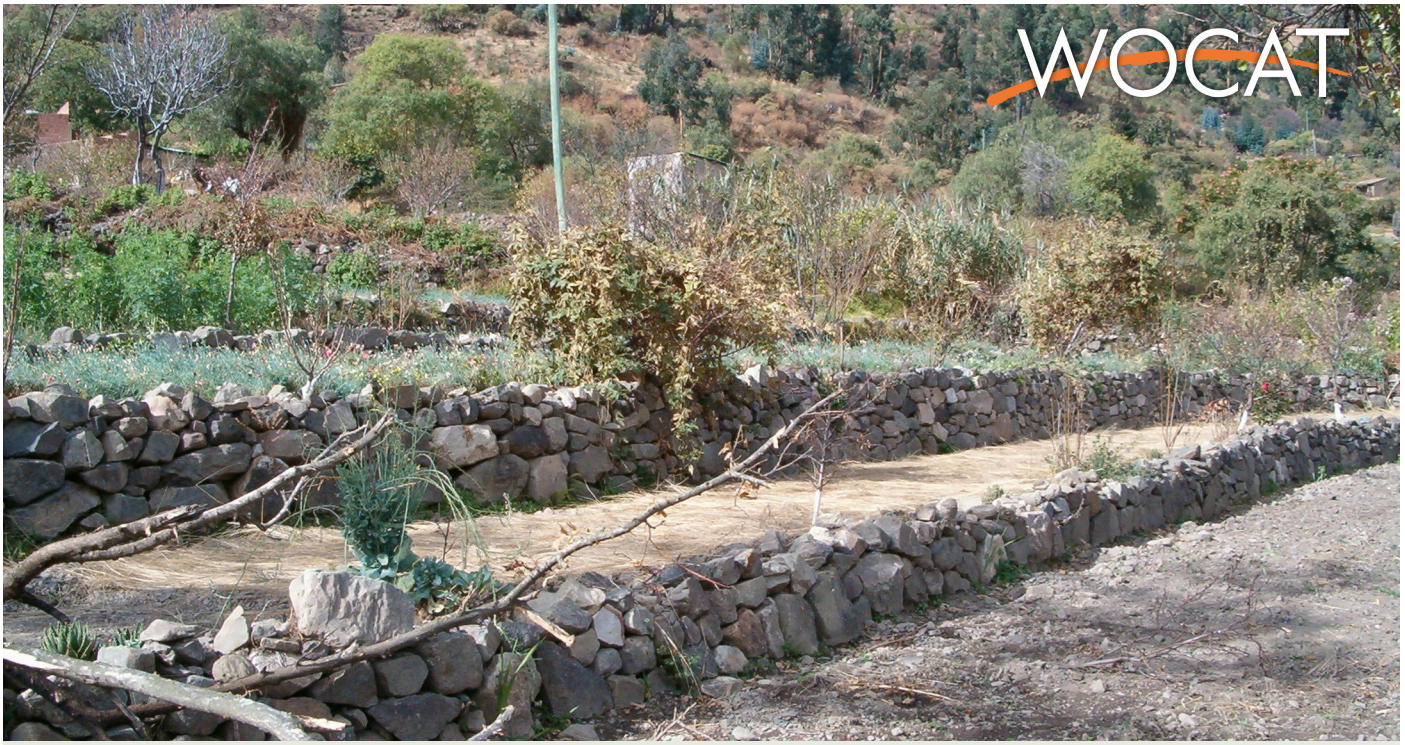

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Muros de Piedras para Terrazas de Formación Lenta (Bolivia, Plurinational State of)

Muros de Piedras para Terrazas de Formación Lenta

DESCRIPTION

Establecimiento de Muros de Terrazas de Formación Lenta con piedras.

