Contour V ditch in Larki

Contour "V" Ditch (India)

Samapatana V nala

DESCRIPTION

V-ahaped sturcture on contour line in order to check sheet/reel erosion and for moisture retension.

V-shaped structures on contour line .The size of the V ditch varies according to slope, depth of soil and soil texture. The V-ditch can be laid eithr in staggered or continuous. Purpose- 1. To control sheet and reel erosion 2. Retention of in situ soil moisture 3. To increase vegetative cover. Establishment/maintenance -- 1. Bunding, 2. Terracing, 3. Turfing, 4. Provisioin of outlets in contour lines. Environment:- Bio-Physical-1-Cropland-Annual 2. Grazing land-Extensive, 3. Forest, Socio-Economic- 1. land ownership-User Group (32 Members) 2. Land use rights-Usufructary Rights.

LOCATION

Location: Orissa/Nuapada, Orissa, India

No. of Technology sites analysed:

Geo-reference of selected sites
- 82.7953, 20.168

Spread of the Technology:

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

Down Stream Effect due to Technology

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, Perennial (non-woody) cropping, Tree and shrub cropping
Main crops (cash and food crops): Major food crop perennial cropping: Arhar Major cash crop tree and shrub cropping: Cashew nut

Water supply

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

Number of growing seasons per year: 2
Land use before implementation of the Technology: n.a.
Livestock density: n.a.

Purpose related to land degradation

- [ ] prevent land degradation
- [x] 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, Wo: offsite degradation effects

