



Reforestation site (Mia Jan Maroofi)

Afforestation for firewood production (Afghanistan)

Bunyodi jangal baroi tavlidi chubi sukht

DESCRIPTION

Non-fruit and fruit trees are planted on heavily degraded forest land to protect the land from erosion and further degradation and provide fuelwood for the local community.

Project supported implementation of afforestation has taken place in the villages of Sari Joy, Jawaz Khana and Dashti Mirzai, located in Chokar watershed of Rustaq District in Northern Afghanistan. The Chokar watershed is a mountainous area situated between 600 and 2,500 m above sea level. The climate is semi-arid with harsh and cold weather in winter, and hot and dry summers. The annual precipitation in average years is 580 mm. Land degradation affects all forms of land use, and includes low levels of vegetation cover, severe water erosion of topsoil, and poor soil fertility. Unsustainable agricultural practices, over-exploitation and high pressure on the natural resources are adversely impacting the socio-economic well-being of local communities, as well as contributing to the risk of being adversely affected by drought - and landslides and flash foods triggered by heavy rainfall. The data used for the documentation of the technology are based on field research conducted in Chokar watershed, namely in the villages of Sari Joy, Jawaz Khana and Dashti Mirzai. These villages represent the upper, the middle and the lower zones of Chokar watershed, respectively. They differ considerably in access to services and infrastructure, but in general are poorly served. The communities depend on land resources for sustaining their livelihoods. In a good year with high yields, wheat self-sufficiency lasts about 5 months. The three villages are home to ethnic Qarluq communities. Since 2012 the Livelihood Improvement Project Takhar (LIPT) implemented by Terre des hommes (TdH) Switzerland has initiated a range of NRM interventions

Despite the low forest cover in Rustaq, Afghanistan, local communities strongly rely on fuelwood and animal dung for cooking and heating throughout the whole year. Forests are mainly found on community land with open access to all, and there are no protection measures in place. The high demand on fuelwood for household needs places strong pressure on the remaining patches of forests and bushes, which are currently threatened by eradication. Such high demand in the area is likely to remain as there are no other alternative energy sources. The mass destruction of local forests is one of the main causes of intensive erosion, aridification, loss of topsoil and formation of gullies. Low forest cover increases vulnerability to severe rainfall and risks of landslides.

Afforestation measures in the three villages were initiated to halt the land degradation and provide sustainable firewood. The reforestation sites are largely on community land with a small share on private land. The area is characterized by hilly (16-30%) and steep (31-60%) slopes. Planting and maintaining forest in such conditions requires close support in the appropriate design of forest plots, and relevant maintenance recommendations, which can then ensure the survival of the plantation. A plot of 0.2 ha is divided into 4 m x 3 m sections. Each tree is placed in a pit of 50 cm x 30 cm with rich soil around the roots. Once the tree is planted, it is watered and covered with lime. Russian willow, acacia, mulberry and almond are the most common tree species used for afforestation purposes.

Most of the newly established forest sites are located at walking distance of the nearby villages: this is important to help provide protection of the plot from animal intrusion and ensure proper maintenance of the trees. The forest plot is watered for three years in a row. The Natural Resources Management Committees (NRM) pays 0.60 US cents per tree per year to sustain the survival of the plantation within the first year. The funding for the irrigation is provided by the Livelihood Improvement Project Takhar (LIPT). LIPT supported the afforestation activities through the provision of technical and financial support. The tree seedlings were supplied by the project, and financial incentives were provided to engage the community in tree-planting.

The plantations are still very young; however, the land users express support for the new forest in their villages, and have observed localized stabilization of the soil and improvement in vegetation cover. There are high expectations of the new forest, which promises access to sustainable fuelwood and non-forest products, such as almonds and mulberry. The grass and tree leaves from the forest plots are already used for animal fodder.

Women and children under 15 years old are expected to be the direct beneficiaries of the new forest. They will no longer spend long hours to collect and deliver fuelwood, bushes and dung. A small portion of women reported involvement in forest establishment activities, while the majority are taking part in protecting the forests from livestock.

