DESIRE REPORT series

List of locally applied and potential strategies from all study sites

(WP 3.1 Identify existing and potential strategies)

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DESIRE

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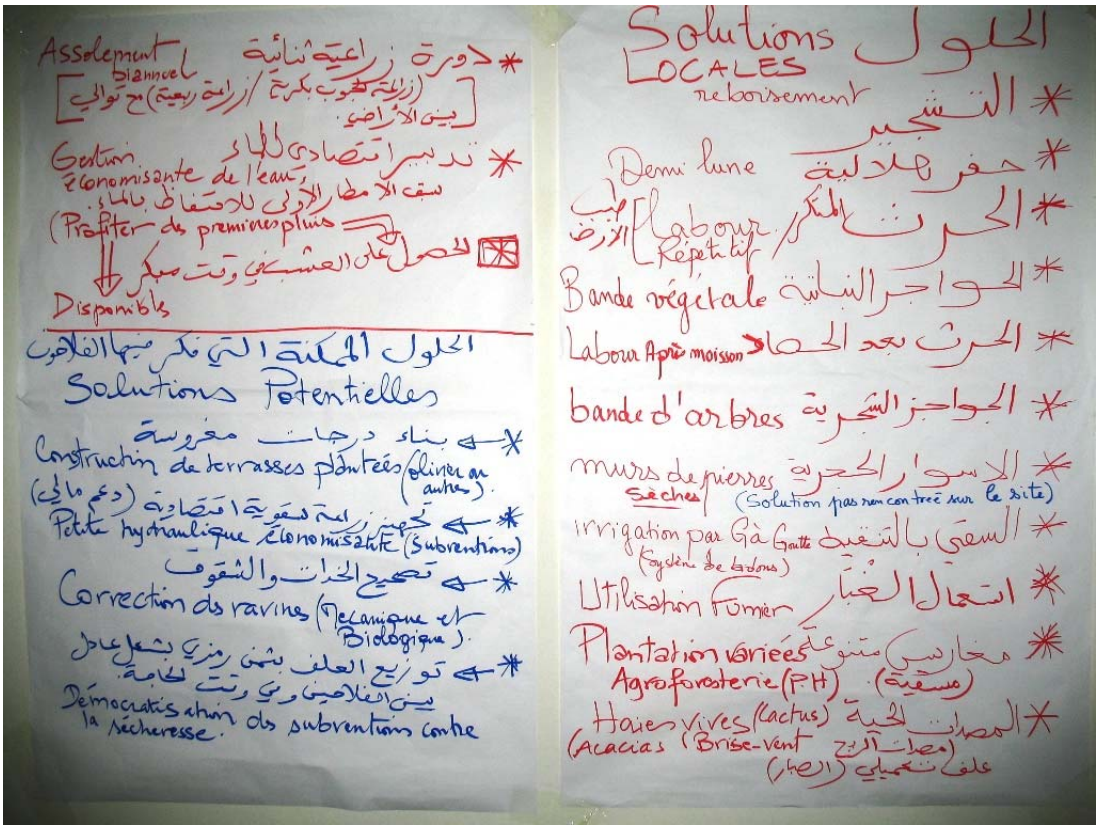

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Photo front cover: list of locally applied and potential solutions as elaborated during the stakeholder workshop in Morocco (Photo Gudrun Schwilch)

Background and methodology

The basis for a successful implementation of a remediation strategy is the knowledge about already applied strategies in the study sites. Successful prevention and mitigation strategies consist of technical measures combined with the framework of their implementation (the implementation approach). To identify such existing strategies as well as ideas of potential strategies in a participatory manner, a stakeholder workshop methodology was specifically designed within DESIRE (see DESIRE report No. 6: “Guidelines for WB3 Part I: Stakeholder Workshop 1 - Identification of existing and potential prevention and mitigation strategies.”). It builds on the assumption that the key to success lies in a concerted effort by all concerned stakeholders. Prevention and mitigation strategies already applied at the respective DESIRE study site are identified and listed during this workshop together with representatives of different stakeholders groups (land users, policy makers, researchers). The participatory and process-oriented approach initiates a mutual learning process among the different stakeholders by sharing knowledge and jointly reflecting on current problems and solutions related to land degradation and desertification.

Researchers and moderators of the DESIRE study sites were trained in this methodology (see DESIRE training report No. 5: “DESIRE WB3 Training Workshop: Training of study site facilitators to conduct first stakeholder workshops and the thereafter assessment of conservation strategies. 1-5 October 2007, Murcia, Spain”) and then conducted first stakeholder workshops in their own site.

The objectives of this 3-5 day workshop are: (1) To initiate a mutual learning process by sharing experience and jointly reflecting on current and potential problems and solutions related to land degradation and desertification. (2) To create a common understanding of problems, potentials and opportunities by integrating external and internal perceptions. (3) To strengthen trust and collaboration among concerned stakeholders. (4) To identify existing and new strategies to prevent or mitigate land degradation and desertification. (5) To select a set of these identified strategies for further evaluation and documentation in the next step.

The workshop is built on a series of 9 exercises, each with its own objectives, methods, procedure and expected results. The first two exercises focus on the identification of land degradation and desertification processes and their causes and impacts as well as on local sustainable land management practices. This is done with the help of photographs of local degradation and conservation, taking account of the water and biomass cycles, and with a transect walk. Exercise 3 develops a list of indicators used by local land users to recognize land degradation processes and land conservation respectively. Exercise 4 focuses on the identification of relevant stakeholders and their influence and motivation concerning sustainable land management. Exercises 5 and 6 serve as wrap-up and introduction for the external participants (see below). In Exercise 7 currently applied and potential solutions to confirmed land degradation problems are identified and quickly assessed. All these exercises constitute contributions to the development of a coherent strategy for sustainable land management in the given local context, which is the topic of Exercise 8. The workshop is closed with an evaluation (Exercise 9). The lists presented in this report are mainly taken from the outcome of exercise 7.

