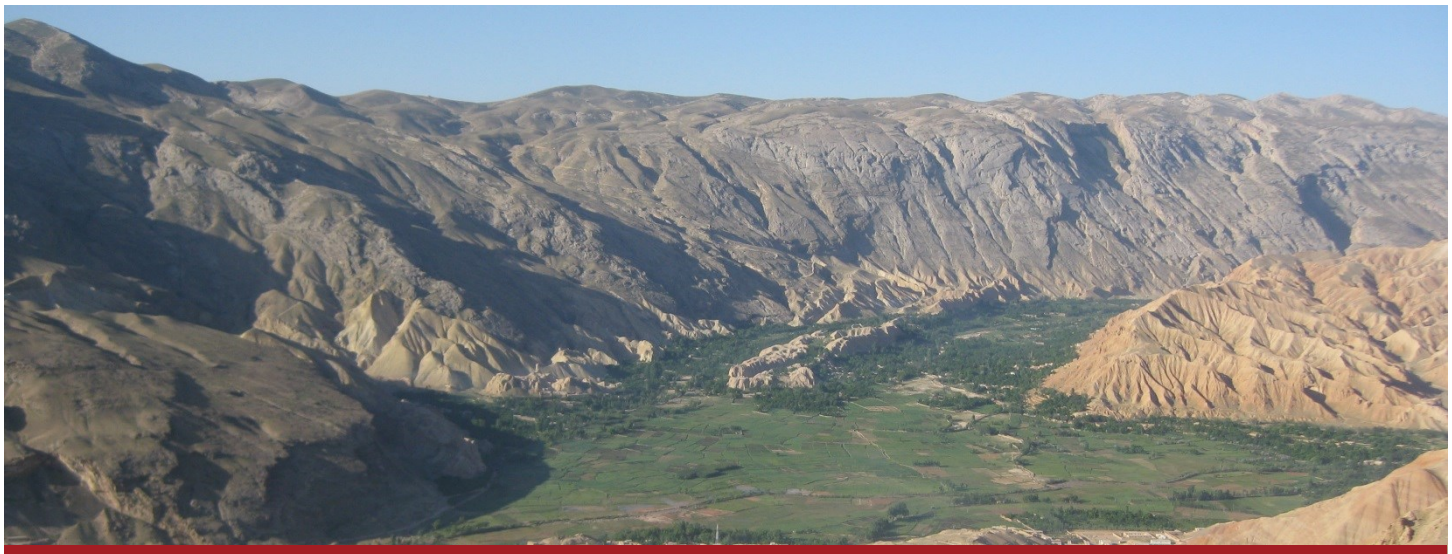
HELVETAS Swiss Intercooperation | AFGHANISTAN

WOCAT
World Overview of Conservation Approaches and Technologies



SLM Technologies and Approaches from Afghanistan

SLM Technologies and Approaches from Afghanistan

"Watershed Management has brought new hope to our lives. In the past rain for us meant disaster, but now it is a boon as there are no flash floods from the treated areas in Sourakhak watershed. Many affected families which had shifted to other areas have started returning to their homes".

Arbob Najmuddin, Roye Sang Nehal Bagh village, Kahmard, Afghanistan

Afghanistan is situated in a naturally multi-hazard prone zone. Its people face flash floods, droughts, earthquakes and avalanches on a regular basis. Climate change is predicted to exacerbate existing vulnerabilities to land degradation, floods and droughts in Afghanistan.

Since 2008, HELVETAS Swiss Intercooperation has explored sustainable ways to mitigate the risks of flash floods and drought through sustainable watershed management and by empowering the communities to play a pivotal role in disaster risk management. Based on the work initiated in 2008/9 with support from the International Swiss Re Award, HELVETAS Swiss Intercooperation implemented Integrated Watershed Management (IWM) project funded by the Swiss Agency for Development and Cooperation (SDC) with the main aim to increase the livelihood security of selected communities of Kahmard district through flash flood and drought risk mitigation.

IWM project promoted structural measures like contour tied trench, terrace, loose stone masonry and gabion check dam, half-moon pit, soil bund and water reservoir. These were combined with vegetative measures, management measures like area exclusion from grazing and shrub cutting and community bakeries for reducing shrub collection. For planning, implementation and site up keep, the communities appointed their watershed management committees and also guards. The watershed project had multiple benefits for the local communities. About 600 ha irrigated land, 320 ha orchards, 10 irrigation canals, 342 houses, 2 schools, 2 mosques, 1 km main road, 8 km river banks and about 1 km irrigation canal were protected from flash flood hazards.

HELVETAS Swiss Intercooperation invests in active knowledge, processes, methods and tools for learning, creating new knowledge, knowledge exchange and applying best practices. For sustainable land management and watershed management, it promotes and applies the globally standardized World Overview of Conservation Approaches and technologies (WOCAT) tools and methods as well as facilitates the setting up of Afghanistan Conservation Approaches Technologies and Approaches (AFCAT) network through Sustainable Land Management Project (SLMP) funded by SDC.

We hope that the documented AFCAT examples will be useful for other organizations and individuals working in similar field and environment. HELVETAS Swiss Intercooperation welcomes any feedback on the documented fact sheets. We hope that these four, and others which will be shared in due course, will contribute to the knowledge on effective SLM practices (traditional and introduced) from Afghanistan and arid/semi-arid regions.

Thank you!

Mohammad Khalid Azami
Deputy Country Director
HELVETAS Swiss Intercooperation Afghanistan
afghanistan@helvetas.org

Contour Tied Trench

Afghanistan – Chuqoarak (Local name in Dari)

left: An overview of Contour Tied Trench at Sourakhak watershed. Also in the picture are a few terraces (Photo: Sanjeev Bhuchar)

right: A closer view of 1-year old trenches with soil bunds at Sourakhak watershed (Photo: Sanjeev Bhuchar)

Trenches with soil bunds constructed in a tied manner along contour lines to trap surface runoff and sediments from degraded uplands

Contour Tied Trenches (CTT) were constructed to trap and retain surface runoff and sediments with the main objective of reducing flash flood risks from the Sourakhak watershed which was badly degraded due to overgrazing, excessive cutting of shrubs for fuel wood, rainfed cropping and recurring droughts. The technology was combined with other structural measures like soil bunds, check dams, water ponds, and plantation of fruit, non-fruit trees, fodder crops like alfalfa, Asafoetida and Cumin as cash crops. The watershed is also protected from grazing and shrub cutting by the participating communities. Community bakeries were constructed in the valleys and bio-briquette technology promoted for reducing shrub consumption/cutting.

Feasibility studies were conducted and workers from three Community Development Councils (CDCs) of Roy-e Sang (Kahmard) implemented the construction works based on the technical proposals. The workers were organised by the Sourakhak watershed management committee and they got a daily wage of USD 5 for their labour inputs. About 670 families (276 person days/ha) participated in the construction of CTTs and other technologies.

One supervisor appointed by the communities and a watershed worker from HELVETAS Swiss Intercooperation side, both paid by the project, monitored the watershed works with technical advice from the project staff. The work was carried out in phases and in 4 years (starting 2009) about 65,000 trenches were constructed. About 216 trenches were constructed per hectare and the construction cost was about 1450 USD/ha, which included 1380 USD for labour and 70 USD for tools. The International Swiss Re Award (2009), the Swiss Agency for Development and Cooperation (SDC), HELVETAS Swiss Intercooperation and the participating families financially contributed to the watershed management works.

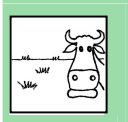
Sourakhak watershed has a semi-arid and temperate climate. The area receives up to maximum 400 mm rainfall annually in a normal year and snow during winter. About 80% of the rain falls from March to June, with most rain falling in the months of April and May. The watershed is located at an elevation ranging from 2000-3000 m (amsl) and the soil is sandy-loam to clay type. The land users who applied the CTTs are mostly smallholders (with less than 1 ha irrigated land) and they reside in the valley bottoms. The upland areas, where the CTT have been constructed, belong to the state but the local communities have land and water use rights. From a climate change perspective, CTTs will not be much affected by temperature changes or drought. Some trenches could break if there is an extreme rainfall event.

Location: Kahmard district, Bamyan province
Coordinates: 35.348248^{0}N; 67.639609^{0}E
Technology area: Approx. 3 km^2
Conservation measure(s): Structural measure
Land use type: Initially: Grazing/shrub land
Stage of intervention: Rehabilitation
Origin: Externally introduced in 2009
Climate: Semi-arid and temperate
WOCAT database reference:
Related approach: Community based watershed management
Compiled by: Ali Ahmad "Sediqi", Ashraf Homayoun, Azami Mohammad Khalid. Bhuchar Sanjeev, Sthapit Keshar, together with land users
Date: 12.12.2012
Comments: CTTs should be combined with vegetative and management measures. Proper alignment of the CTTs is also necessary for stability and effectiveness and their size and spacing should be decided on the basis of hydro-met parameters. Sometimes, people have fear that they will lose land due to trenches. In such a situation other technologies like terracing can be also considered for flash flood reduction.

