DREAM – Learning Event II

Dry Valley Rehabilitation and Productive Use

An overview of the approach of the GIZ-SDR program

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Supported by

Dry Valley Rehabilitation and Productive Use

An overview of the approach of the GIZ-SDR program

Deutsche Gesellschaft
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Dry valleys functioned for thousands of years

Example: Nile Valley

- Nile is permanent, with flooding in the rainy season
- cultivation for thousands of years without additional fertilizer

Nile Valley near Luxor

Learnings:

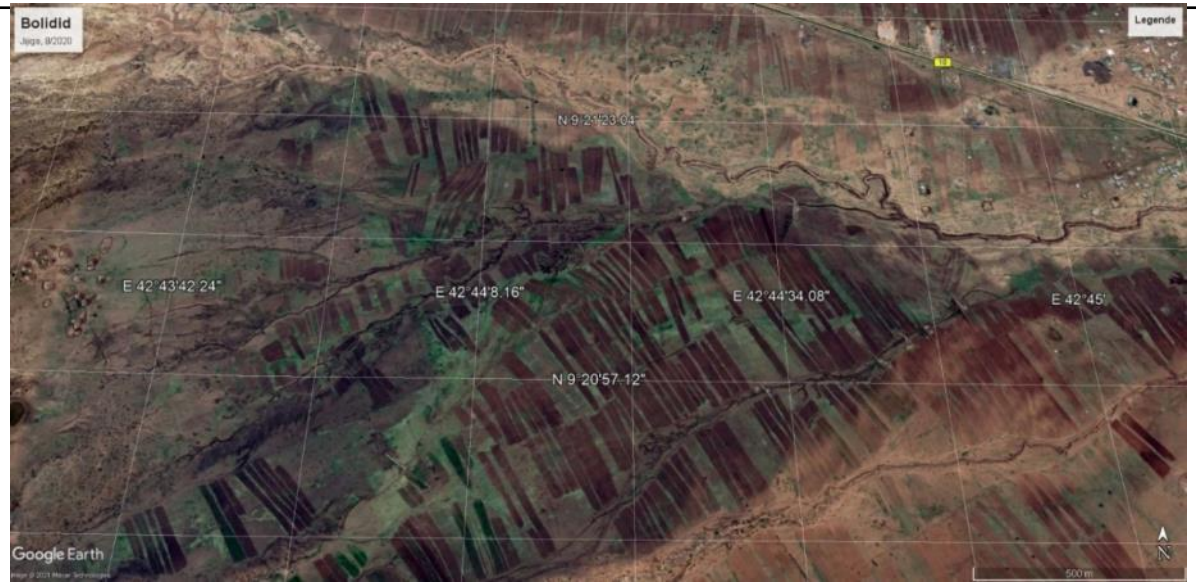
- **Flooding** is an excellent NRM without salinization, provided that erosion is controlled, especially if land use is changed
- **Intact, functioning DVs** are highly efficient and sustainable, enabling intensive and sustainable agriculture
  - ➢ It is the most valuable land in semi-arid areas

innocent valley in Afar, near Mille

In the last 50 years

Erosion and degradation begun in most valleys

- Due to land use change
- They lost their resistance to drought
- Even in good rainy seasons the rain does more damage in the form of erosion than it contributes to regeneration



Bolidid, Jijiga, Somali region, August 2020

Effects of degradation

- Accelerated lack of water infiltration → **degradation**
- Gully deepening is increased due to the water flow concentration and speed

Drainage effect by gully erosion:

There is only infiltration and vegetation growth in the gully

In the short term, the drainage effect of gullies in the surrounding landscape is more damaging than soil loss due to erosion

Causes of Degradation

01

Human activities

Deforestation, extension of agricultural surface with regular ploughing + increased pressure due to grazing

02

Demographic evolution

leads to increased exploitation by agriculture and animal production

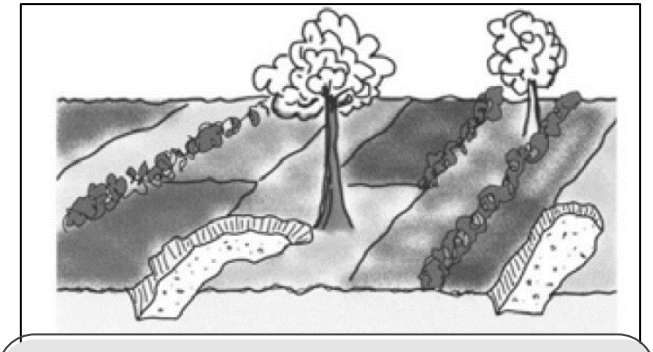
03

Droughts

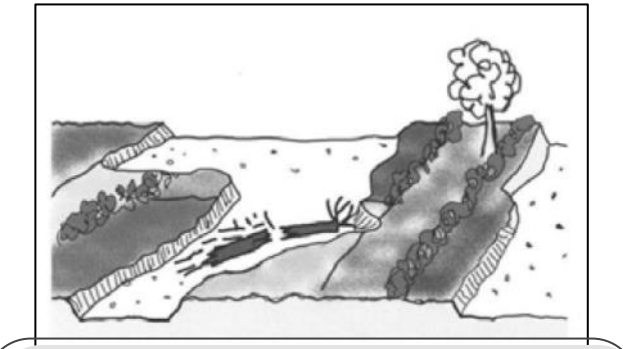
intensify and accelerate non sustainable land use