Identifying land degradation and conservation measures with the help of photographs and the water and biomass cycles (Photos G. Schwilch)

Learning together in the local context and selecting promising technologies and approaches for further assessment. (Photo G. Schwilch)

The stakeholder workshop addresses the following target groups: a) local stakeholders (land users, representatives of local authorities, local NGOs, etc.) who live in the specific rural environment (local participants), and b) external stakeholders, i.e. researchers and development professionals (from NGOs, GOs etc.) with different degrees of professional expertise on environmental and development issues (external participants). The duration of the stakeholder workshop is at least 3 days. During the 1st and 2nd day the focus is on local perspectives and the local context; mainly local stakeholders attend the meetings. On the 3rd day, external stakeholders join the group, and bring in their perspectives and experience, especially emphasizing the broader context, i.e. with a focus on the regional level and regional and national framework conditions.

An important outcome of these learning–action processes is that local people become aware of the rich and vast knowledge they can tap and the fact that they already have many solutions in sustainable land management. Linking scientific and local knowledge makes it possible to derive a range of alternative options, including current practices and new or non-local measures, both of which require further assessment.

Supporting material / references

- First stakeholder workshop reports from all (most) study sites
- DESIRE report No. 6: “Guidelines for WB3 Part I: Stakeholder Workshop 1 - Identification of existing and potential prevention and mitigation strategies.”
- DESIRE report No. 5: “DESIRE WB3 Training Workshop: Training of study site facilitators to conduct first stakeholder workshops and the thereafter assessment of conservation strategies. 1-5 October 2007, Murcia, Spain”

Brief synthesis

Analysing the single workshop reports reveals that in almost all study sites it was possible to identify promising land conservation practices for further assessment and to establish a good basis for participative stakeholder cooperation. Such a first assessment of SLM measures conducted by local and external stakeholders gives already a clear understanding of the importance and benefit of the various measures. In 3 study sites the list was compiled by researchers only (Crete and Nestos Basin, Greece; Rendina Basin, Italy).
From a total of 60 priority measures of all study sites, 39 are already applied solutions, whereas 21 are potential solutions. It is noticeable that in some study sites, all promising measures are already applied and in others all are potential only. Among the first group (all applied) are the study sites of Portugal, Nestos Basin Greece, Crete Greece, Morocco, Tunisia and China, and among the second group (all potential) Djanybek Russia and Chile. Whether this corresponds to countries with a tradition in soil and water conservation or not is non conclusive.
Looking at the type of measures results in 19 agronomic, 10 vegetative, 23 structural and 25 management measures, whereas in 17 cases two types of measures are combined. Some conservation technologies are mentioned in several study sites, such as drip irrigation which is mentioned in both Russian, both Turkish and the Crete Greece study sites, but being applied so far in Konya Karapinar (Turkey) and Crete (Greece) only. Other measure can also be grouped into similar categories, as presented in the table below. The table serves as first overview of the identified measures.

Category / group	**Applied and potential measures identified at DESIRE study sites**
Conservation agriculture	• minimum and/or correct tillage • no tillage • no till land management practice • nets spread on the soil surface in combination with no tillage
Ploughing management	• contour ploughing • deep ploughing (soil internal drainage improvement) • subsoiling
Intercropping	• interplanting • ley farming system
Rotational system	• crop rotation • rotation of annual cultivations • rotational fodder cultivation
Terraces	• terraces and vegetation strips • building terraced field • land terracing
Eco-agriculture	• shift to ecological agriculture/high quality products • integration of agricultural and ecological systems
Soil / nutrient management	• green manure • liquid manure -> biogas -> fertilizer • gypsum addition
Vegetative strips / cover	• strip cropping • green cover in vineyard • land phyto reclamation (sudan grass) • licorice (Glycyrrhiza) cultivation
Agroforestry	• fruit tree plantation along the contour separated by strips of crops

Forest protection	• implementation of a Forest Intervention Area (ZIF) • prescribed burning • primary tracks
Afforestation	• reforestation • assisted cork oak plantation • planting trees • tree planting
Livestock management	• improvement of animal production • game ranching
Pasture management	• controlled grazing in deciduous woods alternate to grazing rangeland and pasture • grazing control • rangeland resting « tegdeel » • closure against grazing • fodder crops production
Drainage and irrigation technologies	• drainage system maintenance (groundwater level control) • drainage • irrigation technologies • freshwater transport
Drip irrigation	• drip irrigation • drip irrigation • drip irrigation • drip irrigation • drip irrigation
Rainwater harvesting	• jessour and tabias • rainwater harvesting • cisterns • water-proofing
Flood management	• spillway Massraf « Jebed » • recharge units and flood spreading
Dams	• building dam • Longueira dam construction
Energy management	• biogas use as energy source
More general and socio-economic strategies	• slopes and riverbed protection • training & sensitization • institutional and legal capacity strengthening

The table indicates that there is a high variety of measures represented. This variety is also reflecting the diversity of degradation and desertification problems prevalent in the study sites. Most of the identified measures are on cropland (66%), 16% are on grazing land and 5% on forest land. The rest is on a combination of two of these land use types. Limiting factors are often costs, education or technical constraints, whereas the perception of these limiting factors is mostly similar between local and external stakeholders. In many study sites it got clear that the land users need support from the government in one or the other way to combat land degradation and desertification, such as direct financial support or training. The similarity or agreement between local and external stakeholders applies also for the assessed potential of the identified measures in the local context.
More analysis on the first stakeholder workshop reports will be done in the planned synthesis report (deliverable 3.1.2).

Introduction to lists of strategies

The lists presented in this report are taken from the first stakeholder workshop reports of all the study sites. In a first table, the most important or most promising ones, as identified by the stakeholders, are listed. These are mostly the ones which will be further assessed and documented with the WOCAT questionnaires in work package 3.2.
Additionally, the first rough assessment made during the workshop by local and external stakeholders is presented for each study site. The tables were taken as such from the workshop reports, without further editing. They are based on a template format provided to the study sites.

