DREAM Learning Events

# The Need for Regional Planning: the Case of Gully Control near to Jigjiga City

DREAM II – Learning Event V

31-August-2021

Proceedings

# Content



# Abstract

The fourth DREAM II Learning Event took place on August 31st, 2021. A group of 65 participants gathered in the online setting and at venues in Jigjiga. As part of the program there was a opening statement by Dr. Abdulkadir and Dr. Elisabeth van den Akker on behalf of GIZ-SDR. There were several presentations explaining the current state of the gully's around Jigjiga from the angle of Jigjiga watershed, gully control measures and stakeholder mapping. This was followed by an online and offline group discussion, where the content was discussed and extended. The output of this meeting serves as input for the DREAM II Conference taking place in Jigjiga from 20th to the 24th of September 2021.

## Introduction (Dr. Frank van Steenbergen, MetaMeta)

Frank van Steenbergen introduces the topic of the meeting, which is in line with previous occasions where coordination, cooperation and capacitation were discussed. This time, the focus is on an actual case where these components are needed, which is the formation and control of gullies close to Jigjiga town and the need for regional planning. This important topic will also be included in the program of the DREAM II Conference, taking place in Jigjiga from 20-24 September 2021.

## Opening (Dr. Abdulkadir)

Dr. Abdulkadir welcomes all participants to the event and introduces the topic of gullies around the city of Jigjiga. He also mentions the potential of water spreading weirs (WSW), which are currently already being introduced and seem to be the best option to control gullies in the lowlands of Ethiopia. He mentions that the regional government is doing whatever it can to reduce the formation of gullies. GIZ is being acknowledged for introducing this technology to the region and for supporting capacity building as well as the implementation.

## Opening (Dr. Elisabeth van den Akker)

Dr. Elisabeth van den Akker first introduces the DREAM II Conference taking place in September 2021, which is framed around Cooperation, Coordination and Capacity Development. "*What is it all about? We have a lot of talking, but what is it about, what could be done, also together, to have in the end a result? From there, the idea came up to investigate the Shek Ali Gure gully around Jigjiga. What I would like to have as an outcome of today, is that we all understand what is happening in the field and then to find out what can be a joint effort to reduce what is happening or to shape it in a way that it is fitting for mankind and for the landscape. Since 2014 I have been observing this favorite gully. Also in 2014, I was asked by representatives of the Jigjiga administration whether we could do something to reduce the growth of that gully with new technology. We developed ideas that have unfortunately not been taken up and the gully developed further. We have a timespan of maximally 10 years before the biggest gully will reach Jigjiga and its houses and compounds will fall into the gully. But this is only one aspect. As Frank van Steenbergen already said, we will not only discuss this topic today, but we will also go jointly to the field at the DREAM II Conference to see and learn. To prepare us, the team around MetaMeta, GIZ-SDR, the Bureau of Agriculture, the municipality of Jigjiga and others, will share insights today. I would like to thank everyone who prepared this meeting and its input and wish all of us a good discussion. And especially, I wish that latest the 24th of September, at the end of the DREAM II Conference, that we have a good idea of what jointly can be done, what is the place for every one of us in changing this landscape and changing that gully formation to the better for everyone around Jigjiga. Thank you very much, and I am looking forward to a very interesting webinar now."*

## Presentation 1 – Overview of Jigjiga Watershed (Dr. Taye Alemayehu, MetaMeta Ethiopia)

Dr. Taye Alemayehu, a geologist, provides a general picture of the Jigjiga watershed (approx. 1500 km$^2$) in his presentation. He has worked in the area for several years. Important characteristics regarding geology, topography, rainfall, land use / cover, urban growth and planning from the catchment are highlighted.

Regarding **geology** (figure 1), it is mentioned that the soluble and karstified carbonate rocks underlying the recent sediments are playing a big role in accelerated gully development, and in the failure of WSW and gully protection structures. Deep-cut gully opening over such rocks affects the groundwater condition and makes the area around gullies drier, as the moisture is washed away. Furthermore, opening of the protective cover (the clay horizon) may lead to contamination of the groundwater in the watershed.

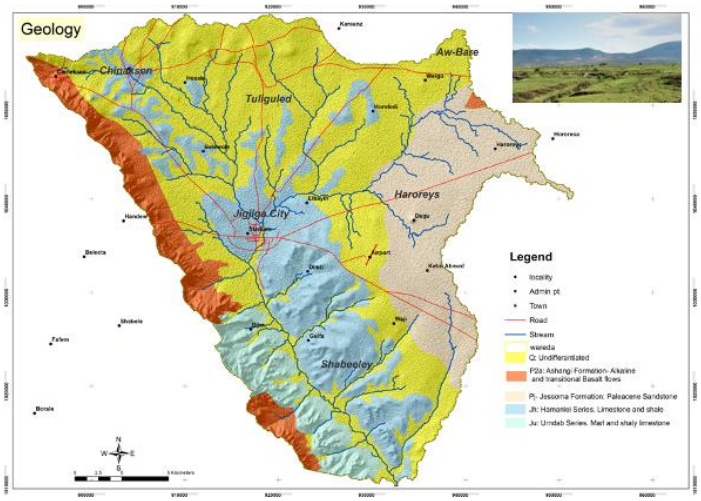


*Figure 1 Geology of Jigjiga catchment (Adapted from Terefe and Woldie, 1996)*

The **topography** of the area (figure 2) is, in combination with other factors, very suitable for gully development. Features making the area suitable are the high altitude of the western and northeastern part of the watershed, the proximity of Jigjiga city to these slopy areas and the undulating nature of the remaining parts.

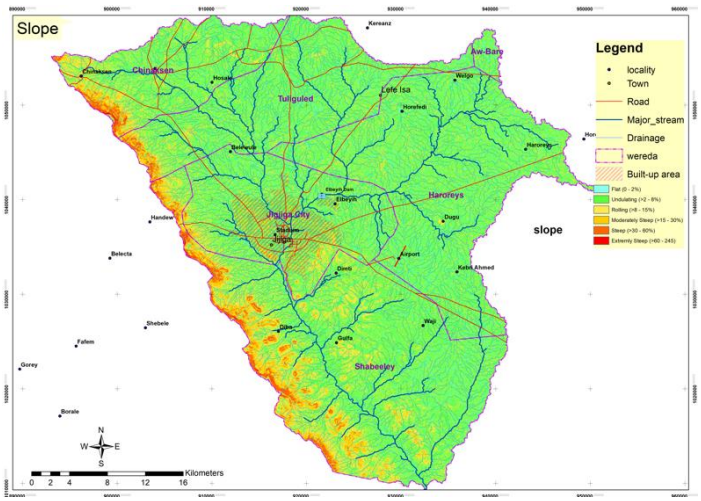


*Figure 2 Digital elevation model of the catchment (https://search.asf.alaska.edu)*

Regarding **rainfall (**figure 3), the elevated western and northeastern parts of the watershed receive relatively more rainfall which make them more vulnerable. Furthermore, the high intensity rainfalls that are frequently occurring in recent years are making all parts of the watershed prone to flood hazard and gully development. In the future, the situation might worsen as rainfall patterns will be more erratic. The need for collaboration on this topic will thus even increase.

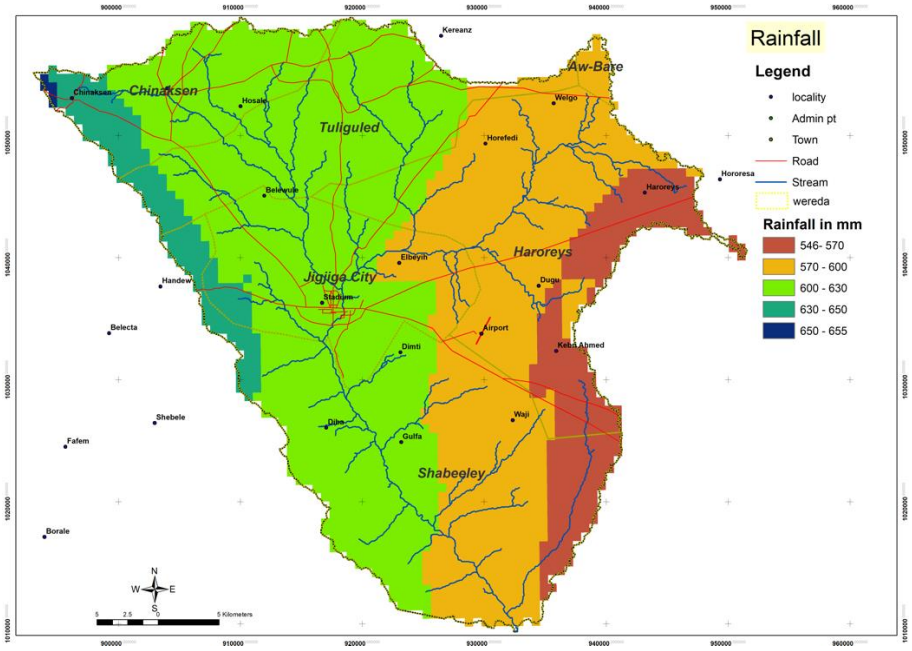


*Figure 3 Rainfall in the catchment*

**Soils** in the watershed are dominantly sandy on the surface and clayey at depth. The poor agricultural practices, the bed rock conditions and the erosive and dispersive nature the soils are highly contributing to gully development. So, unless the soils are well protected and preserved, they are highly erodible.

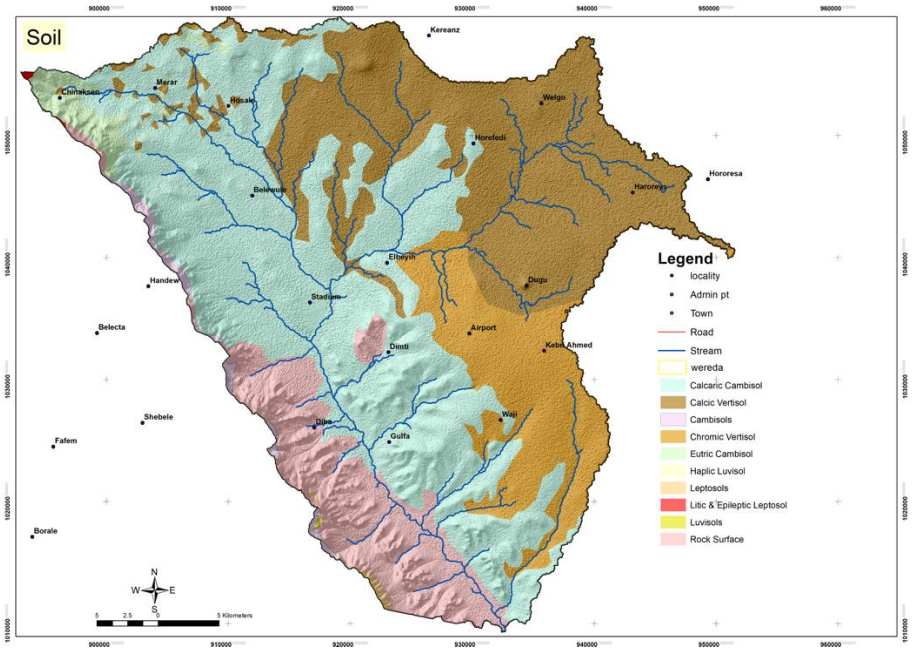


*Figure 4 Soils in the catchment (Adopted from FAO, 1984, Geomorphology and Soils Assistance to Land Use Planning Addis Ababa)*

While the topics discussed above are natural features (biophysical) from the catchment, **land use and land cover** (figure 5) of the area are influenced by people. The main land use in the watershed is agriculture, covering about 67% of the area. The transition from natural cover to agricultural area (table 1), contributed to the aggravation of gully development. That table also clearly shows the enormous increase in the urban areas. The size of Jigjiga grew from 148 ha in 1972 to 7892 ha in 2021.

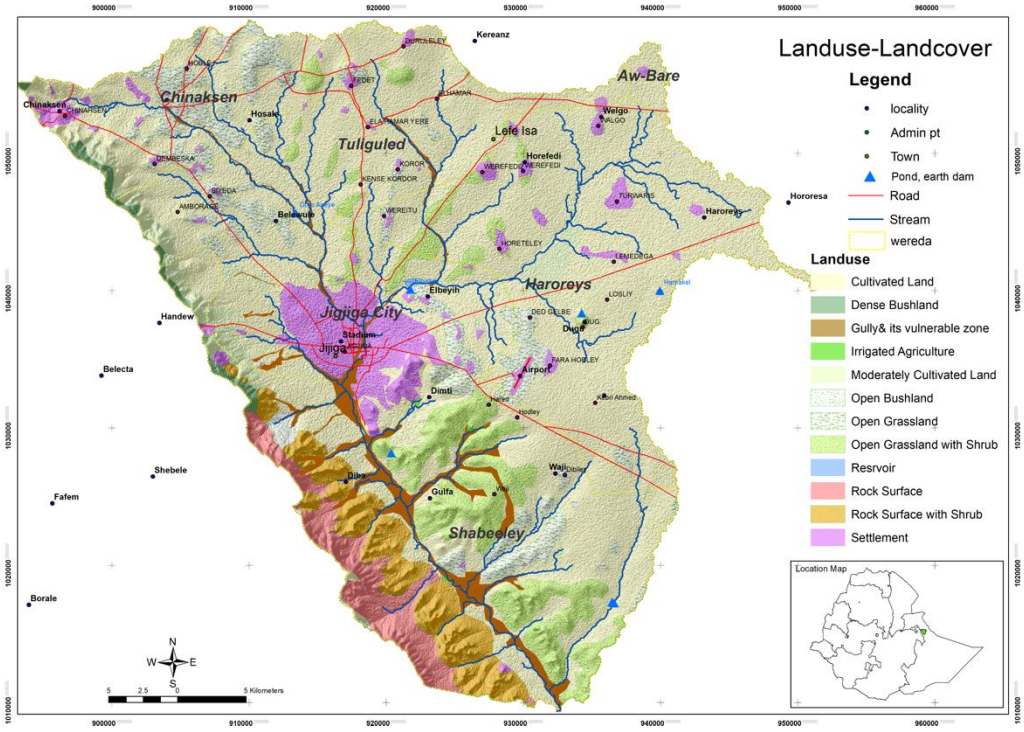


*Figure 5 Land use and land cover*

| Dominant LULC Type | 1985 | 2000 | 2010 | 2021 | Change in percent | | |
|---|---|---|---|---|---|---|---|
| | | | | | 1985-2021 | 2000- 2021 | 2010-2021 |
| Farm land | 86391 | 87193 | 87593 | 84640 | -2.03 | -2.93 | -3.37 |
| Gully/vulnerable areas | 6731 | 6777 | 7250 | 8461 | 25.70 | 24.84 | 16.69 |
| Open, grass and bush land | 56899 | 55128 | 52407 | 50101 | -11.95 | -9.12 | -4.40 |
| Reservoir/pond/wetland | | 83.25 | 92.7 | 92.7 | | 11.35 | 0.00 |
| Settlement | 1990 | 2433 | 3562 | 7892 | 296.64 | 224.42 | 121.58 |

*Table 1 Land use and land cover transition*

As can be seen in figure 6, the growth of Jigjiga is expected to continue in the current decade. To deal with the gully problematics, the draft land use plan for Jigjiga allocates environmental buffers along the gullies. However, it is very much decisive what activities can and will happen in these environmental buffers. The control of further gully development and the type of planned restoration activities are decisive to enforce the planning. Lastly, there is a huge challenge regarding water demand, which will even increase in the future as the city keeps on expanding and the environment in the watershed is becoming drier, due to climatic changes and gully development.

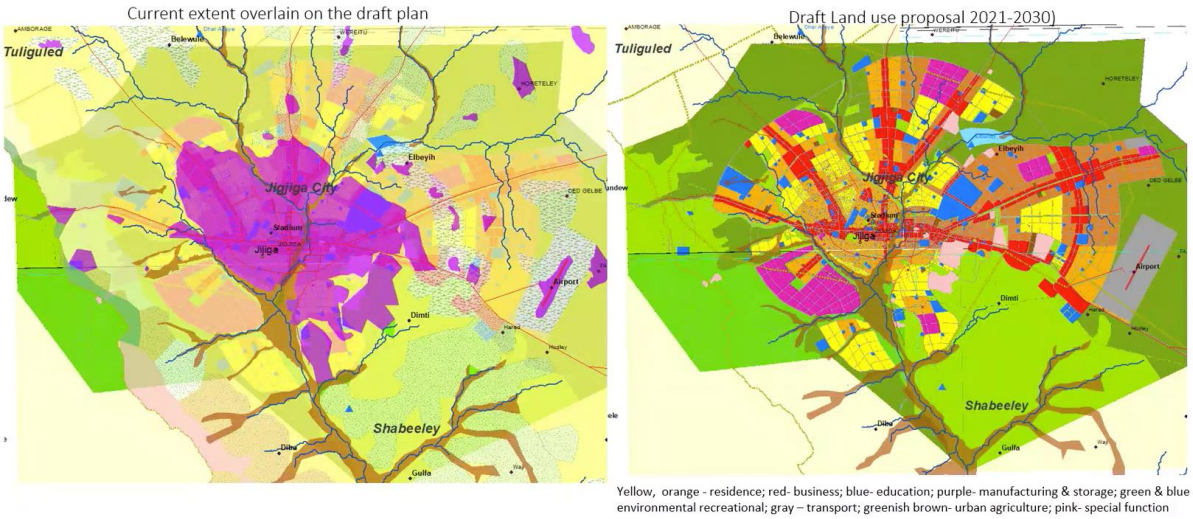


*Figure 6 Current extent overlain on the draft plan (left) and draft land use proposal 2021-2030 (right)*

A question is asked regarding the (knowledge of) reasons of agricultural practices which are supporting gully development. Another question is posed on the behaviour of the geology in the environmental buffer zones, which the are planned in the draft land use proposal 2021-2030. Then, another question is posed regarding whether planning in this region should be part of a larger planning in collaboration with neighbouring regions. The presenter answers that this closed watershed is completely located in Somali region, and therefore mainly collaboration with partners in this region is needed.

Another participant mentions that much focus has been on biophysical characteristics, while the socio-economic characteristics should also be considered in spatial development planning. The presenter reflects on this and mentions that this will be discussed in following presentations.

Download link for the presentation

## Presentation 2 – Gully Control Measures (Girma Senbeta and Solomon Yilma, MetaMeta Ethiopia)

*Figure 7 Gully "Shek Ali Gure", close to Jigjiga, which is moving to the city by approx. 70 m per year (Picture by Girma Genbeta)*

After the broad picture provided in the first presentation, this presentation zooms in into specific gully control measures.

First, a gully is defined as a channel resulting from erosion and caused by concentrated but intermittent flow of water, usually during and immediately following heavy rains. A gully is furthermore a visible manifestation of misuse of land.

Causes of gullying can be physical (rainfall, topography, soil type, shape and size of watersheds, length and gradient of the slope) but also human (mining, improper land use, deforestation, overgrazing, poor road construction and livestock/human foot paths).

At the west of Jigjiga town, there are some specific reasons for gullies to form and grow. These are the deforestation of the upper catchment, quarry mining and destructive access road to these sites, high altitude, steep slopes, increasing occurrence of high intensity rainfall, the relative growth of settlement area and the fragile nature of soil formation.

Gullies are damaging productive arable and pasture lands, thereby reducing productivity. They are furthermore damaging infrastructure and hampering access to field and farm operation. Lastly, they affect social communication and drain shallow ground water.

*Figure 8 Damage by Shak Ali Gure gully (Pictures by Girma Genbeta)*

Efforts have been made to control gullies, specifically by for example PCDP, to rehabilitate the Shek Ali Gure gully, at the southern part of Jigjiga, with stone masonry and gabion check dams. This effort was not successful as the intervention was made at the mid-way of the watershed, where concentrated runoff comes from the upper catchments to one point. Furthermore, the structural measures were not supported by vegetative measures. So, these structures are now damaged, and the gully is still advancing to the city

Currently, there are ongoing efforts by GiZ-SDR in collaboration with BoANRD to reduce gully growth. It includes the construction of many water spreading weirs (WSW) and furthermore the construction of a masonry check dam. There are clear indications that the WSW have a positive effect on trapping sediments, soil moisture conditions and the ability of farmers to grow crops. This project furthermore contributed to local capacity building as the structures are constructed by trained local masons and thereby contributed to job creation.

However, in the future the height of the WSW and the check dam at the Kamara cascade should be increased as sediment will fill up the structures. Furthermore, there is need to combine ongoing efforts with other soil water conservation measures upstream, including vegetative measures. Also, maintenance work of one WSW apron at the Karamara cascade is necessary.

*Figure 9 Water spreading weirs in Bolidid and Karamara (Pictures by Girma Genbeta)*

In conclusion, the ongoing interventions by GiZ-SDR are encouraging but not enough to reverse the prevailing situation, partly because the interventions made so fare are mainly physical/structural. Furthermore, as the rate of gully expansion is high, the required scope of intervention demands big resources to invest, and decisions need to be taken fast.

The contribution and attention of some of the mandated/relevant sectors are observed to be minimal, which is in line with the statement that natural resources management in urban areas is not given adequate attention. Also, there are opportunities to pull resources for integrated intervention as there are many programs (such as: LLRP, PSNP, SDR) having a common domain particularly on NRM and livelihood. Regular NRM and the Green Legacy are also other potentials. The presence of University and TVETs can also contribute a lot for local capacity building works

It needs to be studied further, but, if properly intervened, there are indication of possibilities to change the area into productive land.

The presentation closes with several recommendations for sustainable measures to control gullies.

- Gully management should be intervened at catchment level as part watershed management
- Spatial planning should be based on land capacity
- There is a need to work on alternative energy sources to reduce deforestation
- Awareness should be raised on the quantity and quality of livestock
- Properly designed and controlled access road to quarry and farm sites should be given attention
- Basis rules should be followed in gully control, to be applied in the following order of priority:
    1. Improvement of gully catchments to reduce and regulate the run-off volume and peak rates.
    2. Diversion of run-off water on the upstream of the gully area.
    3. Stabilization of gullies by structural measures, accompanied by re-vegetation
- On the other hand, the above needs linking to livelihood alternatives and circular economy in terms of:
    - Beekeeping, beeswax processing
    - Fodder production, for example the cut and carry system
    - Nursery development
    - Livestock fattening
    - Alternative energy (biogas, solar)

- Road water management is also very important to consider and has multiple advantages including:
    - Road safety
    - Water harvesting for agriculture
    - Water supply for human and livestock
    - Minimize soil and gully erosion
    - Groundwater recharge

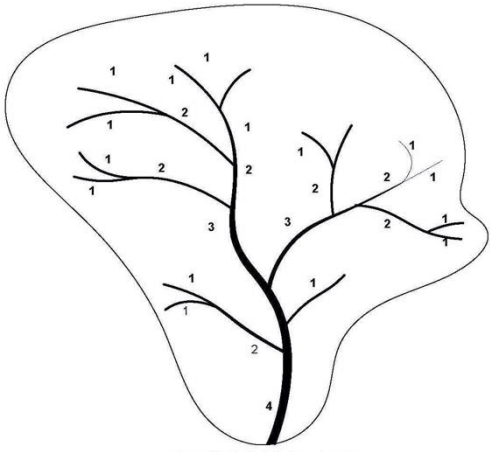

*Figure 10 Gully "tree"*

Dr. Elisabeth van den Akker then reflects with a comment to the "tree" with gullies (figure 10), which was in the presentation. She mentions that a proposition has been submitted in 2014 to invest upstream with approx. 100 structures to reduce the water flow towards the main gully, being number 4 in the "tree" and in reality the Shek Ali Gure gully. From this proposition, the Bureau of Agriculture took up what was in their capacity to do, which was their work on the Bolidid and Karamara weirs (figure 9). So, what we have to discuss now and during the DREAM II Conference is to come to a joint action, we need an integrated approach, not only money and methods, including all different perspectives.

Another participant highlights the importance of the involvement of Jigjiga University, which is actively involved in the DREAM II Conference, and from biological / vegetative measures to control soil erosion. Also, other participants reflect on this presentation and mention that mobilization is one of the main concerns in the area and that publishing research via different medias is important for dissemination to the public. Then, it is suggested by another participant to control gullies in combination with other livelihood alternatives, which was also mentioned in this presentation.

Download link for the presentation

## Presentation 3 – Institutional Overview (Assefa Kumsa, MetaMeta Ethiopia)

Assefa Kumsa, former state minister, provides an overview on the stakeholders engaged, and thereby an institutional overview, in the process of controlling gully formation and its wider implications.

The presenter has been involved in conducting a rapid assessment on the gully development and its challenges in Jigjiga area. In the field, it was observed that the major land use types are agricultural, grazing, urban and open shrub lands. Over the past decades, the land use practices have changed, for example shown by the urban growth (200% from 2011 to 2021), thereby mainly consuming agricultural land.

Another visible observation is the degraded watershed (Karamara Ridge) which was devoid of vegetation. Furthermore, as mentioned in other presentations, the extensive gully developments are disturbing agricultural land, damaging infrastructures (including boreholes) and posing risks to the

city. Furthermore, illegal and not properly managed municipal waste disposal sites increase the vulnerability of the already scarce water resources. This and more is displayed in figure 11.