loss of the stabilizing vegetation and degradation of soil

Cohesive erosion control



Well-managed area, with only a few small erosion gullies.



A few years later: only a few well-managed parcels remain. It will not be possible to protect the still intact parcels!

→ loss of natural resources

The bottom of the valley = the most valuable part of the valley, with more and less productive parts.
It is not possible only to rehabilitate some productive parts. Erosion control is required over the entire valley!

Our Goal:

Dry Valley Rehabilitation and Productive Use

DVRPU

Dry valley rehabilitation (DVR)

Why not just artificial irrigation?

- **New irrigation and production systems** are only sustainable in a stable environment

Stabilization of the environment is the essential task in DVR!

- **1st step:** stop loss of natural resources over the entire valley section! That should happen as fast as possible!
- **2nd step:** maximum increase of natural resources
  - increase of water infiltration
  - increase of vegetation
  - stop of soil erosion

Some DVRPU measures

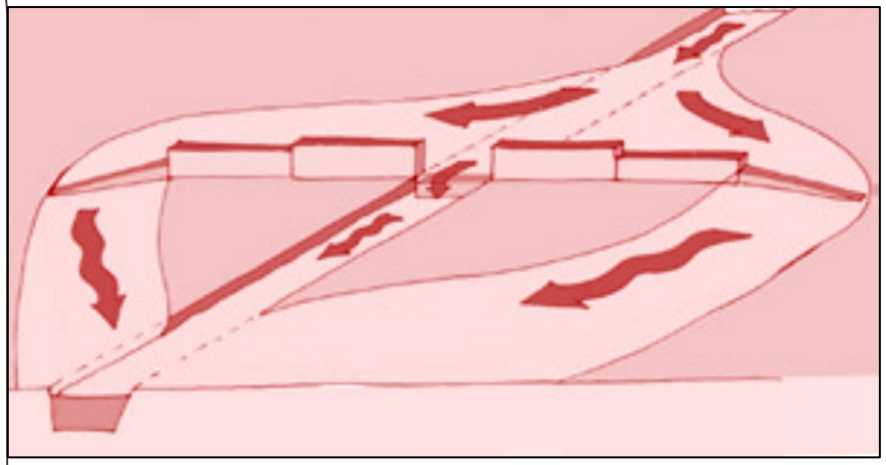
Physical structures: Water-Spreading-Weirs (WSW) and Dry-Stone Measures (DSM), as well as

Biological interventions: planting of bushes and grasses

- Both can greatly reduce the flow velocity of periodic floods
- **The biomass production of the treated areas increases 3 to 4 times**

Water-spreading weirs

- Belong to the general area of technology called '**water harvesting**'
- The earliest water harvesting structures identified date back over 9000 years
- The purpose of water spreading is twofold:
  1. **divert water** that would be lost to stream or overland run-off to flood-irrigate crop production or to improve rangeland vegetation
  2. **enhance water infiltration** for increased groundwater recharge
- **Distributes the flood from the concentrated flow** into the plain in order to reduce its velocity and spread the flood to the other levels



Before

After

Other physical measures

Dry Stone Measures: structures constructed from loose stones along the topographical lines on the sides of the dry river valley

- Reduce the force of water running into the dry river valley and promote local infiltration
- Can be used to fill smaller gullies feeding into the dry valley and disperse runoff in flatter areas

Check dams: constructed to partially or fully block the movements of flood to downstream

- From soil or sometimes mixed with stones
- The harvested water could be used as drinking water for animals and even for human beings when there is critical shortage of water
- It can also be used for irrigation to produce agricultural crops and animal forage and fodder

Stone gabions: the gabion (strong mesh wire) holds the stone together

- to withstand the forces of flood
- helps to settle the soil behind the stone gabion and let the water to flow over the stone gabion wall
- By this action it reduces the force of the flood and reduces the impact of the flood