Template format for assessment of strategies within stakeholder workshop:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		

Legend:
ST = short-term LT = long-term
Labour and costs: very low, low, medium, high, very high
Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium), **-** (slightly negative), **--** (negative), **---** (very negative)

Most of the study sites used exactly this format, with a few exceptions such as Spain, where slight adaptations were made during the stakeholder workshop. In quite a number of study sites the assessment was not made in separate groups of local and external stakeholders as foreseen, but by both groups together (5 sites) or by the researchers only (2 sites).

Guadalentin Basin, Murcia, Spain

Main desertification / degradation problem: drought, soil erosion by water

List of identified solutions in order of importance / potential

Applied /potential	Name	Description / remarks
applied	Minimum and/or correct tillage	Reduced contour tillage
potential	Integration of agricultural and ecological systems	Development of `mosaic landscapes' with alternating zones of natural vegetation and agricultural fields.
potential	Terraces and vegetation strips	A measure pushed and subsidised by the EU. Here is some acceptance of this measure by farmers but also a strong concern and lack of confidence that vegetation of vegetation strips will germinate and maintain under the dry climatic conditions.
applied	Shift to ecological agriculture/high quality products	This is a measure widely commented and promoted by one of the present agricultural cooperatives. However, there is some lack of confidence in this type of agriculture by some of the farmers.
potential	Liquid manure -> biogas -> fertilizer	It is intended to convert liquid manure into fertilizer through a process where under anaerobic fermentation methane gas is produced and a non contaminating fertilizer.
potential	Organic mulch	This is a measure proposed by the 3 groups and a technique known by the farmers.
applied	Selection of species economically and agronomically adapted to the region.	A measure proposed by several technicians of the administration although farmers state that they are doing this already.
applied	Water harvesting structures	Intend to construct or re-construct existing water harvesting structures (e.g. boqueras). Also possibly apply measures of water harvesting used in other areas.
applied	Naturally formed graded terraces	A measure that is presently applied by some of the farmers and consists of the 'natural' generation of terraces by ploughing always in the same direction. This will accumulate soil in a line and create a terrace. Considered generally as very efficient and economic.
potential	Rationalize crop rotations with livestock	

Assessment made by **local and external stakeholders** in Guadalentin Basin, Spain:

Technique (conservation measure)	**Costs**		**Labour**		**Impact/ effectiveness**				**Limiting factors**	**Potential in the local context**	**Who are applying this measure already?**	**What is needed for a wider implementation?**
					Economic		**Ecologic**					
	Initial	**Maintenance**	**Initial**	**Maintenance**	**ST**	**LT**	**ST**	**LT**				
Minimum and/or correct tillage	+	+	-	+	-	+	-	+	Education and awareness	high	Widely applied	Information and promotion
Min. and/or correct tillage wo ody	+	++	0	0	+	++	+	++	Precipitation, low productive and heavy soils	0	Professional farmers	Demonstration
Organic mulch	--	-	--	-	-	+	+	++	Economic material	++	Nobody	Demonstration and economic help.
Rationalize crop rotations with livestock	-	0	-	0	-	+	+	++	Acceptance by the farmer. Information.	++	Nobody	Sensibilisation and demonstation plants
Shift to ecological agriculture / high quality products	-	0	0	0	-	+	+	++	Neighbours, high initial cost, product valuing, commercialisation	++	Increasing	Enhance the commercialisation network, concentration of market offer
Selection of species economically + agronom. adapted to the region	0	+	-	-	-	+	-	+	Economic, for small farmers	Important	Few people	Information, demonstration of what works, subsidies
Terraces and vegetation strips	-	0	-	0	++	++	++	++	Cost, Mechanisation	Important	?	Information and subsidies
Terraces and vegetation strips *	150/300 €	100/200 € ha^{-1}	+	0	+	++	+	++	Drought – soil	Yes	Nobody	Help (subsidies)
Water harvesting structures **	++	0-	++	0-	+	-	-	+	Drought - soil	yes	Nobody	Help (subsidies)

* Erosion control and maintenance of biodiversity (flora y fauna).
** Re-vegetation of small agricultural zones with shrub and/or areas for water harvesting.

ST: Short Term; **LT**: Long term
Valuation: **++** (very positive) **+** (positive) **0** (neutral) **-** (Negative) **- -** (very negative)

Mação and Góis, Portugal

Main desertification / degradation problem: forest fire

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Implementation of a Forest Intervention Area (ZIF)	Management plan
applied	Prescribed burning	On agro-forest land. So far only sporadic initiatives.
applied	Primary Tracks	Segmentation of landscape by implementation of different networks of tracks.


a)


b)


c)


d)


e)

Some of the solutions already applied – a) Agriculture (good practices); b) Grazing; c) Forest tracks; d; Prescribed burning; e) Water tank (Photos University of Coimbra)

Assessment made by **local and external stakeholders** in Mação and Góis, Portugal:

Technology /approach	**Already applied or potential solution?**	**On land use type**	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**			**Limiting factors / constraints**	**Overall assessment** of the potential for the local context
					economic	ecological	sociocult.		
					ST LT	ST LT	ST LT		
Implementation of a Forest Intervention Area (ZIF): Management plan	Being implemented	Forest and grazing land	High	High	- / +	+ / ++	++ / ++	- Lack of human resources - Property structure - Low associativism - Seasonal activities - Environmental impacts (chemical use)	+++
-Production area			High	Very High	-- / ++	+ / ++	++ / ++		
-Conservation area			Low / Medium	High / Very high	-- / --	++ / ++	++ / ++		
-Protection area			Low / Medium	High / Very high	-- / --	++ / ++	++ / ++		
-Recreational area			Medium	Low	+ / +	+ / +	++ / ++		
-Landscape area			Medium	Low	+ / +	+ / +	++ / ++		
Valorisation of traditional goods of differential quality	Only small and sporadically initiatives.	Crop land	Very High	Very High	-- / +	+ / +	++ / ++	- Geomorphology - Property structure - Lack of active population/ ageing	+++
Improv. of pastures	Potential solution								
Improvement of the traditional irrigation systems	Only small and sporadically initiatives.								
Valorisation of olive and citrus crops	Only small and sporadically initiat.								
Measures to attract and settle active population	Already applied, but only small and sporadically initiatives.	Agro-forest land	Very High	Very High	0 / +	0 / +	0 / +	- Financial constraints - Lack of conditions to invest	+++
Investment on training and capacity building			High	Very high	0 / +	0 / +	0 / +		
Prescribed burning	Already applied, but only sporadically initiatives.	Agro-forest land	Medium / Very low	Medium / Very low	+++ / ++	++ / +++	++ / +++	- Climate conditions - Property dimension and land tenure - Technical capacity - Civil responsibility	+++
Primary Tracks	Being implemented	Agro-forest land	Very High / High	Very High / High	+++ / ++	+++ / +++	+++ / +++	- Area dimension - Land tenure - Meteo. conditions	+++
Secondary and tertiary tracks	Being implemented	Agro-forest land	Very High / High	Very High / High	+++ / ++	+++ / +++	+++ / +++	- Area dimension - Land tenure - Meteo. conditions	+++
Water net	Being implemented	Agro-forest land	Medium / Very Low	High / Low	+++ / +++	+++ / +++	+++ / +++	- Land tenure	+++

