Annex 2
Method for assessing investment potential

This annex describes the method used to assess the potential for investments in SSA. It also shows the potential outcomes, in table form, by livelihood zone and type of intervention. In order to determine priority for action in the different livelihoods zones, the method utilized the following three criteria:

- prevalence of poverty;
- water as a limiting factor for rural livelihoods;
- potential for water intervention.

The steps used in order to generate the assessment are described as follows.

Step 1: quantifying priorities according to the three criteria

This entailed a quantification of the three priority levels (low, moderate and high) for the criteria used in the analysis (above). Coefficients were applied to represent these three levels as a percentage of possible interventions for the criteria related to water as a limiting factor and poverty incidence: 100, 50 and 15 percent. The criterion relating to potential for intervention was based on population, land and water data (Table A2.1).

Step 2: assessing unit costs by type of intervention

Costs have been assessed on the basis of data available at FAO from a large number of invest-

Table A2.1 Weighting factor for priority for action by livelihood zone			
Livelihood zone	Poverty incidence	Water as limiting factor	Potential for water interventions
Arid	15	100	
Pastoral	100	100	
Agropastoral	100	100	
Cereal–based	100	100	
Cereal–root crop	100	100	
Root–crop–based	50	15	Based on population, land and water data
Highland Temperate	100	75	
Highland Perennial	50	50	
Tree crop	15	15	
Forest–based	50	15	
Large Commercial and Smallholder	15	100	
Rice–tree crop	50	15	
Coastal Artisanal Fishing	15	15	

Table A2.2 Unit costs (US$/unit)						
Manage soil moisture in rainfed areas (ha)	Invest in small-scale water harvesting infrastructure (Mm³)	Promote small-scale community-based irrigation (ha)	Improve existing irrigation systems (ha)	Improve water control for peri-urban producers (ha)	Invest in water for livestock production (head)	Facilitate multiple use of water (household)
75	1 000 000	4 250	2 000	3 000	30	75

ment projects in the region. In view of the wide range of possible interventions and associated costs, such an assessment can only be viewed as a very rough estimate of such a potential for action and associated costs. Unit costs related to irrigation and land improvement are relatively well known. Costs of multiple-use systems have been assessed on the basis of a recent study (Renwick *et al.*, 2007), considering one system per household. The two types of interventions for which unit cost estimates are most difficult are those related to livestock watering and small-scale water harvesting infrastructures. For water harvesting, the costs associated with the range of possible technical options makes any assessment of an "average" cost very difficult. In order to be able to compare the different technologies, water harvesting interventions were expressed per unit of volume stored. A value of US$1/m³ was chosen. Table A2.2 shows the unit costs selected for this assessment. In view of the uncertainty associated with these costs, no attempt was made to differentiate between the livelihoods zones.

Step 3: assessment of the "absolute" potential for interventions by livelihood zone

The absolute potential for each intervention by livelihood zone represents the maximum possible extent of each type of intervention in each zone, irrespective of the role of water as a limiting factor and of the incidence of poverty in the area. The results are presented in Table A2.3. The potential was assessed on the basis of demographic and natural resources as follows:

- Manage soil moisture in rainfed areas: Extent of rainfed cultivated land in the zone (unit: ha).
- Small-scale water harvesting: the lower of the following two: (i) 80 percent of local runoff (considering a 20 percent "environmental" flow); or (ii) 30 percent of the rainfed cultivated land multiplied by 1 000 m³/ha (unit: million m³).
- Small-scale community-based irrigation: the lower of the following two: (i) current extent of small-scale irrigation (i.e. this would correspond to a doubling of existing small-scale irrigation infrastructure); or (ii) the difference between potential irrigation and actual irrigation (unit: ha).
- Improve existing irrigation systems: 50 percent of existing irrigation.
- Water control for peri-urban producers: 0.008 ha per inhabitant in urban areas, based on assessment made in Ghana (unit: ha).
- Water for livestock production: number of livestock (cattle) in the livelihood zone (unit: head).
- Multiple use of water: number of rural households in the zone, with an estimated 5 persons per household (unit: household).