LIEU



Lieu: Sari Joy, Jawaz Khana, Dashti Mirzai, Takhar Province, Rustaq District, Afghanistan

Nbr de sites de la Technologie analysés: 10-100 sites

Géo-référence des sites sélectionnés

- 69.91984, 37.10936

Diffusion de la Technologie: répartition uniformément sur une zone (approx. 0,1-1 km²)

Date de mise en oeuvre: il y a moins de 10 ans (récemment)

Type d'introduction

- ☐ grâce à l'innovation d'exploitants des terres
- ☐ dans le cadre d'un système traditionnel (> 50 ans)
- ☐ au cours d'expérimentations / de recherches
- ☒ par le biais de projets/ d'interventions extérieures



Holes for planting tree seedlings (Reto Zender)



Young trees on a new forest plot (Mia Jan Maroofi)

CLASSIFICATION DE LA TECHNOLOGIE

Principal objectif

- ✓ améliorer la production
- ✓ réduire, prévenir, restaurer les terres dégradées
- préserver l'écosystème
- protéger un bassin versant/ des zones situées en aval - en combinaison avec d'autres technologies
- conserver/ améliorer la biodiversité
- ✓ réduire les risques de catastrophes
- s'adapter au changement et aux extrêmes climatiques et à leurs impacts
- atténuer le changement climatique et ses impacts
- créer un impact économique positif
- créer un impact social positif

L'utilisation des terres



Mixte (cultures/ pâturages/ arbres), incluant l'agroforesterie - Sylvopastoralisme
Principaux produits/ services: Acacia, Russian willow, mulberry, almond, grass and leaves for fodder

Approvisionnement en eau

- pluvial
- ✓ mixte: pluvial-irrigué
- pleine irrigation

Nombre de période de croissance par an: 1

Utilisation des terres avant la mise en oeuvre de la Technologie: Some of the forest land has been heavily degraded and was used as grazing land for an extensive period. Most of the land is forest land.

Densité d'élevage/ chargement: sans objet

But relatif à la dégradation des terres

- prévenir la dégradation des terres
- ✓ réduire la dégradation des terres
- ✓ restaurer/ réhabiliter des terres sévèrement dégradées
- s'adapter à la dégradation des terres
- non applicable

Dégradation des terres traitée



érosion hydrique des sols - Wt: perte de la couche superficielle des sols (couche arable)/ érosion de surface



érosion éolienne des sols - Et: perte de la couche superficielle des sols (couche arable)



dégradation biologique - Bc: réduction de la couverture végétale, Bq: baisse de la quantité/ biomasse



dégradation hydrique - Ha: aridification

Groupe de GDT

- Amélioration de la couverture végétale/ du sol

Mesures de GDT



pratiques végétales - V1: Couverture d'arbres et d'arbustes, V2: Herbes et plantes herbacées pérennes



modes de gestion - M1: Changement du type d'utilisation des terres

DESSIN TECHNIQUE

Spécifications techniques

The establishment activities begin with selecting the area for reforestation. Most of the reforestation sites are on slopes above 6% steepness. A plot of 0.2 ha is divided into 4 m x 3 m sections. Planting pits of 50 cm x 30 cm are prepared for planting the trees. Each tree is placed in a pit and good soil is added to the roots. Most popular species used for reforestation are: Russian willow, acacia and mulberry. The newly planted tree is watered and the trunk is covered with a lime and water solution for protection and better growth.

MISE EN ŒUVRE ET ENTRETIEN : ACTIVITÉS, INTRANTS ET COÛTS

Calcul des intrants et des coûts

- Les coûts sont calculés : par superficie de la Technologie (taille et unité de surface : **1 ha**)
- Monnaie utilisée pour le calcul des coûts : **dollars US**
- Taux de change (en dollars américains - USD) : 1 USD = 67.0
- Coût salarial moyen de la main-d'oeuvre par jour : 5.2-5.3 USD

Facteurs les plus importants affectant les coûts

Due to the remoteness of the villages where the technology has been implemented, all the inputs for establishment, such as agricultural equipment, plant material, fertilizers, etc., are purchased in Rustaq town. The expenses for traveling and delivering the inputs affect the establishment costs.

Activités de mise en place/ d'établissement

1. Design of the forest plot (Calendrier/ fréquence: Winter)
2. Digging pits 50 cm x 30 cm for tree plantation (Calendrier/ fréquence: End of winter)
3. Planting tree seedlings 3m x 4m (Calendrier/ fréquence: Spring/Rainy season)

4. Watering the tree after planting (Calendrier/ fréquence: Spring)
5. Covering the tree with lime (Calendrier/ fréquence: Spring)

Intrants et coûts de mise en place (per 1 ha)