Before

After

Biological measures

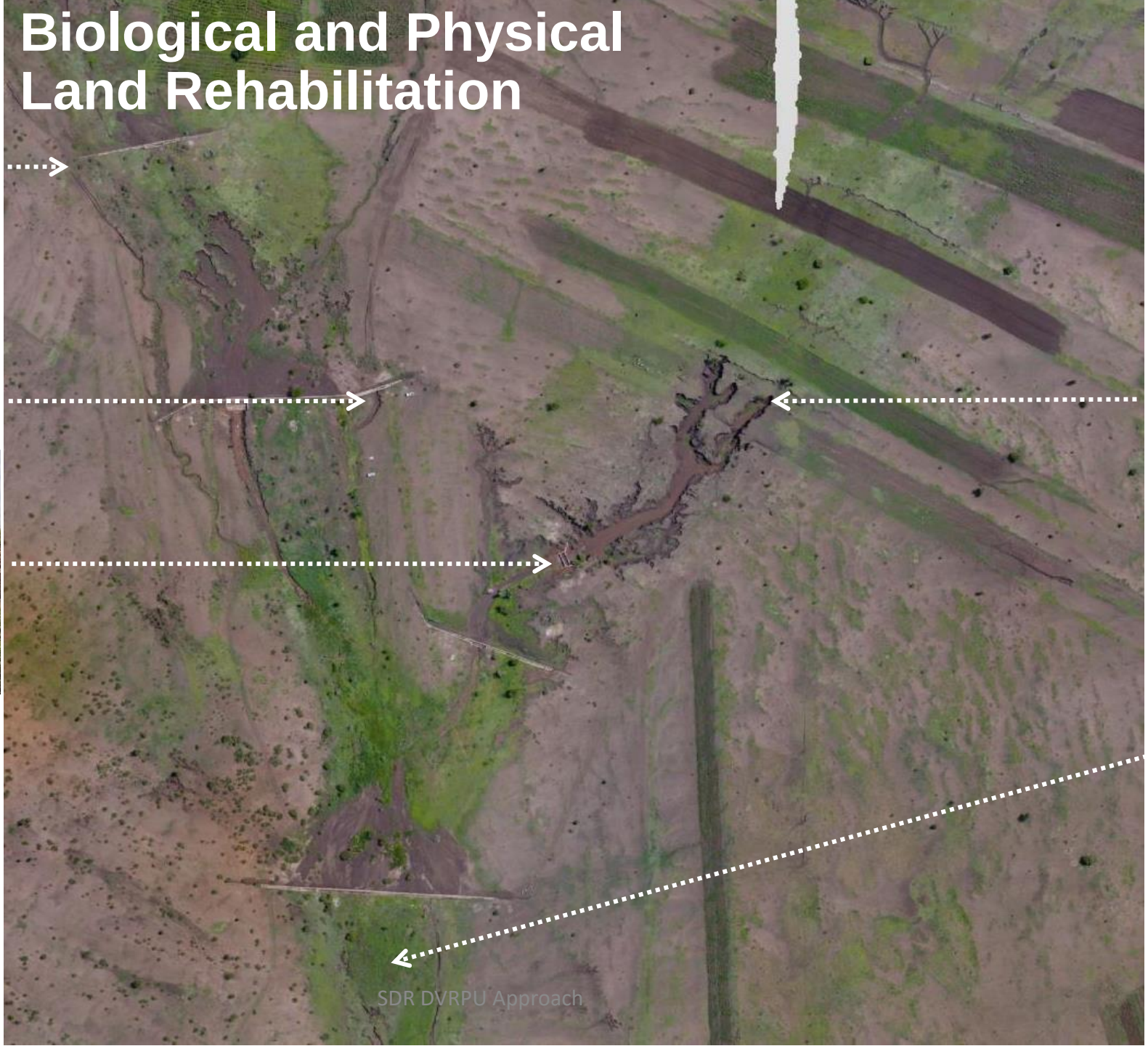
Grass Strips along WSWs:

- Soil erosion control along WSWs with grass strips along contours: planting of several, narrow grass strips of 1-3 meters width along the wings of the measure
  - ➢ stabilization and strengthening of the structure as well as biomass as valuable additional animal feed
  - ➢ Suitable and adaptable grass species are well known to (agro)pastoralists because they rely on forage grasses for livestock → easy to implement

Live Check Dams:

- are created by planting drought-tolerant acacia species, elephant grass, or other suitable species connected horizontally across the gully bottom to reinforce physical protection measures at minimal facility cost
- The velocity of flowing water in the gully will be reduced → reducing erosion
- It also contributes to the quantity and quality of forage in the dry season

Biological and Physical Land Rehabilitation



In practice - Dry Valley Amadle

Insights

So we have a good technology, BUT:

- Where do we start?
- Who is managing the process?
- Who is maintaining the structures and the rehabilitated land?
- What if livestock of other pastoralists eat the crops?
- Who defines land rights and ownership?

It is not only about structures!