Classification

Land use problems in the uplands: Depleted soil, poor vegetative cover and deep gullies which trigger severe flash floods.

Land use



Extensive grazing land in the past

Climate

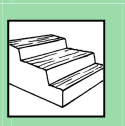
Semi Arid Temperate

Degradation

Erosion by water

Biological degradation

Conservation measure



Structural: Contour continuous trenches()

Stage of intervention

Prevention
Mitigation/reduction
Rehabilitation

Origin

Land user's initiative:
Experiments/research:
Externally introduced: In 2009

Level of technical knowledge required for constructing CTTs

Low:
Medium: SLM specialists
High: Land users

Main causes of land degradation: Overgrazing, excessive shrub cutting, rain fed agriculture without soil and water conservation measures and recurring droughts. Also, lack of organizational structures and institutional mechanisms for managing the uplands. Lack of knowledge on sustainable land management (SLM) technologies and approaches.

Main technical functions:

- Trap / retain runoff and sediments
- Increase infiltration
- Reduce flash flood risks
- Reduce slope length

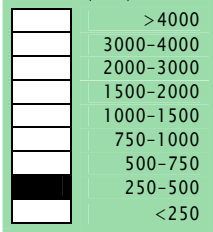
Secondary technical functions:

- Increase soil moisture content
- Increase ground water recharge
- Increase land cover (vegetation)

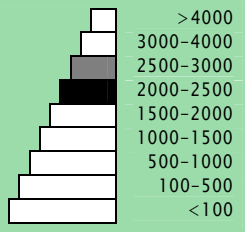
Environment

Natural environment of the watershed sites where CTTs were constructed

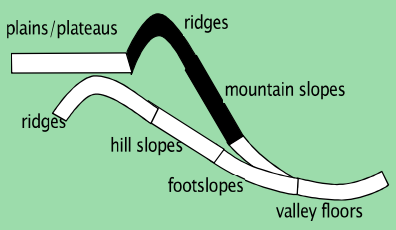
Average annual rainfall (mm)



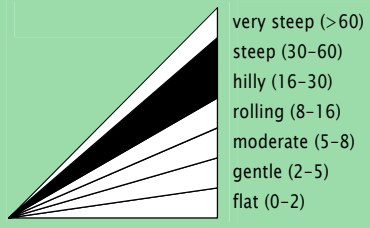
Altitude (a.m.s.l.)



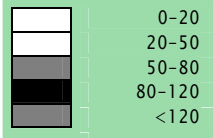
Landform where CTT were applied



Slope (%) where CTTs were applied



Soil depth (cm)



Growing season(s): 1 season (1 crop; March to July)

In the valleys, however, 2 crops are possible (March to July and August to October)

Soil texture: Differs, mostly sandy-loamy; clay

Soil fertility: Low to Medium

Topsoil organic matter: Low

Soil drainage/infiltration: Medium to Good

Soil water storage capacity: Medium (up to 15 days)

Availability of surface water: During rainy season

Water quality: Not good but animals consume

Biodiversity: Initially low but gradually improving as the watersheds are protected from grazing and shrub cutting. Kahmard was once famous for rich biodiversity.

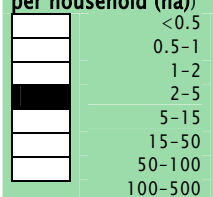
CTT tolerant of climatic extremes: Temperature increase or decrease, variations in rainfall/snow, drought

CTT sensitive to climatic extremes: High intensity rainfall could cause breakages of some CTTs, especially the soil bunds

If sensitive, what modifications were made / are possible: Stabilize CTTs with vegetative and management measures. Trench size should be based on hydro-meteorological parameters considering possibility of an extreme event occurring.

Human environment of the land users applying CTTs

Estimated grazing land per household (ha))



Land user: Mostly small scale and in group

Population density: About 30/km²

Annual population growth (national): 2-3%

Land ownership (upland grazing lands): Mostly state

Land/water use rights: Common (organized)

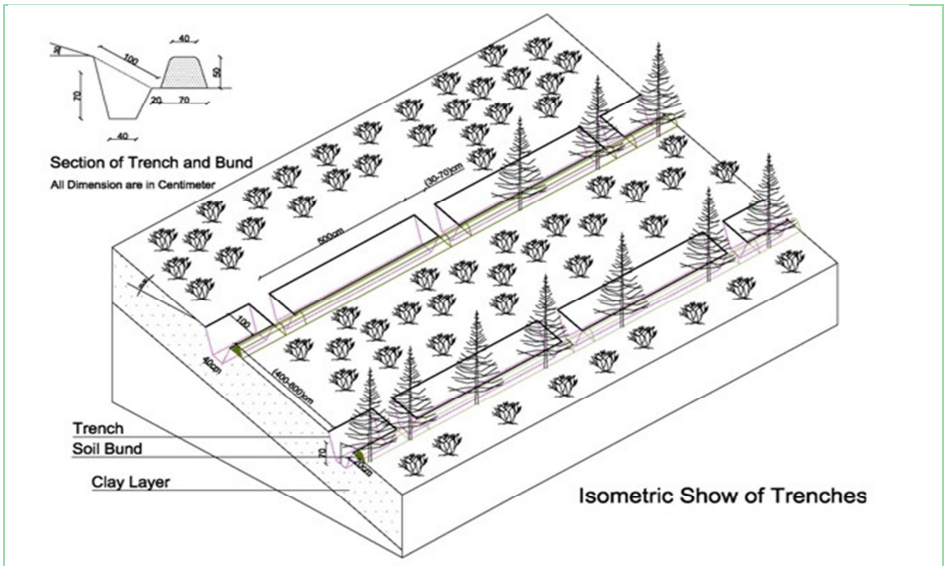
Relative level of wealth: Poor (50%), Average (40%); Rich (10%)

Importance of off-farm income for land users:10-50%

Access to service and infrastructure: *Low*: Technical Assistance, Market, Financial service, Employment; *Moderate*: Health, Education, Energy, Drinking water and sanitation

Market orientation: Mixed (subsistence and commercial). Mainly sheep and goats. People prepare items from sheep wool like carpets (*namads*)

Average livestock per household: (Estimated) 5-9 sheep, 3-5 goats, 1 donkey. About 50% HHs have cows.



Technical drawing: Technical specifications of Contour Tied Trench with soil bunds constructed at Sourakhak watershed. Fruit and non-fruit trees have been planted at a few selected sites in the watershed as vegetative measures. The plant survival per cent was about 10% due to drought, rodent problem and poor adaptation of the tree saplings brought from a different natural environment. The sites are protected from grazing and shrub cutting leading to better land cover.

Trench size: 5 m (L), 1m at top and 0.4 m at bottom (W), 0.7 m (D)
Distance between trench in a row = 0.3-0.7 m and spacing between contours = 4-8 m depending on the slope (steeper slopes have less distance)

Soil bund size: 5.5 m (L), 0.7 m/0.4 m (W), 0.5 m (H)

The trenches have the capacity to store about 159,250 cu.m of water. Kahmard receives up to 350 mm rainfall per year. Considering catchment area of 3 km^2 the trenches can hold all the water if there was 50 mm rainfall at a time, which is rare.

(Drawing: Ahmad Ali Sediqi, HELVETAS Swiss Intercooperation, Afghanistan)

Implementation activities, inputs and costs

Establishment activities

1. Site selection
2. Preparation of contour lines with A-frame
3. Excavation of trenches
4. Compaction of soil bunds

Establishment inputs and costs per ha

Inputs	Costs (US$)	% met by land user
Labour (276 person days)	1380	10%
Materials		
- A-frames, shovel, pickaxe	70	90%
Agricultural		
- Not applicable		%
TOTAL	**1450**	**13.8%**

Maintenance/recurrent activities

1. Repairing of trenches/soil bunds

This is the minimum requirement. If there are very heavy rains and more damages, the maintenance costs will be much higher.

Maintenance/recurrent inputs and costs per ha per year

Inputs	Costs (US$)	% met by land user
Labour (1 person day)	5	100%
Equipment		
- Shovels, Pickaxe	No extra cost	
Materials		
Agricultural		
- not applicable		
TOTAL	**5**	**100%**

Remarks: Most of the expenditure during the establishment phase is for labour. The tools required for the construction of CTTs were provided by the workers.