Spécifiez les intrants	Unité	Quantité	Coûts par unité (dollars US)	Coût total par intrant (dollars US)	% des coût supporté par les exploitants des terres
Main d'œuvre					
Design of the forest	person-day	15,0	5,3	79,5	
Digging pits/holes for the trees	person-day	22,0	5,3	116,6	
Planting tree seedlings and watering	person-day	15,0	5,3	79,5	
Fertilizer and lime application	person-day	8,0	5,3	42,4	
Equipements					
Meter	piece	1,0	2,25	2,25	
Shovel	piece	2,0	3,8	7,6	
Pickaxe	piece	1,0	2,25	2,25	
Rope	meter	500,0	0,07	35,0	
Matériel végétal					
Accacia seedlings	piece	275,0	0,45	123,75	
Russian willow seedlings	piece	275,0	0,45	123,75	
Mulberry seedlings	piece	275,0	0,45	123,75	
Engrais et biocides					
DAP	kg	250,0	0,9	225,0	
Lime	kg	25,0	1,5	37,5	
Coût total de mise en place de la Technologie				998.85	

Activités récurrentes d'entretien

1. Protecting the trees from livestock (Calendrier/ fréquence: Spring/Summer)
2. Pest and disease control (Calendrier/ fréquence: Spring)
3. Irrigation (Calendrier/ fréquence: Summer/First three years)
4. Replanting dead trees (Calendrier/ fréquence: Spring)
5. Pruning (Calendrier/ fréquence: Spring)

Intrants et coûts de l'entretien (per 1 ha)

Spécifiez les intrants	Unité	Quantité	Coûts par unité (dollars US)	Coût total par intrant (dollars US)	% des coût supporté par les exploitants des terres
Main d'œuvre					
Pest and disease control	person day	7,5	5,3	39,75	100,0
Replanting dead trees	person day	7,5	5,3	39,75	100,0
Irrigating the trees	person day	10,0	5,3	53,0	100,0
Pruning	person day	5,0	5,3	26,5	100,0
Coût total d'entretien de la Technologie				159.0	

ENVIRONNEMENT NATUREL

Précipitations annuelles

- ☐ < 250 mm
- ☒ 251-500 mm
- ☒ 501-750 mm
- ☐ 751-1000 mm
- ☐ 1001-1500 mm
- ☐ 1501-2000 mm
- ☐ 2001-3000 mm
- ☐ 3001-4000 mm
- ☐ > 4000 mm

Zones agro-climatiques

- ☐ humide
- ☐ subhumide
- ☒ semi-aride
- ☐ aride

Spécifications sur le climat

Précipitations moyennes annuelles en mm : 564.0
Average annual precipitation for the area was calculated with 564 mm, with minimum in dry years (2000 and 2001) of 270 mm and maximum in wet years (2009/2010) of 830 mm. The absolute maximum rainfall was calculated for 1986 with 1024 mm. The data series covers the time from 1979 to 2014.
Nom de la station météorologique : Climate Forecast System Reanalysis (CFSR), <http://rda.ucar.edu/pub/cfsr.html>
Derived from the publicly available dataset on length of growing period (LGP) (Fischer 2009 / IIASA-FAO). Internet link: http://tiles.arcgis.com/tiles/P8Cok4qAP1sTVE59/arcgis/rest/services/Length_of_growing_peri

Pentes moyennes

- ☐ plat (0-2 %)
- ☐ faible (3-5%)
- ☐ modéré (6-10%)
- ☐ onduleux (11-15%)
- ☒ vallonné (16-30%)
- ☒ raide (31-60%)
- ☐ très raide (>60%)

Reliefs

- ☐ plateaux/ plaines
- ☐ crêtes
- ☒ flancs/ pentes de montagne
- ☒ flancs/ pentes de colline
- ☐ piémonts/ glaciers (bas de pente)
- ☐ fonds de vallée/bas-fonds

Zones altitudinales

- ☐ 0-100 m
- ☐ 101-500 m
- ☐ 501-1000 m
- ☒ 1001-1500 m
- ☒ 1501-2000 m
- ☐ 2001-2500 m
- ☐ 2501-3000 m
- ☐ 3001-4000 m
- ☐ > 4000 m

La Technologie est appliquée dans

- ☐ situations convexes
- ☐ situations concaves
- ☐ non pertinent

Profondeurs moyennes du sol

- ☐ très superficiel (0-20 cm)
- ☐ superficiel (21-50 cm)
- ☒ modérément profond (51-80 cm)
- ☐ profond (81-120 cm)
- ☐ très profond (>120 cm)

Textures du sol (de la couche arable)

- ☐ grossier/ léger (sablonneux)
- ☒ moyen (limoneux)
- ☐ fin/ lourd (argile)

Textures du sol (> 20 cm sous la surface)