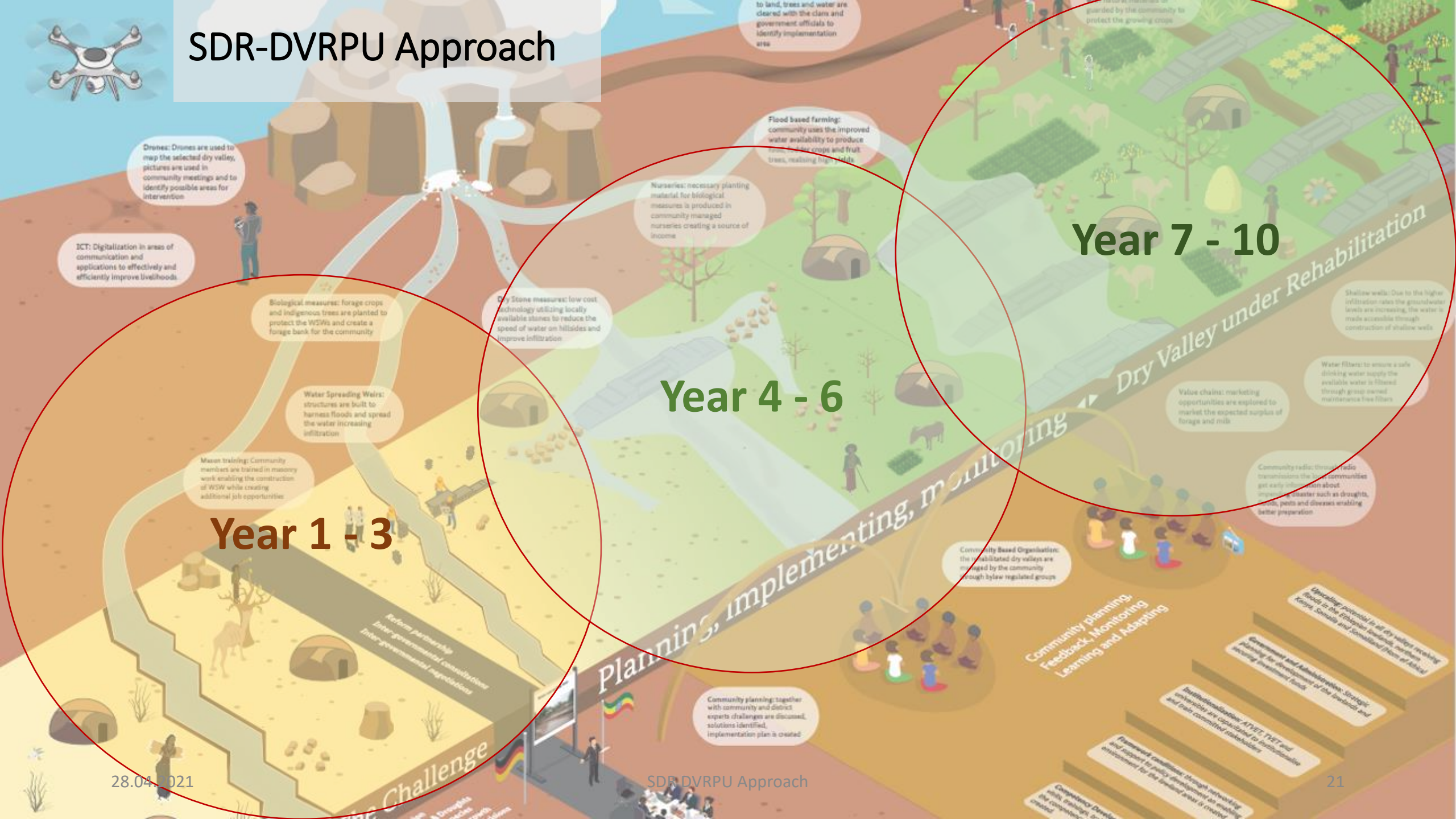
Holistic and long-term planning is needed

Before

After

DVRPU – A 10-YEARS JOURNEY

SDR-DVRPU Approach



10 Year DVRPU Approach

1) **Satellite identification** of suitable potential dry valleys

2) **Decision matrix** to select dry valleys (incl. conflict analysis) and specific environmental and social impact analysis as well as initial profile studies of sites

3) **Community awareness raising**, incl. visits to rehabilitated sites

4) **Commitment** of region, woreda, kebele, doner and community

5) **Clarification of roles and responsibilities**, Role of women, Definition of access rights and ownership

6) **Setting-up of Community-Based Organizations** (CBO) at dry valley level

7) **Community participatory planning** (CPP)
Yearly & for 10 years

8) **Implementation planning, Technical planning, Budget planning** for each dry valley for 10 years

10) **Construction** of water spreading weirs (WSW), dry stone measures (DSM) and biological measures for stabilization

11) **Flood-based farming, Income generating activities**: cuttings, fruits, fodder

12) **Learning and adaption cycle**: Planning, Maintenance, continued rounds of masons training, documentation of knowledge gained