Assessment

Impacts of the Technology

Production and socio-economic benefits	Production and socio-economic disadvantages
++ Contributes to Increased fodder production due to more soil moisture. More Changalak species which are a good animal feed when dry. It collects in the trenches.	− Loss of productive land due to land digging

Socio-cultural benefits	Socio-cultural disadvantages
++ Increased knowledge on conservation technologies	None
++ improved livelihoods of participating households due to reduced flash flood risks	

Ecological benefits	Ecological disadvantages
++ Increased harvesting of surface runoff and reduced soil loss	− Disturbance of soil during excavation works
++ Increased soil moisture	
+ Increased plant diversity owning to more soil moisture	
+ Recharge of springs	

Off-site benefits	Off-site disadvantages
++ Reduced downstream flooding and siltation.	− Sedimentation due to soil disturbance during excavation
++ Reduced damage to property (public and private)	
+ Increased recharge of springs	

Contribution to human well-being/livelihoods

++ Flash flood risks reduced. About 670 families benefited from cash and each family earned at least 400 USD during the project cycle. This income helped in meeting some basic needs like food, education expenses, medicines and clothes. Many agriculture land, houses, markets, road, mosque, school, clinic, district office are now protected from flash floods risks.

Benefits/costs according to land user

Benefits compared with costs	short-term:	long-term:
Establishment	Positive	Very positive
Maintenance/recurrent	Very positive	Very positive

The benefits due to reduced flash flood risks are much more than the establishment costs.

Acceptance/adoption: The technology **is** applied in other districts, for instance, in Saighan (Bamyan province) and Ruy-e Doab (Samangan province) by HELVETAS Swiss Intercooperation. (I)NGOs like the Agha Khan Foundation and Catholic Relief Services (CRS) are also including CTTs in their technology systems for reducing flash flood and snow avalanche risks. There has been no spontaneous adoption of CTTs by the land users and the main reasons could be high investment cost and fear of loss of land.

Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
Reduce flash floods risks → Maintenance and application of vegetative measures along with the trenches. For Instance planting of perennial forage species on the bunds like Alfalfa, Agropyron and Sainfoin..	Soil disturbed during digging and fine clay deposits in the trenches which reduces infiltration → Apply conservation trenches. Planting on the either ends of the trench and soil working to break the clay layering.
CTTs considered better than staggered contour trench if the purpose is to control flash floods as it can trap more runoff and have less chances of damages → Maintenance and correct implementation is necessary	Establishment costs are high → Initial external support necessary. Linking relief to sustainable land management could be an option.
Helps in spring recharge → CTTs should be maintained and combined with vegetation measures for better infiltration.	Loss of land for production due to trenching → Integrate planting of trees and grasses.
Helps in the establishment of vegetation due to more soil moisture → Combine with conservation practices like mulching	Trenches break→ CTTs must be of right size along the contour lines. Workers must be trained before implementation work and there must be proper supervision. The size of a trench and spacing between trenches should be based on hydro-met parameters. Also, avoid steep sandy (blue) and shallow rocky soil beds
Potential technology for reducing flash flood risks → More training and awareness about the limitations of this technology - where to apply and where not to apply	

Key reference(s): WOCAT on-line database on SLM Technologies (www.wocat.net)

Contact person: Mohammad Khalid Azami, Deputy Country Director, HELVETAS Swiss Intercooperation, Afghanistan (khalid.azami@helvetas.org)

left: *Kanda* construction in progress in Sourakhak watershed (Photo from HELVETAS Swiss Intercooperation archive)

right: A view of the *Kanda*/underground tank, conveyance channel, sediment pit (being cleaned) and the rocky catchment (Photo from HELVETAS Swiss Intercooperation archive)

Kanda

Afghanistan – *Kanda* (Local name in Dari and Pushto)

A traditional underground water tank carved out of rocks to collect rainfall and snow water and reduce evaporation losses

Kanda is an indigenous technology for collecting rain and snow melt. The technology comprises an underground tank carved out of rock (limestone), channels to convey the runoff into the underground tank or *Kanda* and a rocky catchment from where runoff is collected. *Kanda* technology is applied in Afghanistan in many places, particularly in areas which experience scarcity of water for human beings, livestock and irrigation. Due to high evaporation rates and low precipitation, harvesting runoff in open tanks is not an efficient way of water harvesting. HELVETAS Swiss Intercooperation is implementing community based watershed management projects in Kahmard district of Bamyan province (Afghanistan) since 2008 with financial support from the International SwissRe Award for sustainable watershed management (2009) and the Swiss Agency for Development and Cooperation (SDC). One of the activities for sustainable watershed management is plantation of fruit and non-fruit trees in the selected watersheds (upland areas) which were used for grazing and extraction of vegetation for domestic use. Due to water scarcity in the upland areas, irrigation of the planted saplings becomes very difficult and water has to be transported on donkeys from far locations. To overcome this constraint, *Kanda* was identified as the most potent technology for harvesting runoff and snow melt.

For constructing *Kandas*, *Kanda* makers from Dara-e Suf district in Samangan province had to be employed as there are no experts in Kahmard. Based on feasibility studies, eight *Kandas* have been constructed including 4 *Kandas* in Sourakhak watershed and 4 in Baqa Kushta watershed. The size of each *Kanda* is 6 m length, 6 m in width and 3 m in height. To convey the runoff into the tank, 10-20 m long graded channels were carved out of the rocks. The establishment cost of one *Kanda* was approximately US$ 7163. *Kanda* making requires special skills, especially when it is carved out of rocks. A *Kanda* maker has sound understanding of the area's geology, and this wisdom is gained through learning by doing and inherited from the ancestors. In Kahmard, 2-3 experts worked for 4-5 months for one *Kanda*.

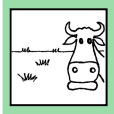
In 2012, due to sufficient rains, 2 *Kandas* which did not have leakage problems in Sourakhak watershed got full with runoff water, which was then used for irrigating 6500 saplings seven times during the year. Kahmard district has a semi-arid climate. Some years are dry with rainfall of about 190 mm. Considering this context, it becomes very necessary to tap rainwater, especially in the rainfed uplands, and to use it for irrigating saplings or for livestock.

Location: Kahmard district, Bamyan Province
Technology area: About 0.5 hectare/*Kanda*
Conservation measure(s): Structural measure (pond)
Land use type: Extensive Grazing Land
Stage of intervention: Rehabilitation of degraded land
Origin: Traditional (> 50 years)
Climate: Semi-arid and temperate
WOCAT database reference:
Related approach: Community watershed management
Compiled by: Sanjeev Bhuchar
Contributors: Azami Khalid Mohammad, Afshar Homayon, "Sediqi" Ali Ahmad, Sthapit Keshar, Sourakhak Watershed Committee members
Revision date: 24/03/2013
Editor's comments: *Kanda* technology is applied in upland areas. These upland areas are used extensively for grazing, shrub cutting and sometimes rainfed agriculture (wheat and barley). People do not live in the upland areas but in the valley bottoms where there is access to water, flat fertile lands and basic services. The uplands are major source of sediments in the valleys and flash floods due to extreme degradation.

Classification

Land use problems: Degraded upland watersheds resulting in severe flash floods; scarcity of water in the uplands which makes plantation activities difficult and also affects productivity of the livestock.

Land use



Extensive grazing land

Climate

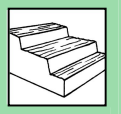
Semi-arid and temperate

Degradation

Erosion by water: Loss of top soil, gully erosion

Biological degradation:

Conservation measure(s)



Structural measure: Underground water tank

Stage of intervention (in terms of land degradation)

- Prevention
- Mitigation/reduction
- Rehabilitation

Origin of *Kanda* technology

- Land user's initiative: > 50 years
- Experiments/research:
- Externally introduced: In 2009
- Other's (specify):

Level of technical knowledge required for constructing *Kanda*

- Low:
- Medium:
- High: Land users and SLM experts

Main causes of land degradation: Excessive grazing, shrub cutting for fuel wood, rainfed agriculture, recurring droughts and lack of upland management measures by the communities and government authorities.

Main technical functions:

- Water harvesting / increase water supply
- Reduces evaporation and seepage losses

Indirect technical functions:

- Helps in re-greening
- Reduces surface runoff

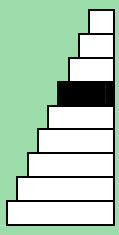
Environment

Natural Environment (relates to the catchment/site where the presented *Kanda* technology has been applied)

Average annual rainfall (mm)

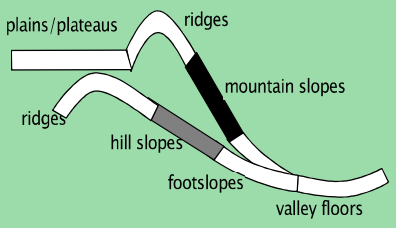
- >4000
- 3000-4000
- 2000-3000
- 1500-2000
- 1000-1500
- 750-1000
- 500-750
- 250-500
- <250

Altitude (m a.s.l.)