- ☐ grossier/ léger (sablonneux)
- ☒ moyen (limoneux)
- ☐ fin/ lourd (argile)

Matière organique de la couche arable

- ☐ abondant (>3%)
- ☒ moyen (1-3%)
- ☒ faible (<1%)

Profondeur estimée de l'eau dans le sol ☐ en surface ☐ < 5 m ☒ 5-50 m ☐ > 50 m	Disponibilité de l'eau de surface ☐ excès ☐ bonne ☒ moyenne ☐ faible/ absente	Qualité de l'eau (non traitée) ☒ eau potable ☐ faiblement potable (traitement nécessaire) ☐ uniquement pour usage agricole (irrigation) ☐ eau inutilisable	La salinité de l'eau est-elle un problème ? ☐ Oui ☒ Non Présence d'inondations ☒ Oui ☐ Non
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Diversité des espèces ☐ élevé ☐ moyenne ☒ faible	Diversité des habitats ☐ élevé ☐ moyenne ☒ faible
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CARACTÉRISTIQUES DES EXPLOITANTS DES TERRES APPLIQUANT LA TECHNOLOGIE

Orientation du système de production ☒ subsistance (auto-apvisionnement) ☒ mixte (de subsistance/ commercial) ☐ commercial/ de marché	Revenus hors exploitation ☐ moins de 10% de tous les revenus ☒ 10-50% de tous les revenus ☒ > 50% de tous les revenus	Niveau relatif de richesse ☐ très pauvre ☐ pauvre ☒ moyen ☒ riche ☐ très riche	Niveau de mécanisation ☒ travail manuel ☐ traction animale ☐ mécanisé/ motorisé
Sédentaire ou nomade ☒ Sédentaire ☐ Semi-nomade ☐ Nomade	Individus ou groupes ☒ individu/ ménage ☒ groupe/ communauté ☐ coopérative ☐ employé (entreprise, gouvernement)	Genre ☒ femmes ☒ hommes	Âge ☐ enfants ☐ jeunes ☒ personnes d'âge moyen ☒ personnes âgées
Superficie utilisée par ménage ☐ < 0,5 ha ☐ 0,5-1 ha ☐ 1-2 ha ☒ 2-5 ha ☐ 5-15 ha ☐ 15-50 ha ☐ 50-100 ha ☐ 100-500 ha ☐ 500-1 000 ha ☐ 1 000-10 000 ha ☐ > 10 000 ha	Échelle ☐ petite dimension ☒ moyenne dimension ☐ grande dimension	Propriété foncière ☐ état ☐ entreprise ☒ communauté/ village ☐ groupe ☒ individu, sans titre de propriété ☐ individu, avec titre de propriété	Droits d'utilisation des terres ☐ accès libre (non organisé) ☒ communautaire (organisé) ☐ loué ☒ individuel Droits d'utilisation de l'eau ☐ accès libre (non organisé) ☒ communautaire (organisé) ☐ loué ☐ individuel

Accès aux services et aux infrastructures

IMPACT

Impacts socio-économiques

production fourragère	en baisse		en augmentation
production animale	en baisse		en augmentation
production de bois	en baisse		en augmentation
production forestière non ligneuse	en baisse		en augmentation
diversité des produits	en baisse		en augmentation

Impacts socioculturels

connaissances sur la GDT/ dégradation des terres	réduit		amélioré
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Land users learned new methods of planting trees based on the local conditions.

situation des groupes socialement et économiquement désavantagés (genre, âge, statut, ethnie, etc.)	détérioré		amélioré
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The established forest is expected to become a reliable source for firewood, which will decrease the burden of women and children under 15 years, who spend long hours to collect firewood.

Impacts écologiques

ruissellement de surface	en augmentation		en baisse
perte en sol	en augmentation		en baisse
couverture végétale	en baisse		en augmentation

Impacts hors site

inondations en aval (indésirables)	en augmentation		réduit
envasement en aval	en augmentation		en baisse
capacité tampon/de filtration (par les sols, la végétation, les zones humides)	réduit		amélioré

ANALYSE COÛTS-BÉNÉFICES

Bénéfices par rapport aux coûts de mise en place

Rentabilité à court terme	très négative		très positive
Rentabilité à long terme	très négative		très positive

Bénéfices par rapport aux coûts d'entretien

Based on the multi-criteria matrix: During the FGD with SLM implementers, a multi-criteria matrix was elaborated, and different SLM practices were rated. In the framework of this exercise, SLM implementers were asked to jointly discuss and rate short term (1-3 years) and long-term (10 years) returns. As the SLM technology was only implemented 1-2 years ago, it is too early to compare benefits to maintenance costs. Farmers have little experience so far on the actual benefits of the SLM technology. The ratings are mostly based on expected benefits and not on actual benefits.

