Report

Report on the second Multi-Actor Platform meeting and site visit of EthiopiaGrass project

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Background

Considering that about 90% of livestock feed is currently derived from shared grazing on community pasturelands, and that these communal lands are highly overgrazed, soil and land degradation are exacerbating. Widespread soil losses and nutrient depletion diminish agricultural productivity and farmer incomes. Around 85% of the total land in Ethiopia suffers from moderate to very serious levels of land degradation, costing about US$4.3 billion per year. Climate change exacerbates these challenges. Novel agricultural production systems including livestock could augment food availability, counteract land degradation, and facilitate economic growth in Ethiopia. Measures to improve livestock feed provisions through intensification without compromising food crop production or landscape health are among the prime objectives for sustainable development. In the highlands, livestock is predominantly managed in mixed crop-livestock systems. Enhancing these agricultural systems involves shifting towards heightened forage production. The number of farmers using improved pastures has increased in the last decade but remains relatively low at under 14%. The potential of grassland species to ameliorate soil quality, lessen land degradation, and raise farmer incomes remains widely unexplored. To date, there are no studies from Africa that examine the effects of grassland mixtures containing diverse tropical grasses combined with legumes on forage and food crop yields.

The Ethiopia Grass project, a collaborative project implemented by Alliance of Bioversity & CIAT (the Alliance), in collaboration with project owner Norwegian Institute of Bioeconomy Research (NIBIO), Norwegian University of Life Sciences (NMBU), Trinity College Dublin, Hawassa University and Bahir Dar university, supports the development of novel approaches around combining the intensification of livestock feed systems and betterment of farmer livelihoods with land restoration. The Ethiopia Grass second Multi-Actor Platform (MAP) meeting brought together its partners and stakeholders on April 25th, at ILRI Addis Ababa campus, to reflect on project implementation so far.

Objectives of the meeting

EthiopiaGrass invited its partners and stakeholders to the second Multi-Actor Platform (MAP) meeting to inform, discuss, plan, and overcome barriers in the project implementation in a transdisciplinary way. The MAP convenes yearly to provide feedback about the research objectives and approach, and to disseminate knowledge for enhanced research uptake. The specific objectives of the second MAP meeting were to:

- update and reflect on project activities and showcase preliminary results.
- introduce planned activities of the project year to stakeholders and ensure alignment with ongoing initiatives.
- receive feedback on research objectives and implementations so far.
- identify opportunities for research uptake.
- discuss the way forwards.

Participants' profile

Forage and restoration experts from multiple national universities, research institutions, and international research centers attended the meeting (Table 1).

Table 1: Overview of MAP participants' profile

Type of institute	Details	Attendants
Government office	SNNP Agri office, Amhara agriculture office, MoA,	5
National/regional research institutes	Andassa agricultural research institute, Southern Agricultural research institute, Amhara Regional Agricultural Research Institute	3
National universities	Hawassa university, Bahir Dar University	3
International research institutes/NGOs	Alliance, ICRISAT, GIZ, NMBU, Land o'Lakes, InterAide France	11
Private sector	Eden field agriculture seed enterprise	1

Figure 1: Participants during the second MAP meeting

Sessions

The second MAP meeting started with a brief welcome from Mr. Mulugeta Gudisa, forage team leader from Ministry of Agriculture, and Dr. Marit Jørgensen, EthiopiaGrass's project manager, from Norwegian Institute of Bioeconomy Research (NIBIO). This was followed by a round of introduction of participants (Figure 1).

Topic 1: Grass-legume mixes the way forward for Ethiopia?

The discussion on the topic was based on Dr. Marit Jørgensen's presentation entitled **"Grass-legume mixtures – a way forward for forage production in Ethiopia? – overview of first results from EthiopiaGrass**", which was complemented by updates on progress from controlled experiments by Dr. Shimelis Raaji and Dr. Bimrew Asmare from Hawassa and Bahir Dar Universities respectively. The experiments were performed both at the university campuses of Bahir Dar and Hawassa, and in a reduced form at two university farms in each region. Treatments consisted of four forage crops established as mono crops and mixtures of 2, 3 and 4 species in different proportions. The forage species used were two grasses: Panicum maximum (Mombassa) and Brachiaria hybrid (Cayman), and two legumes: Desmodium intortum (Desmodium) and Stylosanthes guianensis (Stylo). The altogether six experiments were established according to a SIMPLEX design.