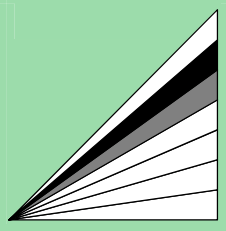


- >4000
- 3000-4000
- 2500-3000
- 2000-2500
- 1500-2000
- 1000-1500
- 500-1000
- 100-500
- <100

Landform where *Kanda* was constructed



Slope (%) of *Kanda* site



- very steep (>60)
- steep (30-60)
- hilly (16-30)
- rolling (8-16)
- moderate (5-8)
- gentle (2-5)
- flat (0-2)

Soil depth (cm)

- 0-20
- 20-50
- 50-80
- 80-120
- <120

Growing season (upland): 1 season (March to July)

Soil texture: Mostly rocky

Soil fertility: Low

Topsoil organic matter: Low

Soil drainage/infiltration: Poor

Soil water storage capacity: Low (rocky catchment)

Ground water table: No information

Availability of surface water: Low (during rainy season)

Water quality: Poor, used for agriculture and livestock

Biodiversity in the grazing lands: Low

Tolerant of climatic extremes: Temperature increase; seasonal rainfall increase and decrease; heavy rainfall events; wind storms; drought, floods

Sensitive to climatic extremes: Not known

If sensitive, what modifications were made / are possible: Install good quality water conveyance system; Determine *Kanda* size based on precipitation and catchment area; Reduce chances of tank leakages by sealing the cracks if any.

Human environment of land users who applied the *Kanda* technology

Grazing land per household (ha)

- <0.5
- 0.5-1
- 1-2
- 2-5
- 5-15
- 15-50
- 50-100
- 100-500
- 500-1000

Land user (who applied *Kanda*): Groups, small scale

Population density (district): 30 persons / km²

Annual population growth (National): 2-3%

Land ownership (*Kanda* site): State

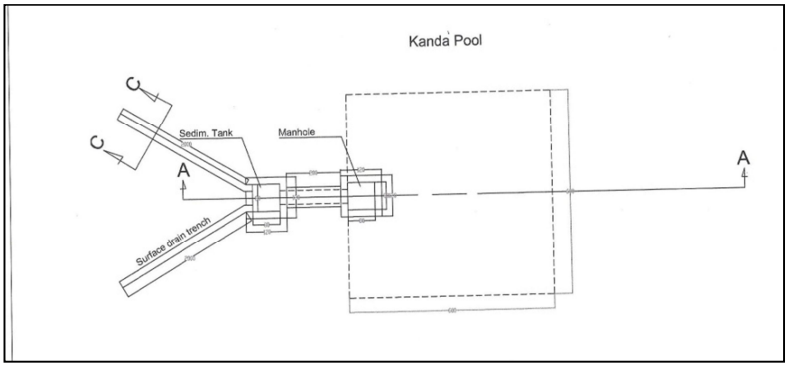
Land/water use rights in watersheds: Communal (organized)

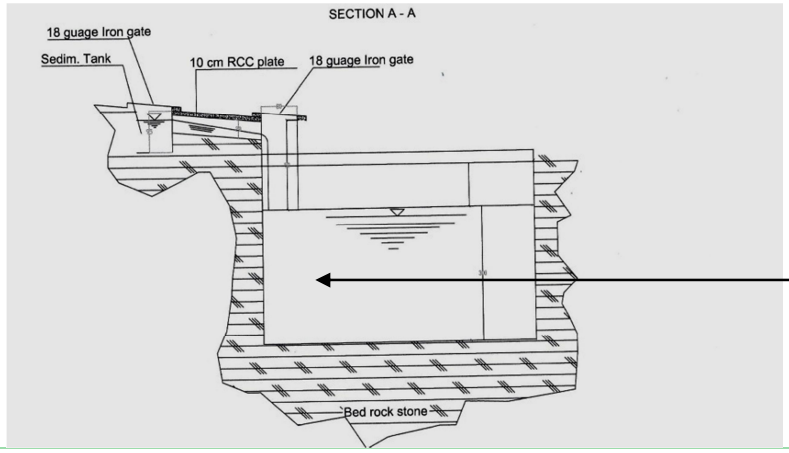
Relative level of wealth of land users who applied the *Kanda* technology: Poor (50%), Moderate (40%), Rich (10%)

Importance of off-farm income for land users: 10-50%

Access to service and infrastructure in Kahmard district: *Moderate*: Health, Education, Technical Assistance, Market, Energy, Road and Transport, Drinking Water and Sanitation. *Low*: Off-farm employment and financial services (formal)

Market orientation with regard to livestock and agriculture: Mixed (Subsistence, Commercial)





Underground *Kanda* (tank) where runoff is stored

Technical drawing

Technical drawing of a *Kanda* constructed at Baqa Kushta watershed in Kahmard district (Bamyan province).

Size of one *Kanda* tank:
Length: 6 m
Width: 6 m
Height: 3 m

108 cu. m water can be stored in one *Kanda*.

(Drawing by Eng. Abdulrehman Rahmani, HELVETAS Swiss Intercooperation, Afghanistan)

Implementation activities, inputs and costs

Establishment activities

1. Prefeasibility study
2. Technical survey
3. Technical proposal preparation
4. Sign of Code of Conduct
5. Signing of four party contract
6. Excavation of *Kanda*
7. Preparation of project completion report

Establishment inputs and costs per *Kanda*

Inputs	Costs (US$)	% met by land user
Labour (116 m³)	5640	15%
Equipment		
Chisel, wheel barrow, hammer, rope, bucket, hanger	458	0%
Materials		
- Cement, sand, gravel, podlo powder, steel bars, water, water proof plaster, steel filter, filler, plain concrete	1065	8.1%
Agricultural (Not applicable)		
TOTAL	**7163**	**13.1%**

Maintenance/recurrent activities

1. Cleaning of the canals and *Kanda*

The inputs and costs for maintenance will vary, depending on the annual sediment production rates.

Maintenance/recurrent inputs and costs per *Kanda* per year

Inputs	Costs (US$)	% met by land user
Labour (2 person days)	10	100%
Equipment		
- No new equipments		%
Materials		
- Not applicable		%
Agricultural		
- Not applicable		%
TOTAL	**10**	**100%**

Remarks: Most of the establishment cost is for skilled labour. 1 USD = 50 Afghani (local currency)
Daily wager of workers: Semi-skilled: US$ 5/day) and skilled/mason: US$ 10/day

Assessment

Impacts of the Technology

Production and socio-economic benefits	Production and socio-economic disadvantages
++ Increased irrigation water availability	- Increased expense for construction
++ Reduced risk of plantation failure	
+ Decreased workload for fetching water	
Socio-cultural benefits	**Socio-cultural disadvantages**
++ Increased conservation knowledge	
+ Increased aesthetic value due to greener watersheds	
Ecological benefits	**Ecological disadvantages**
++ Increased harvesting of surface runoff	- Increased sediments due to excavation of rocks
+ Reduced surface runoff due to water harvesting	
Off-site benefits	**Off-site disadvantages**
+ Contributes to flash flood risk reduction by supporting re-greening efforts	

Contribution to human well-being/livelihoods

++ Increased availability of water for small-scale irrigation for tree saplings and livestock and increased success of afforestation in dry land areas which in the longer term will lead to increased income, fuel wood and timber for the land users and greener watersheds

Benefits/costs according to land user

Benefits compared with costs	short-term:	long-term:
Establishment	Positive	Very positive
Maintenance/recurrent	Very positive	Very positive

Acceptance/adoption: It is an indigenous technology applied in many other districts of Afghanistan, for example, in Dara-e Suf and Ruy-i Doab districts of Samangan province by several families either collectively or privately without external support. The in Dara-e Suf are not constructed inside rocks but in soil.

Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
An indigenous multipurpose technology → *Kanda* size can be improved if the catchment area and precipitation amount are considered. This also depends on availability of long-term rainfall data.	Establishment cost is high if the catchment is rocky → Needs external support during the establishment phase.
Requires minimum maintenance when constructed properly → *Kanda*, conveyance canals, sediment pits and catchment areas should be cleaned. If any leakages occur in the tank, they should be sealed.	Lack of *Kanda* makers in some districts like Kahmard → Get *Kanda* makers from other districts and build skills of interested local people.
The technology supports plantation activities in sites which are far from perennial water sources → The collected water should be used efficiently during irrigation by combining with conservation measures like mulching, drip or pitcher irrigation	Due to a lack of geological and hydro-meteorological information, it is not possible to prepare precise and cost-effective *Kanda* proposals → Make best use of traditional wisdom, install hydro-met stations if possible and make adjustments based on regular monitoring.
As the *Kanda* catchment is rocky, infiltration losses are minimized and most of the surface runoff is harvested → The channel must be constructed properly so that all runoff is trapped and conveyed to the *Kanda*.	If the *Kanda* and sediment trap tanks are not cleaned regularly and the *Kanda* opening is not covered, sedimentation can be a problem leading to reduced *Kanda* capacity and also animals could fall in → Cleaning and maintenance works must be carried out by the local people every year before spring rains. The openings must be covered.
	Due to availability of water, there can be grazing pressure near the *Kanda* → Watershed committee members and guards should ensure that the site is protected from over grazing. Construct *Kandas* outside the selected watershed for livestock purposes.

Key reference(s): www.wocat.net (Online Technology Database)

Contact person(s): Mohammad Khalid Azami, Deputy Country Director, Afghanistan (Email: khalid.azami@helvetas.org)

HELVETAS Swiss Intercooperation AFGHANISTAN

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Direktion für Entwicklung und Zusammenarbeit DEZA
Direction du développement et de la coopération DDC
Swiss Agency for Development and Cooperation SDC
Agencia Suiza para el desarrollo y la cooperación COSUDE

Community bakery

Afghanistan – Dash Nanboe (Local name in Dari)

A sustainable option for baking bread and reducing shrub consumption

Thirty six community bakeries were constructed in Kahmard from 2009-2012 for reducing shrub consumption. Rural communities normally bake bread at home using *tandoors* made from clay and fired by shrubs, wood and coal. Bread baking is a demanding task. Men and boys climb mountains to collect shrubs putting themselves at risk, and women spend 1-2 hours/day for preparing dough, firing oven and baking bread. Shrub cutting causes upland degradation leading to flash floods in the valleys. In Saighan, district adjoining Kahmard, a survey showed that one household uses 81 donkey load shrubs annually, and minimum 50 donkey loads are used for baking bread. Kahmard has a similar situation. To address this, HELVETAS Swiss Intercooperation is supporting an integrated watershed management in Kahmard since 2008 with support from the Swiss Re and Swiss Agency for Development and Cooperation (SDC). The approach comprises other technological and organisational measures where structural and vegetative are applied, combined with grazing and shrub cutting control. To complement re-greening efforts, energy efficient community bakeries were promoted.

The participating community development councils or CDCs allocate land for bakery. One bakery costs about US$ 4640, with 25% community contribution, during construction. It takes about 5 weeks for constructing one bakery if there are no obstacles. About US$ 7300/year is spent on operation and maintenance by the people. One baker and 1-2 assistants are employed for daily bakery operations. The dash or oven is prepared from a mixture of clay and sheep hair and fired by coal. About 1-3 bags are required per day. If mosaic tiles are used, about 1 bag per day is used for heating. The factors influencing the success of community bakeries include access to coal, good quality and low price of coal, on time payment and proper management of bakery funds. The clients bring dough from home and pay about US$ 0.042 (2 Afghani)/bread to the baker or about US$ 6.6/month.

Households using community bakeries reported a decrease in shrub consumption by 50-80%, which contributes to greener watersheds. The other benefits include more time for women and boys and girls for other preferred activities, like attending school, literacy classes, vocational trainings, embroidery, etc. Families also save money (minimum USD 10/month) as they have to purchase less shrubs for baking purpose. In Kahmard, one donkey load shrub costs about US$ 6. Bakers, assistant bakers, masons and workers are employed and bakeries serve as a place for social networking. By contributing to greener watersheds, the bakeries help to reduce flash flood risks. In recent months, running the bakeries has become a challenge as the coal mines in Kahmard have been contracted to a Chinese firm. As a consequence, people are not getting coal easily. Due to coal shortages, several bakeries have stopped functioning. People are looking towards the government authorities to solve this issue soonest. Many households have gone back to shrub cutting and a community asset with proven benefits for the people and environment remains underutilized.

left: A overview of a community bakery. The bakers showing the oven/dash used for baking bread (Location: Doro CDC, Kahmard)

right: A dash made of clay and hair (above) and with mosaic tiles (below). About 17-30 breads can be baked at a time in 5-10 minutes. Per day, about 600 breads can be baked

(Photos: Sanjeev Bhuchar)

Location: Kahmard district, Bamyan Province
Technology area (1 bakery)**:** 104 m²
Conservation measure(s): Structural measure
Land use type where bakery was constructed: Settlement (rural. Common land. Sometimes private but donated for community purpose by the landowners
Stage of intervention: Applicable for all stages – prevention, mitigation and rehabilitation of degraded lands
Origin: Externally introduced (in 2008)
Climate: Semi-arid and temperate
WOCAT database reference:
Related approach: Community based watershed management
Compiled by: Bhuchar Sanjeev
Contributors: Azami Mohammad. Khalid, Ashraf Homayoun, Sediqi Ali Ahmad, Mohammad Faiz, Sthapit Keshar, some bakery clients, bakers from Qaghor and Doro CDCs, watershed management committee members.
Fact sheet updated: 27/02/2013
Comments: Community bakeries have been promoted and accepted by local communities in other districts as well, for instance in Ruy-e Doab, Tala wa Barfak districts, and in Saighan district with financial support from SDC and LED. In Ruy-e Doab, due to lack of sun dried clay bricks, stones are used for bakery construction and therefore the establishment cost there is slightly higher.

Classification

Land use problem addressed by this technology: Degradation of upland watersheds leading to severe flash floods which affect rural livelihoods, destroy private and public properties and jeopardize development efforts.

Land use

Rural settlement: Mostly village land

Climate

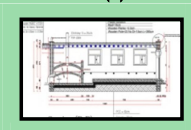
Semi arid and temperate

Degradation

Biological degradation: Due to excessive shrub uprooting

Erosion by water: As a result of land degradation

Conservation measure(s)



Structural measure: Community Bakery (it helps to reduce shrub consumption)

Stage of intervention

Prevention
Mitigation/reduction
Rehabilitation

Origin

Land user's initiative: mosaic
Experiments/research:
Externally introduced: 2009

Level of technical knowledge required to implement community bakeries

Low:
Medium: Land users, SLM experts
High:

Main causes of land degradation in the watersheds: Shrub uprooting for fuel wood, overgrazing, rainfed agriculture, recurring droughts and lack of land management measures by the people and the government.

Main technical functions:

- Reduction of biological degradation by reducing bush extraction from degraded lands

Indirect impacts:

- Increased infiltration of water in the soil
- Reduction in soil loss and runoff
- Reduce flash flood risks

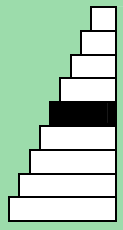
Environment

Natural Environment of the areas where this technology is applied in the valley bottoms

Average annual rainfall (mm)

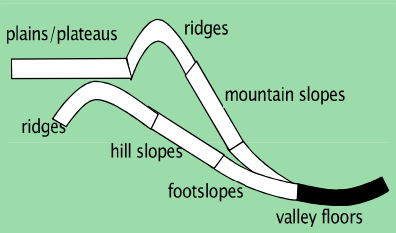
>4000
3000-4000
2000-3000
1500-2000
1000-1500
750-1000
500-750
250-500
<250

Altitude (m a.s.l.)

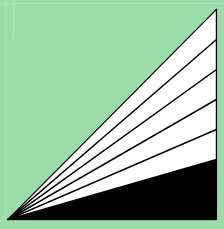


>4000
3000-4000
2500-3000
2000-2500
1500-2000
1000-1500
500-1000
100-500
<100

Landform



Slope (%)



very steep (>60)
steep (30-60)
hilly (16-30)
rolling (8-16)
moderate (5-8)
gentle (2-5)
flat (0-2)

Tolerant of climatic extremes: Temperature increase/decrease, seasonal rainfall increase/decrease, wind storms; drought. If the weather gets too cold, more coal may be required for dash heating.

Sensitive to climatic extremes: There can be damages due to heavy rainfall but the bakeries can still operate. Therefore, it is not a major issue. Even without climate extremes, the bakeries can be damaged due to flash floods.

If sensitive, what modifications were made / are possible: Bakery should not be constructed near the flood ways.

Human environment of the land users who benefit from the community bakeries

Settlement land per household (ha)

<0.5
0.5-1
1-2
2-5
5-15
15-50
50-100
100-500
500-1000
1000-10000
>10000

Land users using the technology: All types of land holders have implemented this technology collectively

Population density (district): About 30 persons/km²

Annual population growth (national): 2-3%

Land ownership (bakery site): Common, sometimes private

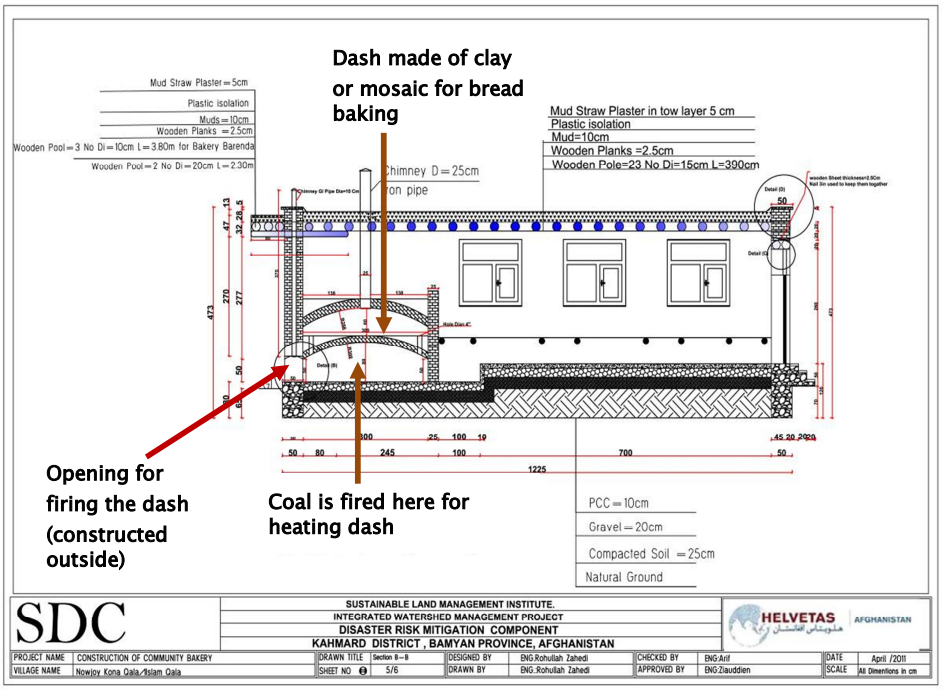
Relative level of wealth of the land users using the bakeries: Poor (50%), Medium (40%) and Rich (10%)

Importance of off-farm income for the land users: 10-50% (estimation by land users)

Access to service and infrastructure in the district:

Moderate: Health, Education, Technical service, Road and transport; Market, Energy (Micro-hydel);

Low: Off-farm employment, financial services (formal)



Technical drawing
A detailed technical drawing (long section) of a community bakery in Kahmard district supported by HELVETAS Swiss Intercooperation with the dome shaped oven or dash.

(Drawing by Eng. Rohullah Zahedi, HELVETAS Swiss Intercooperation, Afghanistan)

Implementation activities, inputs and costs

Establishment activities

1. Pre-feasibility studies based on technical, environmental, social and financial criteria.
2. Allocation of site for the bakery
3. Preparation of bakery business plan and technical proposal with Bills of Quantity (signed by respective CDC members on behalf of the participating communities)
4. Construction of bakery based on agreed technical proposal
5. Construction monitoring (quality and quantity wise)
6. Selection of bakers by the people and their trainings

In Qaghor bakery (Kahmard), people replaced the traditional dash with mosaic tiles for reducing coal consumption and for better bread quality. About US$ 25 were spent on tiles and US$ 25 for transport and tiling work.

Establishment inputs and costs per bakery

Inputs	Costs (US$)	% met by land user
Labour (86 person days)	429.50	
Mason (59.4 person days)	594.00	
Dash maker (lump sum)	200.00	
Equipment		
- Shovels with handles, wheel barrow, pick axe	60.00	
Materials		
- Sand, Soil, cement, gypsum, bricks, stones, gravel, straw, plastic, clay, hair, wooden door, timber for beams, glass, paint, gutter pipes. Ventilation pipes	3356.00	
TOTAL	**4639.50**	**25%**

Maintenance/recurrent activities

1. Bakery operation – baking bread
2. Dash or oven repair (if required)
3. Mud plastering of rooftop (once per year before winter)
4. People also monitor the quality of bread
   - *Mosaic can get very hot and bread can burn. Bakers apply wet cloth on the mosaic to keep the temperature low so that the bread does not burn.*
   - *In Doro CDC, the bakery has been contracted to the baker. He receives 2 Afghani per bread from the client. The baker must get 600 USD (30,000 Afg) per month. If the amount collected from the clients is less, the Doro CDCs collect money to pay the balance, and if it is more than 30,000 Afg, the excess is collected by the CDCs for emergency fund.*

Maintenance/recurrent inputs and costs per bakery per year

Inputs	Costs (US$)	% met by land user
Baker and assistant (365 person days)	3600	100%
Roof plaster (includes labour)	40	100%
Equipment		
- Dash shovel and torch	10	100%
Materials		
- Fuel	3650	100%
TOTAL	**7300**	**100%**

Remarks: Most of the expenses for construction works is on equipment and materials like shovels, pick axe, wheel barrow, wooden doors, timber beams, window, concrete bricks, and sun dried bricks. In terms of recurrent costs, most spending is on coal and for the salary of the baker and assistant bakers.

Assessment

Impacts of the Technology

Production and socio-economic benefits	Production and socio-economic disadvantages
++ Reduced workload of women, men, boys and girls	− Loss of income for some shrub collectors
+ Cash saving due to less purchase of shrubs	
+ Employment for bakers/assistants/masons	
Socio-cultural benefits	**Socio-cultural disadvantages**
+ More opportunity for social networking	− Sometimes funds collected for the bakery are misused
+ Less conflicts among household members over bread baking or shrub collection	
++ Improved health of women due to less exposure to smoke and heat	
++ Increased opportunities for education as boys spend less time on shrub collection and women and girls less time for cooking	
++ Increased conservation knowledge	
Ecological benefits	**Ecological disadvantages**
++ Less shrub cutting: Improved vegetation cover	
++ Reduced surface runoff due to vegetation cover	
Off-site benefits	**Off-site disadvantages**
++ Reduced flash floods due to better land cover	− Carbon emissions due to coal burning (but these are probably still less compared to the emissions if every household burns shrubs for baking bread)

Contribution to human well-being/livelihoods

++ Less shrub consumption; Women are relaxed and have good health. Students and men spend less time collecting shrubs; students attend classes regularly; employment for bakers, assistant bakers, masons and other laborers. Supports greening of the watersheds and reduction of flash flood risks

Benefits/costs according to land user

Benefits compared with costs	short-term:	long-term:
Establishment	Positive	Very positive
Maintenance/recurrent	Positive	Very positive

Acceptance/adoption: Little. In one CDC of Kahmard, people built a community bakery by themselves (spontaneous adoption)

Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
Reduces shrub consumption and helps in watershed re-greening leading to reduced flash flood risks → Continuous supply of coal for running the bakeries. Social auditing to ensure that the payment to the bakers and coal suppliers is on time.	Bakeries run on coal, and due to restrictions on coal mining some of them have stopped running → Government should solve this problem.
Better lives and health of women, men and children and cash saving → Women have more time, they could be supported for certain preferred income generation activities like tailoring, embroidery, vegetable cultivation, and also literacy courses.	Clay oven requires frequent maintenance → Alternatives like use of mosaic tiles could be an option.
Collective action and community ownership → Community bakeries are social hubs where people of all ages come together. Bakeries could be also used for sharing messages concerning sustainable natural resources or Water, Sanitation and Hygiene.	Minimum 80 families are required for running the bakeries profitably → Develop a model which caters to 10-20 households. Also, action research on different sizes and fuel consumed (coal, wood, gas, etc.)
Use of locally resources → There should be synergies in terms of subsidies, planning, designing with between different organizations promoting community bakeries.	As it is dark inside the dash, bakers have to use a torch and it also exposes them to heat → Develop better lighting systems. For instance a window opposite dash for more light or the dash could have a gentle slope.
For the cost of 1 donkey load of shrubs, a family can get bread baked for a whole month → Cost benefit analysis of some communities' bakeries.	2-3 bags of coal are used per day → The oven could be made more energy-efficient, for instance by improving insulation layering or by using mosaic tiles.
If the dash is made of mosaic, there is less coal consumption, bread quality is better and it takes less time to bake → Mosaic technology could be improved to make it more efficient.	Bakeries are used for only bread baking → Options like heating water for which people can collect or a hot bath (*hamam*) could be integrated.
	Loss of income for few shrub collectors →Provide opportunities for off or on-farm income generation and cash for work