CHANGEMENT CLIMATIQUE

Extrêmes climatiques (catastrophes)

pluie torrentielle locale
sécheresse

pas bien du tout ☐ ☐ ☐ ☒ très bien
pas bien du tout ☐ ☐ ☐ ☒ très bien

ADOPTION ET ADAPTATION DE LA TECHNOLOGIE

Pourcentage d'exploitants des terres ayant adopté la Technologie dans la région

- ☐ cas isolés/ expérimentaux
- ☒ 1-10%
- ☐ 10-50%
- ☐ plus de 50%

Nombre de ménages et/ou superficie couverte

23.6 ha have been afforested with LIPT support

Parmi tous ceux qui ont adopté la Technologie, combien d'entre eux l'ont fait spontanément, à savoir sans recevoir aucune incitation matérielle ou aucun paiement ?

- ☐ 0-10%
- ☒ 10-50%
- ☐ 50-90%
- ☐ 90-100%

La Technologie a-t-elle été récemment modifiée pour s'adapter à l'évolution des conditions ?

- ☐ Oui
- ☒ Non

A quel changement ?

- ☐ changements/ extrêmes climatiques
- ☐ évolution des marchés
- ☐ la disponibilité de la main-d'œuvre (par ex., en raison de migrations)

CONCLUSIONS ET ENSEIGNEMENTS TIRÉS

Points forts: point de vue de l'exploitant des terres

- The tree plantations protect the soil from erosion. The land is less vulnerable to heavy rainfall, which washes off the topsoil
- There are very high expectations about production of firewood. Availability of firewood in local forest will make it much easier to access firewood for cooking and heating by local households.
- Apart from firewood and wood production, other non-timber products are provided by the afforestation plots, such as fodder for livestock from grass (alfalfa, sainfoin) and tree leaves during autumn. Also some plots are planted with almond and mulberry, which can be collected for own use or for selling.
- Local people value the recreational benefit of the forest, which make their villages greener and provide green spaces for the local people.

Points forts: point de vue du compilateur ou d'une autre personne-ressource clé

- The afforestation measures in the village including establishing the forest and protecting it, mobilizing the community around a common goal, and this has a positive impact on the village as a whole.
- The planted trees and grass under the trees improve the vegetation cover and increase soil quality, which is then less prone to erosion
- Improved varieties of fruit and non-fruit tree species used for afforestation help to diversify the tree species in the village and make the soil less resistant to dry spells
- The expected combined benefits of wood and non-wood products, especially when the harvesting period starts, may have positive impact on households' income and food security.

Faiblesses/ inconvénients/ risques: point de vue de l'exploitant des terres comment surmonter

- The establishment costs for afforestation measures are very high
- The young trees are vulnerability to droughts
- During maintenance some plots require irrigation
- Afforestation plots, which are established on former grazing land, reduces the grazing land in the village and deprives animals from grazing land

Faiblesses/ inconvénients/ risques: point de vue du compilateur ou d'une autre personne-ressource clé comment surmonter

- Community provides weak or no protection of the afforestation site, which results in low tree survival
- Weak funding sources for irrigation of the afforestation plots, particularly during the first three years when the trees are young, might compromise the new plantations
- Afforestation is established mostly on community land, where unclear land tenure rights persist, which may cause conflict in the community over forest vs grazing land

RÉFÉRENCES

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Description complète dans la base de données WOCAT

https://qcat.wocat.net/fr/wocat/technologies/view/technologies_668/

Données de GDT correspondantes

sans objet

La documentation a été facilitée par

Institution

- Bern University of Applied Sciences, School of Agricultural, Forest and Food Sciences (HAFL) - Suisse
- CDE Centre for Development and Environment (CDE Centre for Development and Environment) - Suisse
- Swiss Agency for Development and Cooperation (DEZA / COSUDE / DDC / SDC) - Suisse
- Terre des Hommes (Terre des Hommes) - Suisse

Projet

- Livelihood Improvement Project Takhar, Afghanistan (LIPT)
- Potential and limitations for improved natural resource management (NRM) in mountain communities in the Rustaq district, Afghanistan (Rustaq NRM Study)

Références clés

- Guidelines for Focus Groups Discussions:
- Methods section of the Rustaq NRM study:

