

LEARNING NOTE



DREAM II LEARNING EVENTS

09-March-2021

The Rangeland Fodder Nexus in Ethiopia's Lowlands



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für Internationale
Zusammenarbeit (GIZ) GmbH



HELVETAS
ETHIOPIA





DREAM II LEARNING EVENTS

The Rangeland Fodder Nexus learning event was organized on 9 March 2021 as the first in a series of run up events for the Development of Resilience Empowering Alternative Measures in Arid and Semi-arid Lowlands of Ethiopia Conference (DREAM II). The DREAM Learning Events are meant to create connections between different organizations working on lowland development, to share experience and discuss the scaling of the good practices. For further details on the learning events, presentations and full proceedings, kindly visit the DREAM SDR website <https://sdr-africa.com/>

The Learning Event highlighted different experiences in increasing the fodder availability in the lowlands – which is the basis for the pastoralist economy. There is much thinking on increasing the capacity of the rangelands by better management as well as by growing fodder. There are also opportunities to better use the lowland potential by better water retention and by stronger value chains. This briefing note summarizes main findings.

The speakers at the Learning Event were:

HE Dr. Fikru Regassa, Ministry of Agriculture, Ethiopia; Dr. Ali Ahmed Abdi, Aged and Children Pastoralists Association ACPA; Mr. Hussein Idris, Afar Pastoralist Development Association APDA; Mr. Abarufa Jatani, HELVETAS Ethiopia; Mr. Jean Marc Pace, MetaMeta on behalf of JustDiggIt; Dr. Kevin Mganga South Eastern Kenya University / MetaMeta; Mr. Bezuayehu Gebremichael, GIZ-SDR;

Mr. Allah Bakhsh Flood-Based Livelihoods Network Pakistan; Dr. Tobias Feldt GIZ; Dr. Ilse Köhler-Rollefson League for Pastoral Peoples and Endogenous Livestock Development.

KEY MESSAGES

- The lowlands currently experience increasing fodder scarcity. At the same time, the lowlands offer important opportunities for increasing fodder availability
- Fodder production and management brings multiple benefits: increasing resources base for pastoralist community; increasing availability and quality of fodder during lean periods; employment opportunities in the value chain; and create mutual beneficial collaboration between agro-pastoralists and pastoralists.
- Additionally, improved quality and quantity of fodder in the lowlands will bring about positive social impacts for instance in terms of women empowerment and income opportunities or in nutrition thanks to better dairy products and better meat production;
- The first strategy concerns improving fodder production both through better rangeland management, utilizing and strengthening traditional rules and norms, and recognizing local management structures. Secondly, developing value chains and creating employment around fodder production is needed to scale-up effective approaches.
- A wide range of approaches for fodder production are suitable to be scaled up. The most prominent approaches include improved rangeland management, bush thinning or clearing to promote quality grass cover, soil water conservation, (flood) irrigated fodder production, hay production, and experimenting with different fodder species including forage trees
- For scaling up, it is important to embed fodder production approaches within comprehensive, multi-aspect strategies in particular the Pastoral Development Policy and Strategy and take into account land use planning and value chain development. Strong collaboration with local communities to leverage indigenous knowledge and create local ownership is essential.

1. THE FODDER RANGELAND NEXUS: INCREASING SCARCITY



Fodder availability is a bottleneck in the lowlands of Ethiopia. With increased pressure on the existing resources, a changing climate, threats such as invasive species and uncontrolled encroachment, **fodder scarcity** is a given in Afar, Somali Region, Borana and other lowland areas of Ethiopia, as it is in many highland areas too. The fodder scarcity in the lowlands limits the development of the pastoralist economy, increases vulnerability to droughts, enlarges the risk of conflict and affects food security. The shortage of fodder for instance affects milk production, an essential food item for women.

Rangelands are by far the largest source of fodder in the lowlands. Natural grass is 67%, 80% and 88% of the forage in respectively Oromia, Somali Region and Afar, with crop residues taking care of most of the balance¹. The effective management of rangelands – in terms of fodder base (quantity) and fodder species diversity (quality) - is essential to the pastoralist economy. Several important additional measures can further enhance fodder availability in time and place, in particular growing and conserving fodder combined with land and water management. The development of a fodder value chain should be part of such a fodder strategy for the lowlands. In this note the different opportunities are discussed: enhancing fodder availability through a range of measures – better rangeland management, soil and water conservation, planting native grasses (section 2) and developing a fodder value chain (section 3). In the concluding section 4 the larger picture of integrating fodder in land use planning and the contribution availability for conflict mitigation is discussed.