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Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium), **-** (slightly negative), **--** (negative), **---** (very negative)

Rendina Basin, Basilicata, Italy

Main desertification / degradation problem: soil erosion by water

Due to various reasons no stakeholder workshop was conducted in the Rendina Basin in Italy. Only one locally applied conservation strategy could be found by the researchers. A search in the WOCAT database revealed one potential strategy.

Applied /potential	Name	Description / remarks
applied	Controlled grazing in deciduous woods alternate to grazing rangeland and pasture	Controlled grazing of cattle (Cows PODOLICA race) or goats/sheep. This grazing is sometime alternated with grazing in the pasture.
potential	Green cover in vineyards	Some potential due to widespread and high value production of wine in the area

Crete, Greece

Main desertification / degradation problem: soil erosion by water, overgrazing, water stress

The study site team responsible for Crete has not followed the methodology suggested by DESIRE WB3, but they conducted a one-day public participation meeting. The outcome was a list of most important degradation factors as voted by the participants.

List of main solutions as defined by research team:

Applied /potential	**Name**	**Description / remarks**
applied	No tillage land management practice	Established in Chania 30 years ago by the collaboration of national specialists and land users. Disking once every four to five years to destroy perennial vegetation and incorporate fertilizers and plant residues to the soil.
applied	Drip irrigation	Drip or trickle irrigation achieves very high irrigation efficiency. Especially suitable for watering trees or other large plants keeping strips among trees dry. Plastic tubes of 12 to 32 mm in diameter lying either on or just below the soil surface and applying the water through small holes in the line or through emitter nozzles.
applied	Nets spread on the soil surface in combination with no tillage	Combines no tillage operations and the cover of the ground with plastic nets, due to the need to overcome obstacles to the collection of olive fruits.
applied	Land terracing	Bench terrace are constructed in two different ways: carrying soil from the uphill side so that benches are formed by using a bulldozer, or alternatively, terraces are built by using stones and filled by earth transported from nearby.

Nestos Basin, Maggana, Greece

Main desertification / degradation problem: salinisation

The research team responsible for the Nestos Basin study site did not use the exact methodology (especially the exercises) as proposed by DESIRE WB3.
In this workshop, which was the introduction to the DESIRE project, they focused on the current status of soil and water quality (based on the research results) and traditional methods for soil reclamation.

Reclamation strategies are either absent or lack scientific background. Farmers use saline groundwater for several years resulting in excessive degradation of soil quality. Methods regarding soil improvement in the hotspot area include:

Applied /potential	**Name**	**Description / remarks**
applied	Use of freshwater	For this reason farmers pump water from adjacent streams and transport it several Km through private network. Local authorities permits farmers to use surface water for irrigation but does not allow to open new well especially in the area where excessive deterioration of water quality occurs.
applied	Soil internal drainage	Several farmers apply deep tillage for drainage improvement. However, this is accomplished without scientific support and as a consequence an undesirable hardpan layers is formed again.
applied	Drainage improvement	The local authorities often perform maintenance works for the surface drainage systems of the area, including digging and weed removal.
applied	Use of gypsum	Farmers use gypsum to improve soil salinity problems. The application lacks scientific background and verification.
applied	Use of pressmud	Has been applied in the past for soil improvement but proved not to be adequate for alkaline soils.
applied	Use of winter rainfall	Winter rainfall is used as a management tool to temporary improve surface soil quality for the proceeding cultivation period. However, the use of saline water during the season enhances soil degradation problems. Winter rainfall can be managed in addition with gypsum application.
applied	Seeding placement	The placement of seeds is especially important since salts accumulated in the ridge area.

Assessment made by local research team in Nestos Basin, Greece

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Freshwater irrigation	Applied in limited area adjacent streams	Crop land	Medium	High	++	++	+	+	++	++	Network construction, pumping station installation, operation (fuel) and maintenance	+++
Gypsum application	Applied by individual farmers	Crop land	Low	High	++	++	-	++	++	++	Gypsum costs (purchase and transport), spreading equipment	++
Pressmud application	Applied by individual farmers	Crop land	Low	Low	0	0	+	+	0	0	Pressmud transport and spreading	0
Winter crops	Already applied	Crop land	Low	Low	+	+	0	0	0	0	Low income for the farmers	+
Drainage improvement	Already applied	Crop land	High	High	+	++	+	+	+	+	Labor, equipment costs, digging, weed removal	+++
Internal drainage improvement	Applied by individual farmers	Crop land	Low	Low	++	++	+	+	+	+	Deep ploughing equipment	++
Seed placement	Applied by individual farmers	Crop land	Low	Low	+	+	0	0	0	0	n/a	++

Legend:
ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium),
- (slightly negative), **--** (negative), **---** (very negative)

Konya Karapinar Plain, Turkey

Main desertification / degradation problem: soil erosion by wind

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
potential	Strip cropping	Strip cropping perpendicular to dominant wind direction. Determination of space in-between and suitable crop types.
potential	Grazing control	Controlling grazing on pasture area and improving grassland by protecting the pasture with fencing, education of farmers, foundation of local guarding assemblies
applied	Reforestation	Reforestation against wind direction
applied	Drip irrigation	Scarcely applied