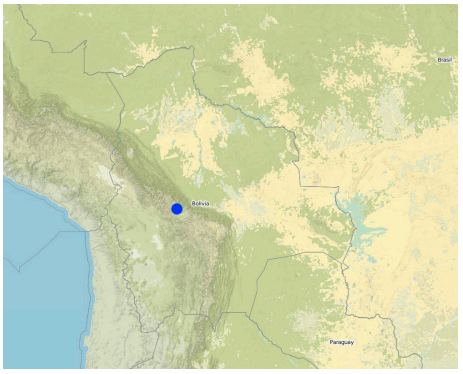
Las Terrazas de Piedras de Formación Lenta (TFL) están puestas en sentido de las curvas de nivel y perpendiculares a la pendiente. En muchas ocasiones se hallan combinadas con arbustos en su lado superior o inferior, dependiente al sistema de riego. La construcción tiene el propósito de acumular el material suelo llegando a constituirse en una terraza de formación lenta a mediano y corto plazo. Sobre los muros se dispone una hilera de Barreras Vivas con especies del lugar.

La práctica reduce el grado y el largo de la pendiente y de tal manera reduce la erosión hídrica laminar y en surcos en los áreas de cultivos.

Los Muros de Piedra de Formación Lenta llegan a constituirse en terrazas que tienen una duración a largo plazo. La práctica requiere poco mantenimiento (colocar piedras caidas). Las terrazas están en sentido de las curvas de nivel ("Nivel A" -> informaciones acerca del "Nivel A" vea anexo T3).

Cuando hay piedras disponibles, las Terrazas de Formación Lenta se constituyen por muros de piedras. Cuando hay falta de piedras se suele construir Barreras Vivas (vea BOL02).

LOCATION



Location: Cercado / Cochabamba, Bolivia, Plurinational State of

No. of Technology sites analysed:

Geo-reference of selected sites
- -66.1364, -17.3153

Spread of the Technology: evenly spread over an area (0.01 km^2)

In a permanently protected area?:

Date of implementation: less than 10 years ago (recently)

Type of introduction
- ☐ through land users' innovation
- ☐ as part of a traditional system (> 50 years)
- ☐ during experiments/ research
- ☑ through projects/ external interventions

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CLASSIFICATION OF THE TECHNOLOGY

Main purpose

- [ ] improve production
- [x] reduce, prevent, restore land degradation
- [ ] conserve ecosystem
- [ ] protect a watershed/ downstream areas – in combination with other Technologies
- [ ] preserve/ improve biodiversity
- [ ] reduce risk of disasters
- [ ] adapt to climate change/ extremes and its impacts
- [ ] mitigate climate change and its impacts
- [ ] create beneficial economic impact
- [ ] create beneficial social impact

Land use

Cropland

- Annual cropping

Number of growing seasons per year: 1

Water supply

- [x] rainfed
- [ ] mixed rainfed-irrigated
- [ ] full irrigation

Purpose related to land degradation

- [ ] prevent land degradation
- [ ] reduce land degradation
- [ ] restore/ rehabilitate severely degraded land
- [ ] adapt to land degradation
- [ ] not applicable

Degradation addressed

soil erosion by water - Wt: loss of topsoil/ surface erosion, Wg: gully erosion/ gullying

soil erosion by wind - Et: loss of topsoil

SLM group

- cross-slope measure

SLM measures

agronomic measures - A1: Vegetation/ soil cover

structural measures - S1: Terraces, S6: Walls, barriers, palisades, fences

TECHNICAL DRAWING

Technical specifications

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated:
- Currency used for cost calculation: **Boliviano**
- Exchange rate (to USD): 1 USD = 6.6 Boliviano
- Average wage cost of hired labour per day: 3.80

Most important factors affecting the costs

Traer piedras desde lejos al terreno requiere mucha mano de obra, pero no son costos que los campesinos tienen que pagar en efectivo. La aplicación de los biocidas es cara pero más barata que comprar los químicos (funghiherbicidas y fertilizantes) en la ciudad.

Establishment activities

1. Excavación de tierra con "Nivel A" (explicaciones acerca del "Nivel A" vea anexo T3) para nivelar el suelo (Timing/ frequency: independiente)
2. Colocar las piedras de manera "carga", al fondo las piedras más (Timing/ frequency: independiente)
3. Plantar arbustos/árboles a lo largo del muro (Timing/ frequency: preferible en temp. de lluvia)

Maintenance activities

1. Preparación del caldo sulfocálcico: Se hace hervir 10 litros de agua en la lata en un fogón (Timing/ frequency: independiente / anual)
2. cuando el agua está hirviendo, se añade el azufre y la cal con cuidado y se mueve con un palo durante 45 min a una hora a fuego fuerte hasta que tenga un color de vino tinto o guindo oscuro. Se debe agregar agua manteniendo la misma cantidad (Timing/ frequency: independiente / anual)
3. Cuando se ha cambiado el color a vino tinto, se saca del fuego y se deja reposar hasta que se enfrie (Timing/ frequency: independiente / anual)
4. Una vez frío, se debe colar y embotellar para guardarlo bien tapado bajo sombra en un lugar seguro. Para guardar por más de seis meses, se aumenta a cada botella llena una cucharilla de aceite comestible (Timing/ frequency: independiente / anual)
5. Bocashi (preparación de compost mejorado): Coleccionar estiércol del ganado tal como de vaca, llama oveja y gallina y se lo mezcla con paja (Timing/ frequency: independiente / todo el año)
6. Reponer piedras caidas por animales o por escurrimiento (Timing/ frequency: ndependiente/si es necesario)
7. Aumentar el alto del muro junto con la formación de la terraza (Timing/ frequency: ndependiente/si es necesario)
8. Podar los árboles y arbustos (Timing/ frequency: en temp. Fría/1 x año)
9. Como opción para consolidar los muros se puede plantar encima del muro falaris (Timing/ frequency: en temp. de lluvia. Cuando hay riego:independiente)

NATURAL ENVIRONMENT

Average annual rainfall
- [ ] < 250 mm
- [ ] 251-500 mm
- [ ] 501-750 mm
- [x] 751-1,000 mm
- [ ] 1,001-1,500 mm
- [ ] 1,501-2,000 mm
- [ ] 2,001-3,000 mm
- [ ] 3,001-4,000 mm
- [ ] > 4,000 mm

Agro-climatic zone
- [ ] humid
- [x] sub-humid
- [ ] semi-arid
- [ ] arid

Specifications on climate
n.a.

Slope
- [ ] flat (0-2%)
- [ ] gentle (3-5%)
- [ ] moderate (6-10%)
- [ ] rolling (11-15%)
- [ ] hilly (16-30%)
- [x] steep (31-60%)
- [ ] very steep (>60%)

Landforms
- [ ] plateau/plains
- [ ] ridges
- [x] mountain slopes
- [x] hill slopes
- [ ] footslopes
- [ ] valley floors

Altitude
- [ ] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [ ] 501-1,000 m a.s.l.
- [ ] 1,001-1,500 m a.s.l.
- [ ] 1,501-2,000 m a.s.l.
- [ ] 2,001-2,500 m a.s.l.
- [ ] 2,501-3,000 m a.s.l.
- [ ] 3,001-4,000 m a.s.l.
- [ ] > 4,000 m a.s.l.

Technology is applied in
- [ ] convex situations
- [ ] concave situations
- [ ] not relevant

Soil depth
- [ ] very shallow (0-20 cm)
- [x] shallow (21-50 cm)
- [x] moderately deep (51-80 cm)
- [ ] deep (81-120 cm)
- [ ] very deep (> 120 cm)

Soil texture (topsoil)
- [x] coarse/ light (sandy)
- [ ] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Soil texture (> 20 cm below surface)
- [ ] coarse/ light (sandy)
- [ ] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Topsoil organic matter content
- [x] high (>3%)
- [ ] medium (1-3%)
- [ ] low (<1%)

Groundwater table
- [ ] on surface
- [ ] < 5 m
- [ ] 5-50 m
- [ ] > 50 m

Availability of surface water
- [ ] excess
- [ ] good
- [ ] medium
- [ ] poor/ none

Water quality (untreated)
- [ ] good drinking water
- [ ] poor drinking water (treatment required)
- [ ] for agricultural use only (irrigation)
- [ ] unusable

Is salinity a problem?
- [ ] Ja
- [ ] Nee

Occurrence of flooding
- [ ] Ja
- [ ] Nee

Species diversity
- [ ] high
- [ ] medium
- [ ] low

Habitat diversity
- [ ] high
- [ ] medium
- [ ] low

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- [ ] subsistence (self-supply)
- [ ] mixed (subsistence/ commercial)
- [ ] commercial/ market

Off-farm income
- [x] less than 10% of all income
- [ ] 10-50% of all income
- [ ] > 50% of all income

Relative level of wealth
- [ ] very poor
- [x] poor
- [ ] average
- [ ] rich
- [ ] very rich

Level of mechanization
- [x] manual work
- [x] animal traction
- [ ] mechanized/ motorized

Sedentary or nomadic
- [ ] Sedentary
- [ ] Semi-nomadic
- [ ] Nomadic

Individuals or groups
- [ ] individual/ household
- [ ] groups/ community
- [ ] cooperative
- [ ] employee (company, government)

Gender
- [ ] women
- [ ] men

Age
- [ ] children
- [ ] youth
- [ ] middle-aged
- [ ] elderly

Area used per household
- [ ] < 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

Scale
- [ ] small-scale
- [ ] medium-scale
- [ ] large-scale

Land ownership
- [ ] state
- [ ] company
- [ ] communal/ village
- [ ] group
- [ ] individual, not titled
- [x] individual, titled

Land use rights
- [ ] open access (unorganized)
- [ ] communal (organized)
- [ ] leased
- [x] individual

Water use rights
- [ ] open access (unorganized)
- [ ] communal (organized)
- [ ] leased
- [ ] individual

Access to services and infrastructure

IMPACTS

Socio-economic impacts

Socio-cultural impacts

Ecological impacts

surface runoff: increased ✓ decreased
Quantity before SLM: 21
Quantity after SLM: 18

soil loss: increased ✓ decreased
Quantity before SLM: 24
Quantity after SLM: 9

Off-site impacts

COST-BENEFIT ANALYSIS

Benefits compared with establishment costs

Short-term returns: very negative ✓ very positive
Long-term returns: very negative ✓ very positive

Benefits compared with maintenance costs

Short-term returns: very negative ✓ very positive
Long-term returns: very negative ✓ very positive

CLIMATE CHANGE

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ADOPTION AND ADAPTATION

Percentage of land users in the area who have adopted the Technology
- [ ] single cases/ experimental
- [ ] 1-10%
- [ ] 11-50%
- [ ] > 50%

Of all those who have adopted the Technology, how many have done so without receiving material incentives?
- [ ] 0-10%
- [ ] 11-50%
- [ ] 51-90%
- [ ] 91-100%

Has the Technology been modified recently to adapt to changing conditions?
- [ ] Ja
- [ ] Nee

To which changing conditions?
- [ ] climatic change/ extremes
- [ ] changing markets
- [ ] labour availability (e.g. due to migration)

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

Strengths: compiler's or other key resource person's view

Weaknesses/ disadvantages/ risks: land user's viewhow to overcome

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's viewhow to overcome

REFERENCES

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Resource persons
Ivan Vargas - SLM specialist

Full description in the WOCAT database
https://qcat.wocat.net/af/wocat/technologies/view/technologies_1349/

Linked SLM data
n.a.

Documentation was faciliated by

Institution
- n.a.

Project
- n.a.

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