¹ Source: Alvarez Aranguiz, A., and Creemers J., 2019. Quick Scan of Ethiopia's Forage Sub-Sector, Working paper, Wageningen, Wageningen UR-Livestock Research.

2. INCREASING FODDER AVAILABILITY: RANGELAND MANAGEMENT



Participatory rangeland mapping identify existing resources, gaps and actions. Credit: Abarufa Jatani - HELVETAS.

Rangelands exhibit the largest fodder potential in Ethiopia's lowland. More actions need to be taken to preserve and upgrade this potential. Issues like invasive species, insufficient grazing management and the effect of climate change requires more concrete support for rangeland management.

Better rangeland management is needed. Traditional pastoralist institutions such as the *Dheeda* need to be the centre of this and should be strengthened. This is also endorsed in the pastoralist strategy. Experience has been gained in Borana by Helvetas **with joint planning by rangeland users** and other stakeholders. This consisted of mapping the existing resources, the gaps and the necessary action to be taken. Based on this pastoralist communities mapped out their vision for the rangeland and identified the actions to be taken and the support to be mobilized. These

maps and visions were meant as living documents to be regularly updated. There are many measures that can be undertaken by pastoralist communities to improve the enhance of the rangelands. A few concrete measures can be highlighted. First, rehabilitation of bush encroached rangeland benefitted many, including women through providing cash for work and extra fodder. This was very meaningful , as recent locust outbreaks affected the rangeland and reduced fodder availability. Second, joint labor for establishing soil water conservation infrastructures e.g. ponds helped reducing dry season water gaps, and provide income from cash for labor. Several other measures for participatory rangeland planning and management include building nursery sites for seeds and seedlings; training on animal health, and provide machines for hay making.

A special method for rangeland improvement is **bush clearing**. Bush clearing means to balance the grass cover and the endogenous multipurpose trees to meet the need of different livestock species - grazers as well as browsers. Local communities selectively clear, or thin out bushes to create suitable growing conditions for fodder species. This approach is also used for controlling invasive species in the rangeland. Selective bush clearing and thinning should be executed with care, to ensure a good balance between the benefits and the potential ecological impacts.

SOIL AND WATER MANAGEMENT PRACTICES

Water, moisture and nutrient availability for fodder production in the lowlands can be improved by **water retention measures**, appropriate to the conditions of the dry lowlands. Such measures will stimulate the regrowth of dormant fodder grasses or can be used to create to grow fodder grasses or fodder trees. They can also create more reliable sources for stock water. The most important soil water management practices for the lowlands are:

² Controlled holistic grazing also help to concentrate manure and to ensure all plants are grazed – not just the most palatable species. This in principle further boosts rangeland quality.

- **Controlled holistic grazing:** by having animals graze in confined areas on a rotational basis hard soil crusts are broken by hoof action. This allows more water to infiltrate in the soil after rain². This helps to regenerate rangeland. Success is contingent on strong local organization.
- **Vegetative bunds or stone bunds.** Low bunds may be placed across the landscape on run-off drainage paths. This will trap silts and retain soil moisture. The bunds may be vegetative (with sisal plants for instance) or with carefully placed low wall of stones.
- **Water spreading weirs.** Spreading weirs are placed – often in a series - in ephemeral rivers and guide the flood water to the adjacent land, making it possible to grow a variety of crops, including special fodder crops, such as elephant grass, or crops that produce stalks and stover.
- **Road water harvesting.** Road bodies can be used to guide water to areas where soil moisture will be concentrated, allowing fodder grass or fodder trees to grow. Similarly using water from road culverts to grow fodder has been successfully used in Kenya.
- **Other soil moisture retention measures.** In different dryland areas several other soil moisture retaining measures have been used - such as half-moons, zai pits to trapezoidal bunds, serving both pastoralist and agro-pastoralist areas.



Water Spreading weirs in Afar. Credit: ILRI/Fiona Flintan



V-shaped diversion structure constructed from soil and stone to spread water from culvert, Ethiopia. Credit: <https://roadsforwater.org/>



Stone bunds strengthened with elephant grass. Credit: MetaMeta



Road water harvesting structure in Afar. Credit: MetaMeta

PLANTING NATIVE GRASSES AND RESEEDING THE RANGELANDS

Water retention measures are often combined with **planting fodder grasses or reseeding the rangelands**. There is positive experience with this from Afar by APDA, Somali Region by ACPA and Seku University/MetaMeta in Kitui (Kenya). The preferred practice is to use native fodder species and prioritize (combinations of) species with a large and adaptive ecological range. Different grass have different properties – in ecological restoration and in their potential to contribute to increased production of milk or meat. Species selection should keep this different characteristics into account. Overall, there are quite a range of different species to be selected based on the needs and soil water conditions. These include *Cenchrus ciliaris*, *Enteropogon macrostachyus*, *Eragrostis superba*, *Chloris roxburghiana*, *Chloris gayana*, Sudan grass (*Sorghum* × *drummondii*). Table I presents an inventory and characteristics of the recommended grasses.