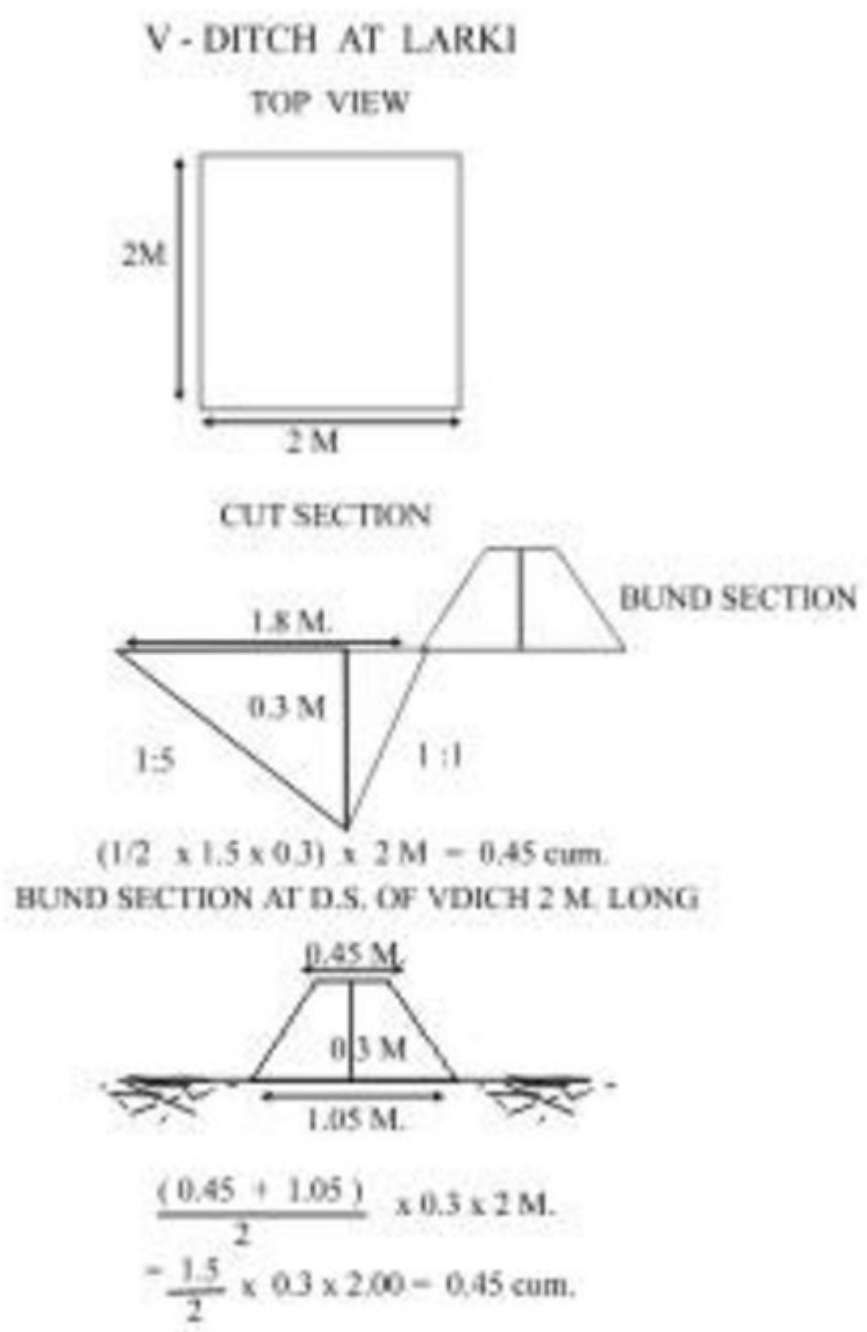
SLM group

- cross-slope measure
- water harvesting

SLM measures

TECHNICAL DRAWING

Technical specifications



V-Ditch technical drawing

Location: QTInd16TechDraw.jpg

Technical knowledge required for field staff / advisors: moderate

Technical knowledge required for land users: low

Main technical functions: control of dispersed runoff: retain / trap

Secondary technical functions: control of dispersed runoff: impede / retard, increase of infiltration, increase / maintain water stored in soil, increase in soil fertility

Vegetative measure: Turfing of bund
Vegetative material: G : grass
Vertical interval between rows / strips / blocks (m): 2
Spacing between rows / strips / blocks (m): 1
Vertical interval within rows / strips / blocks (m): 2
Width within rows / strips / blocks (m): 1.5

Vegetative measure: Vegetative material: G : grass

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Grass species: Vetiver/Berunbuta

Slope (which determines the spacing indicated above): 8.00%

If the original slope has changed as a result of the Technology, the slope today is (see figure below): 6.00%

Gradient along the rows / strips: 0.00%

Structural measure: Contour V ditch
Vertical interval between structures (m): 2
Spacing between structures (m): 1
Depth of ditches/pits/dams (m): average
Width of ditches/pits/dams (m): 2
Length of ditches/pits/dams (m): 1.5
Height of bunds/banks/others (m): 0.3
Width of bunds/banks/others (m): Bottom=0.8 Top=0.2
Length of bunds/banks/others (m): 1.5

Construction material (earth): Soil excavated from the ditches are used to construct banks/bunds

Slope (which determines the spacing indicated above): 8%

If the original slope has changed as a result of the Technology, the slope today is: 6%

Lateral gradient along the structure: 0%

Vegetation is used for stabilisation of structures.

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated:
- Currency used for cost calculation: **Rupee**
- Exchange rate (to USD): 1 USD = 50.0 Rupee
- Average wage cost of hired labour per day: 1.00

Most important factors affecting the costs

Labour availability, Availability of grass/stone , Transportation facility.

Establishment activities

1. Local grass barrier (Timing/ frequency: On the onset of monsoon)
2. Cashew plantation (Timing/ frequency: During rainy season)
3. Survey & layout (Timing/ frequency: Before onset of monsoon.)
4. Digging of pit & construction of earthen bund (Timing/ frequency: Premonsoon.)
5. Stone pitching on upstream slope of pit (Timing/ frequency: Premonsoon.)
6. grass turffing (Timing/ frequency: monsoon)

Establishment inputs and costs

Specify input	Unit	Quantity	Costs per Unit (Rupee)	Total costs per input (Rupee)	% of costs borne by land users
Labour					
Labour	ha	1.0	35.0	35.0	
Construction material					
Stone	ha	1.0	5.0	5.0	
Total costs for establishment of the Technology				**40.0**	

Maintenance activities

1. Mini tillage (Timing/ frequency: khariff / annual)
2. Cover cropping (Timing/ frequency: khariff / annual)
3. Weeding (Timing/ frequency: After rooting /Six months)
4. Soil work (Timing/ frequency: After rooting /Six months)
5. Manuring (Timing/ frequency: During rainy season /Twice in a year.)
6. Fire Control measures (Timing/ frequency: During winter season /annual)
7. Turfing of bund with grass (Timing/ frequency: during rain/annual)
8. De-silting of pits (Timing/ frequency: before onset of monsoon/annual)
9. Maintaining upstream & down stream arrrangement (Timing/ frequency: before onset of monsoon/annual)
10. Re-arrangement of displaced stone (Timing/ frequency: before onset of monsoon/annual)