Stakeholders in Karapinar sharing their knowledge about local land degradation and conservation with the help of photographs. (Photo Sanem Açıkalın)

Assessment made by **local stakeholders** in Karapinar, Turkey:

Technology / approach	**Already applied or potential solution ?**	**On land use type** (e.g. crop land / grazing land, etc.	**Labour** required (initial + maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		Socio-cultural			
					ST	LT	ST	LT	ST	LT		
Reforestration against wind direction	Already scarcely applied	Crop land	Low	low	+	+++	+	+++	+	+++	Low precipitation / high evaporation, lack of socio-cultural inheritance	Very positive
Strip cropping	Potential	Crop land	Low	Medium	++	++	+	+	0	0	Small sizes of cropland causes difficulties in agricultural activities (i.e. tillage, cropping, etc.)	Positive
Contour cultivation against wind direction	Already scarcely applied	Crop land	Low	Low	++	++	0	0	0	0	In the case of narrow fields parallel to wind direction, increase in fuel consumption during tillage	Slightly positive
Mulching	Potential	Crop land	Low	Low	++	++	++	++	+	+	Very weak plant cover, use of probable mulch for fodder purpose	Slightly positive
Drip irrigation	Scarcely applied or potential	Crop land	Low	Very high	+++	+++	+++	+++	+++	+++	High initial maintenance costs, use for only limited number of crops	Very positive
Grazing control	Potential	Grazing land	Low	Medium	++	+++	+++	+++	++	+++	Lack of legislative and management directives	Positive
Rotational grazing	Scarcely applied	Grazing land	Low	Low	+	+++	++	+++	++	++	Need of extra-pay for men who guards rotation.	Positive

Legend: ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium),

- (slightly negative), **--** (negative), **---** (very negative)

Assessment made by **external stakeholders** in Karapinar, Turkey:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial + maintenance)	**Costs** (initial + maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		Socio-cultural			
					ST	LT	ST	LT	ST	LT		
Reforestration against wind direction	Already applied	Crop land (protected area), grazing land	high	high	+	+++	+	+++	++	+++	Initial and maintenance costs are high, lack of enough budget allocated to reforestation, lack of pupil education	Very positive
Strip cropping	Potential	Crop land	Low	Medium	++	++	+	+	0	0	Small size of croplands causes difficulties in agricultural activities (i.e. tillage, cropping etc.)	Positive
Contour cultivation against wind direction	Already scarcely applied	Crop land	Low	Low	++	++	0	0	0	0	In the case of narrow fields parallel to wind direction, increase in fuel consumptions during tillage	Slightly positive
Mulching	Potential	Crop land	Low	Low	++	++	++	++	+	+	Very weak plant cover, use of potential mulch for fodder purpose	Slightly positive
Drip irrigation	Scarcely applied or potential	Crop land	Low	Very high	+++	+++	+++	+++	+++	+++	High initial maintenance costs, use for only limited number of crops, lack of education about the advantages of technique	Very positive
Grazing control	Potential	Grazing	Low	Medium	++	+++	+++	+++	++	+++	Lack of legislative and management directives, need for extra-pay for man who guards rotation	Positive
No tillage	Potential	Crop land	Low	Low	+	++	+	++	+	+	Need of novel tillage machines	Positive

Legend: ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium),
- (slightly negative), **--** (negative), **---** (very negative)

Eskisehir Plain, Turkey

Main desertification / degradation problem: soil erosion by water

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Tree planting	legal constraint about the status of the land
applied	Crop rotation	
applied	Fodder crops production	
potential	Drip irrigation	

Working with the water and biomass cycle to identify causes and impacts of degradation as well as conservation (photo by Sanem Açıkalın)

Assessment made by **local stakeholders** in Eskisehir, Turkey:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		Socio-cultural			
					ST	LT	ST	LT	ST	LT		
Terracing	Potential	Agricultural	High	High	-	++	++	+++	0	+	Driving force, financial support	Positive
Mulching	Potential	Agricultural	Medium	High	+	++	+	+++	-	++	Availability of organic material	Positive
Improving grassland	Potential	Pasture	High	High	+	+++	++	+++	0	++	Driving force, financial support	Very positive
Tillage perpendicular to slope	Potential	Agricultural	Medium	High	-	++	+	+++	0	++	Appropriate machinery, financial support	Positive
Check dam	Potential	Natural	Very high	Very high	-	+	++	++	0	+	Driving force, financial support	Slightly positive
Tree planting	Partly already applied	Forest and Orchard	High	High	+	++	+	+++	+	+	For forestration legal constraints for land use type; providing seedling, water scarcity	Positive
Vegetation strips	Potential	Agricultural	High	High	+	+	++	++	0	0	None	Positive
Drip irrigation	Potential	Agricultural	Medium	Medium	-	++	++	++	+	+	Driving force, financial support	Positive
Crop rotation	Partly already applied	Agricultural	Medium	Medium	++	+++	+++	+++	0	0	Only can be used under irrigated conditions	Positive
Fodder Crops Production	Partly already applied	Agricultural	Medium	Medium	+	++	++	+++	0	0	Only can be applied by a part of the farmers (livestock producers)	Positive

Legend: ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium), **-** (slightly negative), **--** (negative), **---** (very negative)

Assessment made by **external stakeholders** in Eskisehir, Turkey:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		Socio-cultural			
					ST	LT	ST	LT	ST	LT		
Terracing	Potential	Agricultural	High	High	-	++	++	+++	0	+	Planning, labour, finance, maintenance	Positive
Improving grassland	Potential	Pasture	Medium	Medium	0	+++	++	+++	0	+	Responsibility for continual conservation	Positive
Tree planting	Partly already applied	Forest and Orchard	High	High	0	++	++	+++	+	+	Legal constraints for land use type, continual technical help	Positive
Drip irrigation	Potential	Agricultural	Medium	High	-	+++	++	+++	+	+	Introduction, teaching and convince the farmers for using the technology	Positive
Crop rotation	Partly already applied	Agricultural	Medium	Medium	++	+++	+++	+++	0	0	Only can be used under irrigated conditions	Positive
Fodder Crops Production	Partly already applied	Agricultural	Medium	Medium	+	++	++	+++	0	0	Only can be applied by a part of the farmers (livestock producers)	Positive