Grass farming for fodder and seeds in Jigjiga -Fafan Zone. Photo credit: Ali Ahmed, ACPA.



Fodder produced in Sifra in November/ December ready for the dry season. Credit Hussein Idris, APDA.

The fodder grasses can be either grown in controlled conditions, such as community fodder production sites or close , or they can be used to reinvigorate rangeland areas. In addition to the fodder grasses, **forage trees** may be promoted. *Acacia* sp., *Ziziphus* sp, *Grewia* sp, *Balanites aegyptiaca*, and *Salvadora persica* are species that are native to many lowlands: they may be protected and expanded. The leaves and branches of tree legumes can be used as a source of protein for livestock.

³ Content was developed with inputs from presenters and the pasture management manual.

TABLE I: AN INVENTORY OF FODDER GRASS SPECIES FOR DIFFERENT USES IN THE LOWLANDS³

1 CENCHRUS CILIARIS (BUFFLEGRASS)



Characteristics

Highly tolerant to droughts, tolerant to grazing pressure. Spread strongly and cover the ground very well.

Cultivation & remarks

Suitable for drought-prone areas. Can be used for reseeding rangeland.

2 ENTEROPOGON MACROSTACHYUS



Characteristics

Drought tolerant, widely available in arid and semi-arid areas.

Cultivation & remarks

Suitable for seed production. Can be used for reseeding rangeland and suitable for soil water conservation.

3 ERAGROSTIS SUPERBA



Characteristics

Grow fast, relatively drought tolerant.

Cultivation & remarks

Suitable for seed production, high biomass yield.

4 CHLORIS ROXBURGHIANA



Characteristics

Drought tolerant, leaf biomass is not very high.

Cultivation & remarks

Suitable for reseeding. Provide biomass for fodder but not very productive.

5 CHLORIS GAYANA (RHODES)



Characteristics

Resistant to drought, but requires about 600mm rain to thrive.

Cultivation & remarks

Suitable for many purposes: Seed production, fodder production, and for soil water conservation.

6 SUDAN GRASS (SORGHUM × DRUMMONDII)



Characteristics

Resistant to droughts, can grow well on compacted soil with strong root.

Cultivation & remarks

Suitable for rehabilitating soil, especially compacted dry soil. High biomass, suitable for fodder production.

3. DEVELOPING VALUE CHAINS TO PROMOTE FODDER PRODUCTION AND MANAGEMENT

Given a remarkably wide range of available approaches for fodder production and management, it is important to create enabling environments for upscaling. Such enabling environment requires, first and foremost, development of a full value chain surrounding fodder farming, developing products e.g. seeds, hay and bringing end products to the market. The value chains will make sure products are stored and adequately distributed in time and space. The fodder value chains are also a source of jobs and income opportunities. There are several elements in a strengthened fodder value chain:

- Producing and selling grass seeds
- Producing, storing and selling hay
- Producing and selling end products: milk, meat and leather products: this can include high value products.

GRASS SEED BANKS

Using **grass seed banks** is a good starting point to improve the fodder value chain, as they can ensure a consistent and high-quality supply of grass seeds. Financial gains from selling seeds also contribute directly to improving local income. As the need for fodder seeding increases it becomes attractive to grow the grass seeds. There are examples from Amboseli in Kenya, where with support of Just DiggIt, groups of Maasai of women operated grass seed banks. These are based on the traditional Maasai concept of an olopololi: a small part of the communal rangelands set aside for a specific purpose, in this case to grow grass seeds.

A grass seed bank is typically around 10 ha and located close to the

homesteads so it is easier to protect and carry out maintenance if necessary. The land is ploughed, grass seeds are sown and harvested to be sold. The area is protected by a so called 'living fence' of local shrubs to keep out wildlife and livestock. The grass seed bank is managed and maintained by a group of 10-20 members of the community (typically a women's group). They are trained in the grass sowing and harvesting and business skills. They function as local landscape restoration enterprises, making grass seeds available to individual farmers and to organizations that work on landscape restoration and pasture establishment. The groups also generate income from selling hay and honey.



Grass seedbanks help restoring landscape as well as generating income from selling hay and seeds.



Grass seed bank operated by women group in Kenya. Photos credit: Emmanuel Atamba Oriedo, JustDiggIt.