NATURAL ENVIRONMENT

Average annual rainfall

☐ < 250 mm

Agro-climatic zone

☐ humid

Specifications on climate

- [ ] 251-500 mm
- [ ] 501-750 mm
- [ ] 751-1,000 mm
- [x] 1,001-1,500 mm
- [ ] 1,501-2,000 mm
- [ ] 2,001-3,000 mm
- [ ] 3,001-4,000 mm
- [ ] > 4,000 mm

- [ ] sub-humid
- [x] semi-arid
- [ ] arid

Average annual rainfall in mm: 1250.0

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

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

Altitude
- [ ] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [x] 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)
- [ ] 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)
- [x] 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
- [ ] high (>3%)
- [x] 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?
- [ ] Yes
- [ ] No

Occurrence of flooding
- [ ] Yes
- [ ] No

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

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

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

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

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

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

Level of mechanization
- [x] manual work
- [ ] 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
- [x] 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
- [x] state
- [ ] company
- [ ] communal/ village
- [ ] group
- [ ] individual, not titled
- [x] individual, titled

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

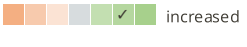
Water use rights
- [ ] open access (unorganized)
- [ ] communal (organized)
- [ ] leased
- [ ] individual

Access to services and infrastructure

IMPACTS

Socio-economic impacts

Crop production

decreased  increased

fodder production

decreased  increased

Nil

fodder quality	decreased ✓ increased	Nil
product diversity	decreased ✓ increased	Cover crop, Agro forestry,Fruit crops and Tuber crops taken up
farm income	decreased ✓ increased	Rs. 500/- per Ha. Rs. 10/- per day
workload	increased ✓ decreased	Needs maintenance timely.

Socio-cultural impacts

community institutions	weakened ✓ strengthened	Users groups formed and functioning.
SLM/ land degradation knowledge	reduced ✓ improved	By the users
conflict mitigation	worsened ✓ improved	Community mobilisation is requirede to solve conflicts.

Ecological impacts

surface runoff	increased ✓ decreased	Quantity before SLM: 65 Quantity after SLM: 40
excess water drainage	reduced ✓ improved	Crops grown and supplemental irrigation
soil moisture	decreased ✓ increased	Waste weir disposal
soil loss	increased ✓ decreased	Vegetation established
plant diversity	decreased ✓ increased	Due to fertility

Off-site impacts

downstream flooding (undesired)	increased ✓ reduced	
downstream siltation	increased ✓ decreased	
groundwater/ river pollution	increased ✓ reduced	
wind transported sediments	increased ✓ reduced	

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

-

ADOPTION AND ADAPTATION

Percentage of land users in the area who have adopted the Technology

- ☐ single cases/ experimental
- ☐ 1-10%
- ☐ 10-50%
- ☐ more than 50%

Of all those who have adopted the Technology, how many have done so without receiving material incentives?

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

Number of households and/ or area covered

34

Has the Technology been modified recently to adapt to changing conditions?

- ☐ Yes
- ☐ No

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

- Low cost
  Simple technology
  User friendly
  Affordable

  How can they be sustained / enhanced? Guidance on cropping practices

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

- Based on traditional practices
  Low Cost
  Farmers can maintain
  Coserve insitu soil moisture
  Conserve the most vluable top soil

  How can they be sustained / enhanced? Involve people in planning
  Involve farmers while executing
  Place suitable disposal system in right places
  Regular maintenance
  Establishment of vegetative measures
  Adoption of proper cropping practices by the farmers

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

- Apprehend getting benefits which will suffice their livelihoods Off farm activities tomake them financially sound.

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

- Conflicts in future among farmers Exposure on group dynamics and management of common property
- Mobilisation of DWF and developemnt of corpus fund Community organisation to generate corpus fund

REFERENCES

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Date of documentation: June 3, 2011

Last update: April 20, 2017

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Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/technologies/view/technologies_1478/

Linked SLM data
n.a.

Documentation was faciliated by

Institution
- n.a.

Project
- n.a.