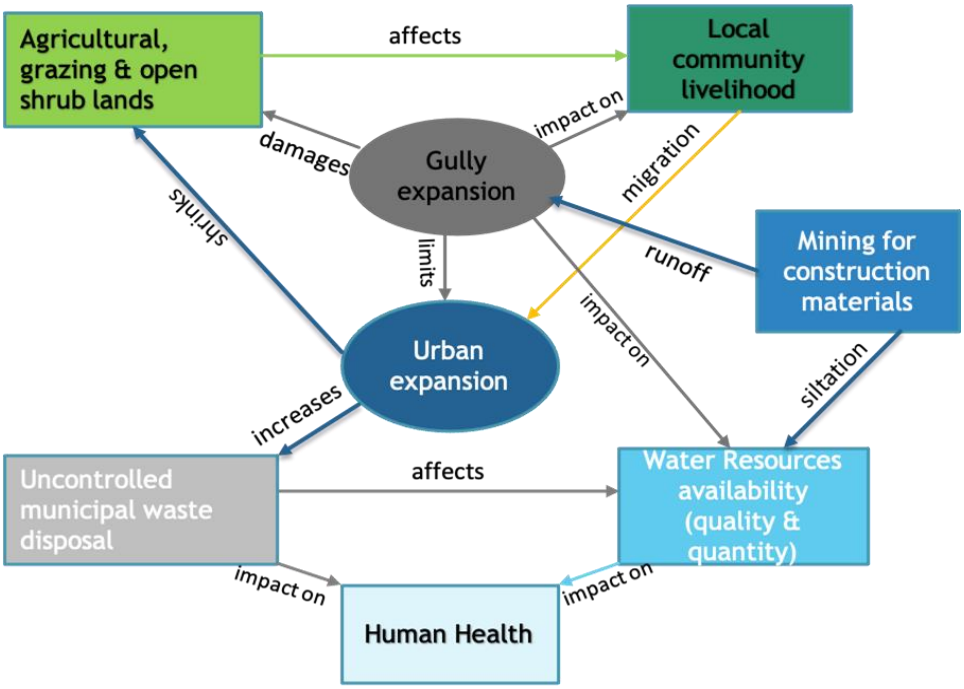


*Figure 11 Watershed processes and interrelationships - causes and effects*

In the discussion with stakeholders, it was found that environmental degradation, gully expansion, uncontrolled waste disposal and related environmental processes are major concerns with adverse environmental and socioeconomic consequences. It was also noted that construction of WSW and check dams along some gullies are visible efforts, but that they are not in line with the scale and complexity of the problems. It was concluded that awareness is still low, capacity is limited, efforts are fragmented and coordination is weak.

As a next step, the importance and influence matrix (figure 12) has been used to identify and map key stakeholders, based on field observations and additional discussion with stakeholders. Stakeholders with both high importance and high influence are the most important and key players that need to be engaged closely as owners and promoters of the effort. Based on this analysis, a proposed steering committee (responsible for overall strategic guidance, resource alignment and coordinating of efforts) and technical task force (to deal with technical and professional aspects of integrated development plan) are proposed (table 2). Lastly, a secretariat office is proposed which is exclusively responsible for planning and managing the activities of the steering committee and the technical task force. These three (steering committee, technical task force and secretariat office) can serve as a tool for coordination, cooperation, and capacitation.


*Figure 12 Importance and influence matrix*

| No. | Steering Committee | Technical Task Force (TTF) |
|---|---|---|
| 1 | Agriculture & Natural Resources Development Bureau | Agriculture & Natural Resources Development Bureau |
| 2 | Water Bureau | Water Bureau |
| 3 | City Administration/ Municipality | Municipality |
| 4 | Livestock Resources & Pastoral Development Bureau | Livestock Resources & Pastoral Development Bureau |
| 5 | Environment, Forest & Climate Change Bureau | Environment, Forest & Climate Change Bureau |
| 6 | Woreda Administration | Irrigation & Basin Development Bureau |
| 7 | Federal Ministry of Agriculture | Jijiga University |
| 8 | Federal Ministry of Peace | Pastoral & Agropastoral Research Institute |
| 9 | Office of the President | Design & Supervision Works Enterprise |

*Table 2 Proposed steering committee and technical task force*

Regarding resources, it was found that resources are always limited but there is also an opportunity for integration by mobilizing and coordination existing efforts and resources in the region. There are namely several development programs being implemented and running in the region. Discussion with executing agencies (BoANRD, BoLRPD) and program partners indicated the possibility of integration and alignment.

Programs currently operating in the area are Lowland Resilience Project (LLRP), Productive Safety Net Program (PSNP), Development Response to Displaced Impact Project (DRDIP), Strengthening Drought

Resilience in Pastoral and Agro-Pastoral Communities (SDR). Furthermore, there is a regular budget of the regional government and perhaps also other development partners.

A remark is added by a participant regarding the location of Jigjiga University in the influence matrix, he argues that it should be in the upper right corner, which is also agreed upon by other participants. Also, he mentions the importance of a MoU, long term planning and the inclusion of stakeholders upstream and downstream. Another remark is raised regarding the importance of also including informal stakeholders. Then, conflicts are discussed. A clarification is made by the presenter (Assefa Kumsa). The conflict is not between people/groups of people. What is meant is that there are conflicts between land uses as demand for land for different purposes is high, but these are not between people/clans. The presenter comes back to the role of Jigjiga University and mentions the importance of this institute, also within the proposed technical task force, as this fits well within their mandate.

Download link for the presentation

## Group discussions

Frank van Steenbergen introduces the group discussion, in which 4 questions are discussed. To some extent, they have already come to the table earlier in this event, but now the floor is also open for discussion and to bring in the overlooked. At the DREAM II Conference, today's input will be further discussed in detail with more time. Elisabeth van den Akker suggest having a very practical discussion and to come to a work plan to be prepared for the DREAM II Conference (question 4), including concrete activities. "*Let's bring the virtual discussion to practical work!"*

In the summary below both the responses from the online discussion as well as the discussion in Jigjiga have been combined.