Key reference(s): (1) www.deza.admin.ch/ressources/resource_en_196067.pdf; (2) www.youtube.com/watch?v=YXU15NfOu-8

Contact person(s): Mohammad Khalid Azami, Deputy Country Director, HELVETAS Swiss Intercooperation, Afghanistan (khalid.azami@helvetas.org)

left: People from Roy-e Sang CDCs of Kahmard district constructing soil bunds in Sourakhak watershed, in return for cash. Kahmard valley (downstream) is visible in the background (Photo source: HELVETAS Swiss Intercooperation)

right: Greener watershed: An *Acacia* tree growing in Sourakhak watershed (Photo source: HELVETAS Swiss Intercooperation)

Community watershed management

Afghanistan – Tanzim Abreza ba sathe Qarya (Dari)

Watershed (upland) management through people's participation

In the mountainous Kahmard district of Afghanistan, the predominantly rural population sustains on limited irrigated land in the bottom of the valleys. Uncontrolled use of the limited natural resources on less fertile land in high altitude rangeland leads not only to flash floods in the valleys and decreasing soil fertility but also to reduced income of the farmers. The degradation of the watersheds responsible for the floods, which threaten houses, agricultural land and infrastructure in the villages of Kahmard district, must be reduced. The problem can only be solved in the long term by an improved management of the areas where runoff and erosion originate. This is why HELVETAS Swiss Intercooperation launched a community-based watershed management project in 2008 focusing on short- and long-term solutions.

The approach aimed to demonstrate the relevance of community-based watershed management in Afghanistan for mitigating flash flood and drought risks by enhancing local capacities to: (i) undertake restoration measures (structural, vegetative and management) in the critical watersheds to control flash floods and droughts, and protective and relief measures in the downstream areas to safeguard against floods, and (ii) apply sustainable income generating activities to improve livelihoods.

The (upland) watershed approach described here comprised activities like establishment of watershed management committees, identification of critical water courses and respective protective measures to be implemented, elaboration of revegetation and land use concepts, discussion with land users on type of interventions as well as implementation of identified interventions aiming at fodder, fuel wood and cash crop production in designated areas. Whereas the inter-linked downstream approach comprised activities for rural energy management (e.g. community bakeries, bio-briquette, passive solar house, energy plantations), protective infrastructures (e.g. flood ways and flood protection wall), nurseries establishment and vegetable gardening.

The approach had ecological, social and economic impacts: e.g. reduced flood risks and damage, rehabilitation of degraded watersheds, productive use of degraded land and cash for work schemes to improve economic situation of the communities, reduced conflict related to land and water use. An important aspect of the approach was the involvement of the local communities so that they take over the responsibility and contribute increasingly from their own resources. The community-based approach is useful also for decision-makers at national level as the Afghan government works on new policies to promote sustainable, community based rangeland and forest management legislations.

Location: Sourakhak Watershed, Kahmard district, Bamyan province
Approach area: About 10 km² (uplands)
Land use type: Grazing land (originally)
Type of Approach: Project based (started in 2008)
Focus: Mainly conservation with other activities
WOCAT database reference:
Related technology (ies): Continuous Contour Trench, *Kanda*, Community Bakery
Compiled by: Bhuchar Sanjeev
Contributors: Azami Mohammad Khalid, Ashraf Homayoun, Sediqi Ali Ahmad, Sthapit Keshar, Ziauddin Arbob and other Sourakhak watershed management committee members
Date: 30/12/2012
(Editors comments): This documented fact sheet refers to the approach supported by HELVETAS Swiss Intercooperation for managing the upland areas. For activities in the valley bottoms, e.g. community bakeries, energy plantations, nurseries, protective infrastructure, home based gardening, the approaches followed were different. In all the cases, target CDCs were the main implementing partners of HELVETAS Swiss Intercooperation. Projects related to bio-briquettes, home-based gardens and nurseries were women-specific.

Problem, objectives and constraints

Problems: Watershed degradation due to overgrazing, shrub cutting for fuel wood purpose, ploughing of pastures for rain fed wheat cultivation and recurring droughts resulting in severe flash floods and damages.

Aims/Objectives
The goal of the approach was to increase the livelihood security of selected communities of Kahmard district through flash flood and drought risk mitigation.

Constraints addressed

Major	Constraint	Treatment
Financial	Lack of funds for rehabilitating degraded watersheds, particularly common lands	Funding support from Swiss Re, HELVETAS Swiss Intercooperation and Swiss Agency for Development and Cooperation (SDC)
Institutional	Lack of local organisational and institutional mechanisms for sustainable land and water management	Watershed management committees and rules and regulations formed in a participatory way
Land use rights	Ambiguous land use rights and ownership with regard to common grazing lands/upland watersheds even though, formally, the land belongs to the state	Clarification of land ownership and use rights through a participatory process involving respective local communities and the district government authorities
Technical	Low capacities of local communities to apply community based sustainable land and water concepts and methods	Piloting and scaling-up of multi-purpose conservation measures in the upland and valley bottoms. Capacity building of local communities and project staff.
Minor	**Constraint**	**Treatment**
Policies	Lack of policies and institutional frameworks for community based natural resource management	Lessons learnt shared with relevant government agencies at the district, provincial and national levels, and with SDC and SwissRe.

Participation and decision making

Stakeholders / target groups


Land users: Group


SLM specialists


Planners: District Government and DDA, CDCs

Approach costs met by:

International Donors (SDC, SwissRe Award)	90%
Land users	10%
TOTAL	100%

Annual budget for SLM component: About 30,000-40,000 USD. This is based on 5 years average. In some years, there was more expenditure and in others less. It also depends on the site selected and the technologies to be applied.

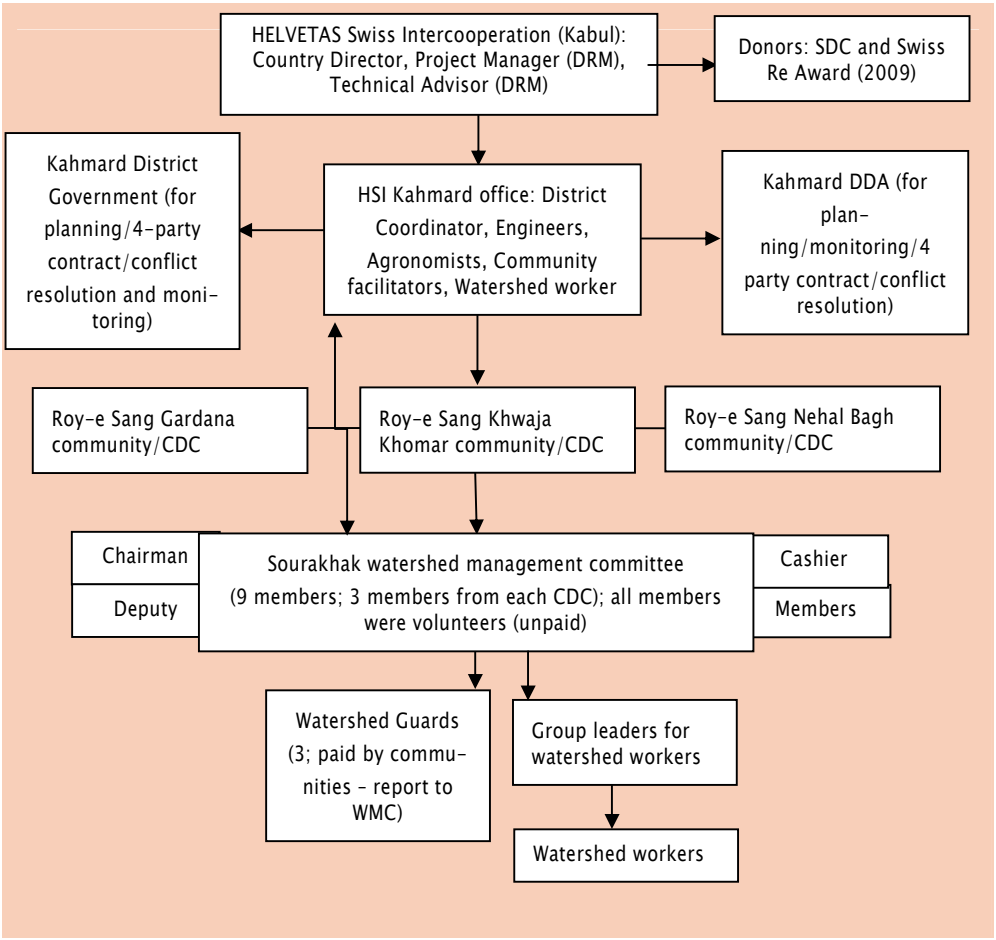
Decisions on choice of the Technology (ies): Mainly by SLM specialists in consultation with the land users.
Decisions on method of implementing the Technology (ies): Mainly by SLM specialists in consultation with the land users.
Approach designed by: The approach was designed by international and national SLM specialists and land users.
Implementing bodies: International non-governmental organisation (HELVETAS Swiss Intercooperation); international donors, namely, SwissRe Award and SDC; Kahmard district government; 3 Roy-e Sang Community Development Councils (CDCs), Sourakhak Watershed Management Committee and land users (about 670 families).