Legend: ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium),
- (slightly negative), **--** (negative), **---** (very negative)

Mamora / Sehoul, Morocco

Main desertification / degradation problem: increasing pressure due to urbanization nearby

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Assisted cork oak plantation	Forest management
applied	Rotational fodder cultivation	Degraded lands converted to pasture
applied	Rotation of annual cultivations	In rainfed annual agriculture
applied	Fruit tree plantation along the contour separated by strips of crops	Rainfed fruit trees in lines with strips of cereal or bean production

Fruit tree plantations and cactus opuntia fences (Photo Felicitas Bachmann)

Assessment made by **local stakeholders** in Sehoul, Morocco:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Fodder cultivation	PS	GL	low	low	+++	+++	+++	+++	+++	+++	Consumption of space normally devoted for grain production	Adapted to the context
Fruit Plantation	AP	Cropland	high	Very high	++	++	++	++	--	--	Cost, stop of breeding on the planted fields	Requires a high context and much efforts
Terraces	PS	Cropland	Very high	Very high	+	+++	+	+++	+	+	Cost, stop of breeding on the terraced fields	Non adapted to the context due to the lack of water
Medicinal plants	PS	GL	medium	medium	+	+++	++	+++	++	++	Protection of the pastures	Promising

Assessment made by **external stakeholders** in Sehoul, Morocco:

Technology / approach	**Already applied or potential solution?**	**On land use type (**e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Pastures improvement	PS	GL	Low	Low	+++	++	+++	+++	+++	+++	Space consumed	Well adapted for conservation
Small check dams	PS	GL and CL	Medium	Medium	++	++	++	++	--	--	Population resistance	Very efficient to conserve fields and pastures
Plantations	AP	Cropland	High	High	+	+++	-	+	++	++	Cost	Difficult to adapt for peasants with weak tradition for agriculture
Big check dams	PS	GL and CL	Very high	Very high	+	+	++	+++	+	+	Cost	Efficiency for the big dam on the Bouregreg river

Legend: ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium),

- (slightly negative), **--** (negative), **---** (very negative)

Zeuss-Koutine, Tunisia

Main desertification / degradation problem: competition for scarce water resources

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Jessour and tabias	Runoff water harvesting techniques
applied	Spillway Massraf « Jebed »	
applied	Rangeland resting « tegdeel »	
applied	Recharge units and flood spreading	With Gabions
applied	Cisterns	For rainfall collection
potential	Buried stone pockets “poche en pierres sèches”	For growing young plantations
applied	Plantations	Arboriculture plantations
applied	Contour stone ridges “Seuils en pierres sèches »	

Tabias in the piedmont area of Bhaira (70% of farmers practice this technique in the study site) (Photo IRA, Tunisia)

Assessment made by **local stakeholders** in Zeuss-Koutine, Tunisia

Technology/approach	**Already applied (AA) or potential solution (PS)?**	**On land use type**	**Labor required** (initial and maintenance)	**Costs** (initial and maintenance)	**Impact/Effectiveness**						**Limiting factors/constraints**	**Overall assessment** of the potential for the local context
					Economic		Ecological		Socio-cult			
					ST	LT	ST	LT	ST	LT		
Tabias and jessour	AA	Crop land and grazing land	Medium	Medium	++	+++	+	++	+	+++	Costs and the lack of workforce (according to the farmers)	Adapted to the local context
Spillway *'Massraf' "jebed"*	AA	Grazing land	High	High	++	+++	+	++	+	+++	Costs	
Contour stone ridges *"Seuils en pierres sèches »*	AA	Grazing land	Medium	Medium	+	+++	++	+++	++	++	Costs	Adapted to the local context
Gabion (Recharge units and flood spreading)	AA	Grazing land	High	High	+	+++	++	+++	++	+++	Costs	
Cisterns	AA	Crop land and grazing land	Medium	High	+	++	+	+	+++	+++	Costs	
Rangeland resting *« Tegdeel » (mise en repos)*	AA /PS	Grazing land	Low	Low	+	++	+++	+++	++	+++	Costs and fragmenting land *"morcellement"*	Adapted to the local context
Arboriculture plantation	AA	Grazing land	Medium	Medium	+	+++	+	++	++	+++	Costs and rain water scarcity	

Assessment made by **external stakeholders** in Zeuss-Koutine, Tunisia:

Technology/approach	**Already applied (AA) or potential solution (PS)?**	**On land use type**	**Labour required** (initial and maintenance)	**Costs** (initial and maintenance)	**Impact/Effectiveness**						**Limiting factors/constraints**	**Overall assessment** of the potential for the local context
					Economic		Ecological		Socio-cult			
					ST	LT	ST	LT	ST	LT		
Tabias and jessour	AA	Crop land and grazing land	Medium	Medium	++	+++	+	++	+	+++	Cost	Well adapted for conservation. Very efficient of local context
Spillway *Massraf (jebed)*	AA	Grazing land	High	High	++	+++	+	++	+	+++	Cost	Very efficient to conserve fields
Gabion (Recharge units and flood spreading)	AA	Grazing land	High		+	+++	++	+++	++	+++	Cost	Very efficient to conserve water and soil and recharge of water table
Cisterns	AA	Crop land and grazing land	Medium	High	+	++	+	+	+++	+++	Cost	Well adapted to supplement irrigation
Rangeland resting '*tegdeel (mise en repos))*	AA /PS	Grazing land	Low	Low	+	++	+++	+++	++	+++	Costs and dividing up	Adapted to the local context
Arboriculture plantation	AA	Grazing land	Medium	Medium	+	+++	+	++	++	+++	rain water scarcity	Well adapted
Pastoral plantation of grasses	PS	Grazing land	Low	Low	+	++	++	+++	+	++	Rainwater scarcity and population	Adapted to the local context. Very efficient to conserve water and soil and grazing for breeding
Medicinal plants	PS	Crop land and grazing land	Medium	Medium	++	+++	+++	+++	++	+++	Rainwater scarcity and population resistance	Difficult to adapt
Buried stone pockets *(poches en pierres sèches)*	PS	Crop land	Medium	Medium	+	++	++	++	++	+++	Population resistance	Very efficient growing young plantation