Step 4: assessment of the intervention potential

The intervention potential was calculated by applying the coefficients of Table A2.1 to each combination of intervention and livelihood zone. The coefficients were modified for poverty incidence in three cases. In the cases of irrigation improvement and peri-urban producers, no

Table A2.3 Absolute potential

Livelihood zone	Manage soil moisture in rainfed areas (ha)	Invest in small-scale water harvesting infrastructure (Mm³)	Promote small-scale community-based irrigation (ha)	Improve existing irrigation systems (ha)	Improve water control for peri-urban producers (ha)	Invest in water for livestock production (head)	Facilitate multiple use of water (household)
Arid	765 135	230	200 000	389 793	62 606	8 368 400	1 668 478
Pastoral	8 948 023	2 684	500 000	601 019	113 497	24 223 700	5 448 920
Agropastoral	41 547 366	12 464	600 000	458 437	234 625	35 174 400	7 686 340
Cereal–based	35 413 458	10 624	499 407	312 130	322 533	24 497 200	13 180 280
Cereal–root crop	51 176 547	15 353	358 122	223 826	249 844	38 576 100	13 588 440
Root–crop–based	28 619 812	8 586	149 226	93 267	222 446	16 240 100	9 742 340
Highland Temperate	10 101 891	3 031	138 838	86 774	123 970	12 377 500	6 006 700
Highland Perennial	7 026 607	2 108	43 088	26 930	107 556	6 254 820	6 551 020
Tree crop	13 567 324	4 070	92 743	57 965	189 631	4 186 170	5 924 960
Forest–based	10 915 013	3 275	73 212	45 758	147 982	3 327 710	5 834 060
Large Commercial and Smallholder	13 849 601	4 155	0	709 010	118 778	12 833 100	4 087 820
Rice–tree crop	2 007 666	602	86 686	346 763	30 521	1 153 460	1 610 470
Coastal Artisanal Fishing	3 257 752	977	298 859	186 787	206 410	1 967 010	3 111 620
Total	227 196 195	68 159	3 040 181	3 538 456	2 130 401	189 179 670	84 441 448

Table A2.4 Number of people reached per unit

Livelihood zone	Manage soil moisture in rainfed areas (person/ha)	Invest in small-scale water harvesting infrastructure (Mm³)	Promote small-scale community-based irrigation (ha)	Improve existing irrigation systems (ha)	Improve water control for peri-urban producers (ha)	Invest in water for livestock production (head)	Facilitate multiple use of water (household)
Arid	0.54	540	10	10	10	0.90	5
Pastoral	0.27	268	10	10	10	1.01	5
Agropastoral	0.45	452	10	10	10	0.87	5
Cereal–based	1.46	1462	10	10	10	1.35	5
Cereal–root crop	1.05	1052	10	10	10	0.88	5
Root–crop–based	1.35	1352	10	10	10	1.20	5
Highland Temperate	2.34	2338	10	10	10	0.97	5
Highland Perennial	3.70	3700	10	10	10	2.09	5
Tree crop	1.73	1732	10	10	10	2.83	5
Forest–based	1.86	1855	10	10	10	3.51	5
Large Commercial and Smallholder	0.94	937	10	10	10	0.80	5
Rice–tree crop	2.38	2384	10	10	10	2.79	5
Coastal Artisanal Fishing	2.14	2142	10	10	10	3.16	5

reduction coefficient was applied. In the case of multiple-use systems, it was estimated that the need for multiple-use systems could never be more than 90 percent of the households.

Step 5: assessing the number of people reached for each intervention

For soil moisture management and small-scale water harvesting, the number of persons per hectare and per 1 000 m3 of water respectively was estimated by multiplying the number of rural people in the zone by a coefficient representing the number of crop farmers, and dividing by the rainfed cultivated area in the zone. For small-scale irrigation, improvement in irrigated systems and peri-urban producers, the area was multiplied by the average number of farmers per hectare (estimated at 10 farmers per hectare). Livestock was calculated by dividing the number of head by the rural population, and multiplying by a coefficient representing the percentage of households having animals. Multiple-use systems were calculated considering 5 persons per household. These figures are summarized in Table A2.4.

Step 6: calculating investment costs

The investment costs were calculated by multiplying the relevant intervention figures of the livelihood zones by the unit costs of Table A2.2.