Land user involvement

Phase	Involvement	Activities
Initiation/motivation	Self-mobilisation	Local communities submitted request to HELVETAS Swiss Intercooperation for project support aiming at reducing flash flood risks
Planning	Interactive	A participatory planning workshop was organised in 2008. Project proposal was prepared and awarded. Pre-feasibility and feasibility studies were conducted.
Implementation	Interactive	SLM options were identified. Technical and financial proposals prepared. Code of conduct with respective CDCs and a 4-party contract was signed. Watershed management committee was appointed by the 3 CDCs and through that committee, all the works were organised with technical support from the project staff.
Monitoring/evaluation	Interactive	All the stakeholders, including district government, DDA and local communities, were involved in assessing the quality of work. Surveys were conducted to assess the outcomes and lessons learned. Social audits were also organised for financial transparency.
Research	None	

Differences between participation of men and women: There were great differences due to cultural reasons. Mostly men participated in the planning and implementation of upland activities. However, there were projects specific for women in the valleys like projects on bio-briquettes, private nurseries, home based vegetable gardens, vegetable cash crop cultivation, etc.

Involvement of disadvantaged groups: There was no specific approach for involving the disadvantaged groups as everyone had equal opportunity.



Organogram

Organisational structure for the watershed (upland) management component of the Sourakhak watershed management approach supported by HELVETAS Swiss Intercooperation

(Drawing by Sanjeev Bhuchar)

District government and DDA were involved in planning, conflict mitigation, monitoring and knowledge sharing activities. They were signatories to the 4-party contract.

Abbreviations:

CDC: Community Development Council

DDA: District Development Assembly

DRM: Disaster Risk Mitigation

HSI: HELVETAS Swiss Intercooperation

SDC: Swiss Agency for Development and Cooperation

WMC: Watershed Management Committee

Technical support

Training / awareness raising: Practical trainings (mostly on the job) were organised for Watershed Management Committee members, watershed workers and group leaders. Selected project staff participated in international and national training courses organised by the International Centre for Integrated Mountain Development (ICIMOD, Nepal) and Sustainable Land Management Institute Organisation in Bamyan (Afghanistan), respectively.
Advisory service: There was no formal advisory service from the government but HELVETAS Swiss Intercooperation provided continuous technical backstopping.
Research: No, but lessons learned and good practices were evaluated, documented and shared with different stakeholders.

External material support / subsidies

Contribution per area: International Swiss Re Award (2009) for sustainable watershed management, SDC, HELVETAS Swiss Intercooperation and participating communities (about 20% contribution) were the main contributors.
Labour: The project had a "Cash for Work" approach and national daily wage rates were applied. All the participating families from Roy-e Sang CDCs had the right to work in the watershed. The Sourakhak Watershed Management Committees organised watershed works while for projects in the valley bottoms, CDC members were involved. Whenever there was a need for workers, announcements were made through the mosques so that everyone received information. People worked in groups and each group had a group leader who had the overall responsibility for ensuring that the work was done properly and on time.
Inputs: All the equipments, constructing materials and planting materials were financed under the approach.
Credit: There was no provision for credit for any party.
Support to local institutions: The project built capacities of participating CDCs and the watershed management committees by providing technical, training, and financial and equipment support. By involving government authorities and District Development Assemblies in monitoring activities, their capacities were also enhanced.

Monitoring and evaluation

Monitored aspects	Methods and indicators
Bio-physical	Plant survival rates, changes in land cover (natural vegetation) and flash flood risks were observed, and application of grazing and shrub cutting rules monitored. Project staff, WMC, CDC and DDA members, and government authorities were involved in the monitoring.
Technical	The quality and quantity of SLM measures applied were monitored on a regular basis by the project staff together with the Watershed Management Committee, District Development Assembly (DDA) and designated government officials.
Socio-cultural	Reduction in food gap and migration due to cash for work schemes were measured through surveys and case studies.
Economic/production	Survey methods were used for measuring change in family income and migration pattern and harvest methods employed for assessing crop yields.
Area treated	Areas treated/to be treated were surveyed with the help of watershed management committee members and by using Google Earth technology.
No. of land users involved	Direct and indirect project beneficiaries for each major activity were identified during pre-feasibility studies by the project staff in consultation with respective CDCs and watershed committee members.
Management of Approach	Participatory annual reviews were conducted by the project management. Based on lessons learned, slight adjustments to the approach were made.

Changes as result of monitoring and evaluation: Some: e.g. Continuous Contour Trenches were constructed in place of staggered trenches; Mulching and pitcher irrigation methods were included for plantations; Community bakery designs were slightly modified. Plantations of tree species were reduced due to remoteness of the areas, water scarcity problem and micro climate. Watershed worker paid by HELVETAS Swiss Intercooperation was appointed for supervision and plantation caretakers were appointed who also guarded the areas.

Impacts of the Approach

Improved sustainable land management: Sourakhak watershed is greener. Shrubs and other useful plant species are re-establishing. There are no more severe flash floods from Sourakhak, and the communities living downstream are protected.
Adoption by other land users/projects: Yes, a few: e.g. Doro CDC in Kahmard district, Sayed Baba, Deh Nola, Khudaded Khel, Qwarana CDCs in Saighan district and also in Ruy-e Doab implement similar approach.
Improved livelihoods / human well-being: Yes greatly. Flash flood risks were reduced. About 600 families earned cash from work which reduced food gaps and migration. Due to community bakeries, women, children and men are relaxed and there is more cash saving as people purchase less shrubs for baking bread. Many students continue their studies due to increased family income from the watershed works.
Improved situation of disadvantaged groups: Yes little, due to cash for work schemes and reduction in flash flood risks.
Poverty alleviation: Yes, little due to more cash for work opportunities and protection of private assets from floods.
Training, advisory service and research: Trainings provided to land users as well as project staff were effective.
Land/water use rights: Clear land ownership and use rights and people's willingness to work collectively are critical factors for the smooth implementation and sustainability of watershed activities.
Long-term impact of subsidies: Providing subsidies or external support for community watershed management projects will have positive long-term impacts on local and national economy and the environment and reduce flash flood and drought risks provided too much cash injection (through cash for work) does not cause inflation.

Concluding statements

Main motivation of land users to implement SLM: Reduction of flash flood risks, increased on-site and off-site production and improved well-being of rural population.
Sustainability of activities: People will sustain the activities. They will get a boost if there is policy and institutional support from the Afghan government for community based natural resource management.

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
Flash floods risks from Sourakhak watershed reduced (no more severe flash floods and damages) → People must maintain the applied measures, keep control over grazing and shrub cutting and plant more fodder, fuel wood and cash crops.	Lack of institutional support from the government, although the Kahmard district governor is very supportive of the approach → Lessons learnt must continue to be shared with the government. Register watershed committee with the Government following endorsed national guidelines for natural resource management.
Cash for work approach improved people's well-being → Fodder, fruit, timber, fuel wood and cash crops (Asafoetida and Cumin) will provide sustainable economic/production benefits in the long-term and they should be further promoted.	Benefit-sharing mechanism is missing → A mechanism should be developed in a participatory way with all the stakeholders and by involving all the community members of Roy-e Sang CDCs.
Local organisational capacities for sustainable watershed management enhanced → Social mobilisation aspect needs to be improved. Capacities of staff and watershed management committee members also need to be enhanced for better social mobilisation.	Less involvement of women → Women should be involved in the planning and implementation process in culturally sound way. Men also need to be sensitized about the role of gender in natural resource management and rural livelihoods.
The approach facilitates a participatory process based on principles of good governance → The entire target population and not just CDC members and selected land users should be considered during the planning phase. The government should take an active role in supporting community-based and holistic watershed management and disaster management approaches.	Sometimes people think watershed management is about digging trenches and do not have complete idea about which technology should be applied where → People need to visualise and plan holistically. As there is now experience gained, it will be better to prepare watershed management master plans considering community development plans and participatory water and land use plans.

Key reference(s): http://www.youtube.com/watch?v=ySR-qWnZZgM
Contact person(s): Mhd. Khalid Azami, Deputy Country Director, HELVETAS Swiss Intercooperation, Afghanistan (khalid.azami@helvetas.org)