The results indicated that there are significantly positive diversity effects of mixing legumes and grasses both in Bahir Dar, and in Hawassa (Figure 2). It was also indicated that these preliminary findings need to be analyzed in more detail, specifically focusing on annual yields in addition to accumulated yields over years.

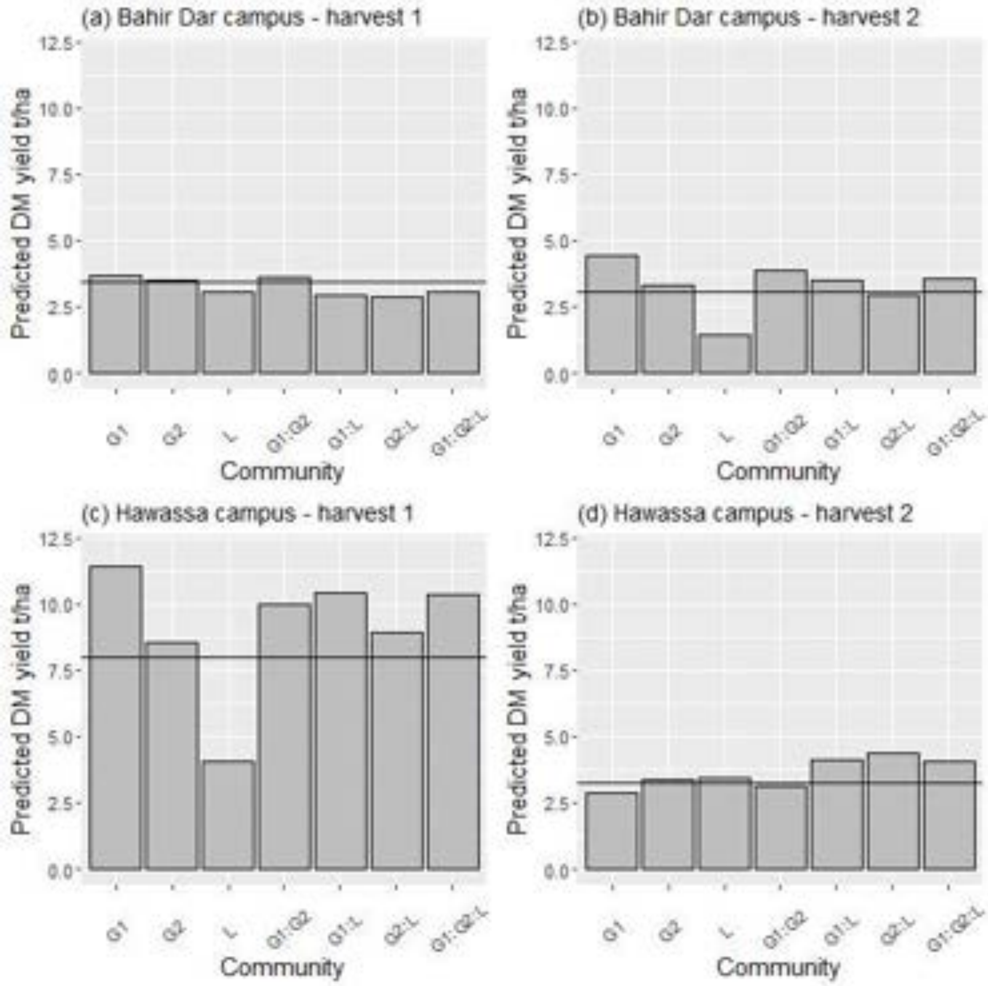

Figure 2. Model predictions of dry matter yield (t ha-1) in 1st and 2nd harvest at Bahir Dar (a and b) and Hawassa (c and d) from monocultures with P. maximum (G1), Brachiaria hybrid (G2), D. intortum (L) and 50:50 mixtures of the two grasses (G1:G2), P. maximum: D. intortum, (G1:L) and Brachiaria:D. intortum (G2:L) and the 0.33:0.33:0.33 mixture (G1:G2:L). The horizontal line in each panel shows the average performance of the monocultures. (From: Jørgensen M., Asmare B., Raji S., Brophy C. 2023. Grass-legume mixtures: a novel approach to forage production in Ethiopia. In: "The future role of ley-farming in cropping systems". Proceedings of the 22nd EGF Symposium. Vilnius, Lithuania 11-14 June 2023. Grassland Science in Europe 28, 149-151, eISBN: 978-609-451-008-3.)

The MAP participants raised the below questions and provided suggestions around topic 1:

Questions (Q): How were harvest times decided? E.g., Desmodium's CP content was low, was it over-mature?

Answers (A): The harvest time was decided based on grasses – on average 100/120 days. Optimal harvest time could be decided based on optimal feed quality, which depends on season. This is a topic that merits further investigation under varying climatic conditions.

Q: Were yields separated between legumes and grasses? And is it changing, e.g., what is the status of Desmodium now? Is it dominating the grasses?

A: Yields of perennial crops are expected to increase after first harvest, with peak expect in year 2 or 3.

We have estimated botanical composition by separating between legumes and grasses, but these data have not been analysed yet. However, as the the project duration is short and experiment is ploughed out (to test legacy effect), we cannot really assess long-term domination of Desmodium. However, there are indications that their performance is improving and that their roots are deep.

Q: Desmodium and Crotalaria's roots are deep; they have weed potential & need to be managed carefully - Desmodium might not be compatible with grasses (except Napier + with enough spacing)

A: Another interesting legume to consider in this case is alfalfa

Suggestion (S): It is better to express the yields as annual yields.

Q: As the performances in Bahir Dar seems low, why not use irrigation?