Legend: ST=short-term LT=long-term

Labour and costs: very low, low, medium, high, very high

Impact/effectiveness: +++ (very positive), ++ (positive), + (rather positive)

Djanybek, Russia

Main desertification / degradation problem: poor vegetation growth

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
(applied)	(Green manure)	
(applied)	(Drainage system)	
potential	Drip irrigation	
potential	Water-proofing	Impermeability of the bottom of water storage pond/pull by artificial alkalinisation
potential	Land phyto reclamation (sudan grace)	

Assessment made by **local stakeholders** in Djanybek, Russia:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Drip Irrigation	potential	Crop land House garden Municipal trees	low	low	+++	+++	+++	+++	+++	+++	Poor quality of irrigation water, need in filters High risk of demolition and robbery	Profitable, water saving, cultural and ecological effect
water-proofing (Impermeability) of the bottom of water storage pond/pull by artificial alkalinisation	potential	Water harvesting reservoir	medium	medium	+++	+	+++	+++	+++	+++	Need of research	No experience and available data
Land phyto reclamation (sudan grace)	potential	Crop land	medium	low	+	++	++	++	+	+	Chemical soil composition constraints	No experience

Legend:
ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (rather positive), **0** (medium),
- (rather negative), **--** (negative), **---** (very negative)

Assessment made by **external stakeholders** in Djanybek, Russia:

Technology / approach	**Already applied or potential solution?**	**On land use type (**e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Drip Irrigation	potential	Crop land House garden Municipal trees	low	low	+++	+++	+++	+++	+++	+++	Poor quality of irrigation water, need in filters High risk of demolition and robbery	Less water loss for evaporation and percolation, good for vegetable growing
water-proofing (Impermeability) of the bottom of water storage pond/pull by artificial alkalinisation	potential	Water harvesting reservoir	medium	medium	++	++	++	++	++	++	Need of test at small scale	Use of salt from Elton saline lake (analogue of Dead Sea)
Land phyto reclamation (sudan grace)	potential	Crop land	medium	low	+	+++	++	++	+	+	Chemical soil composition constraints	Quite profitable

Legend: ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (rather positive), **0** (medium),
- (rather negative), **--** (negative), **---** (very negative)

Novyj, Saratov, Russia

Main desertification / degradation problem: Salinisation

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Green manure	
applied	Drainage	
potential	Drip irrigation	
potential	Licorice (Glycyrrhiza) cultivation	

Presentation of drip irrigation as potential strategy (photo by Tatiana Smirnova)

Assessment made by **local stakeholders** in Novyi, Saratov, Russia:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Green manure	applied	Crop land	medium	low	++	+++	++	+++	+	+	Teaching farmers	Effective
Drainage	applied	Crop land	high	very high	++	+++	+	++	+	+	Currently unprofitable	Well developed method

Assessment made by **external stakeholders** in Novyi, Saratov, Russia:

Technology / approach	**Already applied or potential solution?**	**On land use type (**e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Phyto land reclamation (licorice)	potential	Crop land	medium	low	+	+++	++	++	+	+	Chemical soil composition constraints	Quite profitable
Drip irrigation	potential	Crop land	low	medium/high	++	+++	++	+++	+	++	Poor quality of irrigation water, need in filters	Costs will be returned in a year

Legend: ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (rather positive), **0** (medium),

- (rather negative), **--** (negative), **---** (very negative)

Loess Plateau, China

Main desertification / degradation problem: soil erosion by water and wind

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Planting trees	
applied	Building dam	
applied	Building terraced field	
applied	Closure against grazing	
applied	Interplanting	

Assessment made by **local and external stakeholders** in Ansai county, Shanxi province (Loess Plateau), China

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Building dam	Already applied	crop	high	high	-	+	0	+	0	+	Funds are limited	Hard but benefit
Building terraced field	Already applied	crop	high	high	+	++	+	++	0	++	Need lots of funds and labour	Good
Planting trees	Already applied	Forest	medium	medium	+	++	+	+++	0	+	survival rate of trees	Good
forest enclosure	Potential solution	forest	low	low	+	++	+	++	0	+	human quality	Hard to implement
closure against grazing	Already applied	Grazing land	low	low	0	+	+	+++	0	+	Human quality	Good
interplanting	Already applied	crop	low	low	+	++	0	+	0	+	soil fertility	Improve the rate of land-use

Legend:
ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium),
- (slightly negative), **--** (negative), **---** (very negative)

Mopipi, Boteti Area, Botswana

Main desertification / degradation problem: overgrazing and decreased flooding

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Rainwater harvesting	
potential	Using bio-gas instead of firewood	As energy source
potential	Ranch Farming	Diversify into wildlife farming
potential	Commercial farming (cropping)	Diversify into commercial farming
applied	Feedlot	For supplementary feeding of livestock
applied	Building dams	To capture rainwater

Assessment made by **local stakeholders** in Mopipi, Botswana

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		Socio-cult.			
					ST	LT	ST	LT	ST	LT		
Using bio-gas instead of firewood	Potential	Grazing land	Low	Low	-	-	+	++	+	++	High mortality rate of cattle, unfamiliar technology	High potential
Ranch Farming	Potential	Tourism	High	High	+	+++	+	+++	+	++	Shortage of land and high costs	Low potential
Commercial farming (cropping)	Potential	Crop land	Medium	Medium	++	+++	0	-	+	++	Shortage of water	Moderate potential, perhaps low scale as water shortage is a serious constraint
Feedlot	Applied	Grazing land	Low	High	+	++	+	++	++	+++	Shortage of land, high costs and regulations on sales of livestock.	Low potential
Building dams	Applied	Irrigation	Medium	High	-	-	++	+++	++	+++	High costs	Moderate to high potential as financial assistance can be souht from government
Rainwater harvesting	Applied	Homes in lands (cropping) areas	Medium	High	-	+	++	++	++	+++	High initial costs	Moderate to high potential as financial assistance can be souht from government.