Fodder grass is harvested for producing hay. Credit: Abarufa Jatani - HELVETAS.

HAY PRODUCTION AND TRADE

Hay making will preserve fodder for the lean season or allow it to be transported to areas of shortage. If good quality forage is conserved, the gap between high quality (wet season) and low quality (dry season) may also be bridged. Fodder grasses are cut before plant matures, then dried and bundled. Hay can be taken from the rangelands or from special fodder production areas. Household level hay making ensures equity utilization of rangeland/fodder among poor and better off families. Hay making and trading is bringing substantial income for households in the parts of the rangeland. Hay making also shows positive social impacts through reducing the drudgery of women to travel long distances and labor required for cut and carry. Attention should be paid to **proper hay storage** techniques, as many farmers lack experience with proper preservation and have to sell hay at very low prices as a result. Good storage is hence important.



Example of a hay storage structure. Credit: <https://roadsforwater.org/>

The hay should be properly dried. It should be stacked and stored off the ground on a platform made of wood or stone to avoid spoilage. Shades are part of good storage, to protect the hay from heavy sunlight, as is common in arid lowlands.

MARKETING OF END PRODUCTS

Meat, milk and leather are main products from the lowlands. Rather than only concentrating on bulk commodity markets. Recent trends in milk and other dairy products could be picked up in the lowlands, for instance the growing **international market demand** for camel milk. An example is the camel milk from Rajasthan in India that is based on a camel diet of 36 plants, many with medicinal value. This Rajasthan camel milk is properly processed and sold as a high value therapeutic product. Similar opportunities would exist in Ethiopia. In this sense, it is important to integrate the rangeland economy with national and international markets for supplying high-value dairy products. Market integration and the strengthening of local producer organizations is crucial to sustain fodder promotion approaches, as this creates a strong and sustained motivation to move a newer forms of livestock keeping, with larger reliance on broader range of sources and more focus on quality of animal products rather than livestock numbers.



A ever increasing international demand for camel milk presents opportunities for the lowlands. Photo credit: Hussein Idris, APDA.



Milk containers help to properly storage and preservation of milk.
Credit: Ali Ahmed Abdi, ACPA & RILE project.

4. CONCLUSIONS:

INCREASING PROSPERITY, REDUCING CONFLICT

Policy integration represent an important factor in further scaling up fodder management approaches across the lowlands. In the case of Ethiopia, while land use planning and guidelines are available, bringing them to the ground and supporting rangeland management require further actions. The government recently developed **regional development plans**, with specific strategies for six regions of Ethiopia, where rangeland management is a core element. In this regard, it is important to bring good rangeland management practices, particularly fodder approaches to the spotlight and integrate them into investment programs.

Increasing fodder availability and sustainable production represent an important pillar for rangeland management in the lowland context. It will create (1) stronger basis for the pastoralist economy, (2) reduce the risk of shocks and (3) create jobs and employment opportunities in the value chain. There is a fourth important benefit of increased fodder production which is that it may foster symbiotic relations between pastoralists and farmers in the lowlands. Whereas in the Horn of Africa conflicts between pastoralists and farmers are recurrent, experience from other areas show that this need not be and that mutually beneficial interdependent relations between pastoralist and farmers can drive the lowland economy. In Pakistan for instance it is common for nomadic pastoralists to buy the standing sorghum crops from farmers. The pastoralists then sell the panicles and use the stover and the sorghum stems to feed their livestock. In India there are manuring contracts between pastoralists and farmers, whereby the livestock keepers are paid for their animals to graze and manure the farm land.

A considerably wide range of good approaches are available with great potential to address increasing fodder scarcity at the landscape level. Creating an enabling environment through value chain development - would be essential to promote good practices, moving the lowlands towards

sustainability and climate-resilience. Pastoralist economies embody both diversity and a zero net emission system of producing livestock products. While fodder promotion shows great potential, it is important to maintain a balance between the rangeland carrying capacity and fodder/farming development. An excessive dependence on either fodder production or rangeland outcomes can lead to increasing vulnerability to external shocks e.g. prolonged droughts, and thus requires attention. A balanced approach will contribute to increased prosperity in the pastoralist lowlands.

Fodder production is a broad topic, which deserves follow-up programs and discussions to fully realize its potential for rangeland management. To continue on relevant themes in rangeland management, the next Learning Event will take place on April 7 on Dry Valley Rehabilitation and Productive Use approach DVRPU and the DREAM II Conference will take place from 20 to 24 September 2021. Further information is available [here](#).



Animal from the Nomads grazing on harvested fields, in agreement with field owners. Credit: Allah Bakhsh, FBLN.