### 1. What are the existing efforts and gaps in gully control near Jigjiga?

Regarding the existing efforts, the following is mentioned:

- Soil and water conservation activities by regional agriculture bureau
- Recreation parks by Jigjiga city administration
- Research study by Jigjiga university
- SDR-II project including WSW
- LLRDP / PCDP project
- ERCS project

Regarding the gaps existing, the following is mentioned:

- Seeing the gully control not only as a threat, but also as an opportunity, whilst being realistic. For example in the storage of sand. Currently mining of sand and quarry, for construction material, is now often mined and sold to be able to pay for the (expensive) drinking water through bowsers.
- There should be more focus on realistic opportunities such as sand storage / mining
- Considering gully control as an important part of integrated watershed management
- No integration efforts and joint plans for all stakeholder, everyone is doing its own business, important to work together along integrated watershed management.
- Lack of proper communication

- Bottom-up approach
- Lack of community involvement from planning, to implementation and evaluation
- Lack of evidence based implementation modalities
- Lack of participatory land use planning approach
- Budget and resource gap
- Lack of data base management
- Lack of awareness raising
- Lack of accountability

## 2. Who are the stakeholders to this challenge? What do they undertake?

There is obviously an exhaustive list of stakeholders, but the government must mainly play a facilitative role, while universities can have an important role in capacity building, awareness raising, research and more.

The ownership of the land where the gully is (government, community or private), is critical in the responses. In line with that, the land tenure, in which clans have a large role, is very crucial and decisive and should be considered. At a watershed level, these are very important, whereas Water User Associations (WUAs) are important in other parts of the world. There are Ethiopian examples in which traditional structures play an important role in land use planning and coordination, which is something to consider. During the discussion examples from Kenya and Sudan were also shared.

Mentioned stakeholders are:

- Local Community
- Regional bureaus, Agriculture and livestock, Environmental protection bureau, Presidents Office, Ministry of Agricultural, DRM, road authority,
- Local elders
- SorPARI
- LLRDP / PSNP / SDR-II
- The media
- Jigjiga University
- Communication media

## 3. How to bring cooperation and coordination towards resolving this problem? (modalities, alignments)

As presented in a presentation, it was agreed that having a steering committee and a technical task force is a very good idea, supported by a MoU. Thereby it is also very important to identify the lead agency.

There is a need for a systematic approach in which there is a focus on pre-treatment, treatment and post-treatment of the gully control measures.

Furthermore, the following suggestions came up:

- Creating a communication and collaboration platform
- Develop term of references (ToR) and delineate the responsibility and deliverables of stakeholders and actors
- Assessments, and participatory land use planning, watershed delineation and link livelihood components
- Establish participatory monitoring and evaluation system

## 4. What practical steps can we do to prepare for the DREAM II conference? (workplan)

The gully control issues are really a central concern in Jigjiga, so it is important that stakeholders from Jigjiga have the leadership and come to solutions.

Regarding the DREAM II conference itself, the selection of appropriate topics and experience speakers is important, and thereby using local knowledge and learning from good practice. The involvement of key parties such as Jigjiga University and Somali government is also crucial, next to media involvement to create awareness.

Suggested is the following:

- Build on the study made by the different stakeholders and continue the assignment
- Assess organizational capacity and contributions
- Identify potential manpower and special experts at every institution
- Invite stakeholders and actors with participation and implementation

# Closure (Dr. Frank van Steenbergen, Dr. Martin Maurer & Dr. Elisabeth van den Akker)

Frank van Steenbergen mentions that we now have made the first steps towards the DREAM II Conference where we can take it further. He mentions to always be surprised by the amount of useful and practical suggestions in such a short time and hopes this sets the scene for the DREAM II Conference.

Martin Maurer mentions that a lot of useful information has been collected, which should now be transformed into a work plan for the DREAM II Conference. In the coming weeks, it is important to shape the plans for the DREAM II Conference, which is the major event to bring ideas and plans into action.

The final words are provided by Elisabeth van den Akker. She thanks all participants for the energy brought in today, energy for doing something and willingness to support. We really must investigate stakeholders, ownership and leadership, which are in Jigjiga. She is really looking forward to the (preparation of) the event and invites participants to contribute to the event and thanks all involved and participating for the very interesting webinar.

The presentations of the Learning Event can be found on the website https://sdr-africa.com.