producers association,