Legend:
ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (rather positive), **0** (medium),
- (rather negative), **--** (negative), **---** (very negative)

Cointzio catchment, Mexico

Main desertification / degradation problem: soil erosion by water

No information received from this study site.

Secano Interior, Chile

Main desertification / degradation problem: soil erosion by water, extensive gullying

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
potential	Subsoiling	
potential	No tillage	
potential	Contour ploughing	
potential	Ley Farming sytems	legume pasture - cereals
potential	Irrigation technologies	

Assessment made by **local stakeholders**:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Subsoiling	Potential solution	Crop land	Low	High	++	?	++	?	++	?	Slope and cost	It Is a good practice that needs more evaluation.
No tillage	Potential solution	Crop land	Low	High	++	?	0	?	-	?	Cost, lack of technology, lack of trained labour.	It is a good practice that needs more research in machinery and chemical products.
Contour ploughing	Potential solution	All type	Moderate	Low	+	++	+	++	0	0	Farmers lack of knowledge	Because of its low cot I a good alternative hat need to be promoted.
Cattle – crop system (legume pasture - cereals)	Potential solution	Crop / grazing	High	High	++	++	++	?	++	++	Lack of knowledge and financial resources. Heavy traditions	It is a good productive alternative, but need more long term evaluation.
Irrigation technologies	Potential solution	All type	High	High	++	++	++	++	+	++	Lack of water, it only allows for small irrigation area (0.25 hectares)	Good for small areas.

Legend:
ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium), **-** (slightly negative), **--** (negative), **---** (very negative)

Assessment made by **DESIRE researchers and technicians**:

Technology / approach	**Already applied or potential solution?**	**On land use type** (e.g. crop land / grazing land, etc.)	**Labour** required (initial and maintenance)	**Costs** (initial and maintenance)	**Impact / Effectiveness**						**Limiting factors / constraints**	**Overall assessment of the potential for the local context**
					economic		ecological		socio-cult.			
					ST	LT	ST	LT	ST	LT		
Subsoiling	Potential solution	Crop land	Low	High	++	?	++	?	++	?	Slope and cost	It Is a good practice that needs more evaluation.
No tillage	Potential solution	Crop land	Low	High	-	-	++	++	++	++	Cost, lack of technology, lack of trained labour.	It is a good practice that needs more research in machinery and chemical products.
Contour ploughing	Potential solution	All type	Moderate	Low	++	++	- -	- -	-	-	Farmers lack of knowledge	Because of its low cost a good alternative that needs to be promoted.
Cattle – crop system (legume pasture - cereals)	Potential solution	Crop / grazing	High	High	-	-	-	?	-	-	Lack of knowledge and financial resources. Heavy traditions	It is a good productive alternative, but need more long term evaluation.
Irrigation technologies	Potential solution	All type	High	High	-	-	-	-	-	-	Lack of water, it only allows for small irrigation area (0.25 hectares)	Good for small areas.

Legend:
ST = short-term LT = long-term

Labour and costs: very low, low, medium, high, very high

Impact / effectiveness: **+++** (very positive), **++** (positive), **+** (slightly positive), **0** (medium),
- (slightly negative), **--** (negative), **---** (very negative)

Ribeira Seca watershed, Santiago Island, Cape Verde

Main desertification / degradation problem: soil erosion, drought, flash floods

List of most important or promising solutions:

Applied /potential	Name	Description / remarks
applied	Slopes and riverbed protection	Rehabilitation of SWC infrastructures
applied	Training & sensitization	Environmental issues training and sensitization for farmers, animal raisers, associations, communities, and representatives of Ministry of Agriculture, City Halls, and schools
potential	Longueira Dam Construction	Construction of a small dam
potential	Improvement of animal production	
applied	Institutional and Legal Capacity Strengthening	

SWC structures in Ribeira Seca Watershed, Santiago Island, Cape Verde (Photo Gudrun Schwilch)

Evaluation made by **local and external stakeholders** in Ribeira Seca watershed, Cape Verde

Appropriate Technology	**Already applied or potential solution?**	**On land use type** *(e.g. crop land / grazing land, etc.)*	**Labor required** (initial and maintenance)	**Costs** (initial and maintenance)	**Impact/Effectiveness**						**Limiting factors / constraints**	**Who will implement**	**Overall assessment of the potential for the local context**
					economic		**ecologic**		**socio-cult.**				
					ST	**LT**	**ST**	**LT**	**ST**	**LT**			
1. Slopes and riverbanks protection and rehabilitation of SWC infrastructures	Being applied	Rainfed and irrigated agriculture, and pasture	high	high	++	+++	+++	+++	++	+++	Agrarian	Associations; C. Hall; MAA	More sensitization
2. Environmental issues training and sensitization for farmers, animal raisers, associations, communities, and representatives of Ministry of Agriculture, City Halls, and schools	Partially applied	—	Medium / high	Medium	++	+++	+++	+++	++	+++	Education level Resistance to change	MAA; NGOs; medium	More information sensitization
3. Construction of a small dam located at Santa Maria/ Longueira	Potential solution	Irrigated Agriculture	high	high	+++	+++	+++	+++	+++	+++	Technical Studies	Associations; C. Halls; MAA; NGOs	
4. Improvement of animal productivity and production	Potential solution	Pasture	Medium	Medium	+++	+++	+++	+++	++	+++	Agrarian Cultural	MAA; Associations	Sensitization
5. Institutional and legal capacity strengthening *(techno professional)*	Partially applied	—	Low/ Medium	Medium / high	0	++	+++	+++	++	+++	Political Financial	Government	Sensitization

Legend:
ST = short term LT = long term
Labor: very low, low, medium, high, very high
Impact/effectiveness: **+++** (very positive), **++** (positive), **+** (rather positive), **0** (medium), **-** (rather negative), **--** (negative), **---** (very negative)