A: The poor performance is also influenced by soil properties. In addition, in the standard protocol it was decided not to irrigate, as we are also looking for solutions for smallholder farmers that do not have access to irrigation. Therefore, if the forages do not survive, they are not the right solutions.

Q: Is time too short to observe legacy effect?

A: We expect to –at best- see small effect. The research on effect of plants on soils is also one part of our research interest under this project.

S: In relation to grass-legume mixes, it might be better to express yield in CP/ha and look at economics too – which links with forage production via livestock production.

S: Agriculture has multiple objectives nowadays: Food production and Soil/natural resource restoration. Livestock is very central to all these functions in Ethiopia (incl. Draught power).

Q: Who will be the end-user? Which production systems and which farmers are we targeting?

S: Important to also look at seed systems – for scaling purposes. There is interest from the private seed sector on seed production, supply and distribution.

Q: Have you used the soil parameters in any analysis?

A: We have done soil analysis, and are extracting weather data – we plan to relate these with performance.

Q: What are the agronomic recommendations for the different mixtures?

A: Recommended seed rates for the species in single stands were used, and the proportion of each species in the mixtures were calculated based on this.

Q: Why did Stylo perform so poorly? And why did you replace by Sweet Lupin (it has availability of seeds)?

A: We do not know why Stylo did not germinate well. However, we expect seed dormancy to play part, as it needs at least 6 months storage. We replaced Stylo with sweet lupin in the screening trial, due to these problems with the Stylo germination.

Topic 2: Effects of forage plants and their mixtures on soil life

Preliminary results from the study of effects of forage plants and their mixture on soil life through experimental approaches were presented by Dr. Peter Dörsch, and his PhD student Niklas Wickander from Norwegian University of Life Sciences (NMBU).

The presentation described the main ideas in why there is a big focus on soil biological parameters by explaining the microbial loop. To find measurable parameters we focus on three different soil microbial endpoints, exoenzyme activity, microbial biomass of C, N and P, and carbon use efficiency, to measure how the plant input affect the soil biological activity as a proxy for long-term effects. The first preliminary result from the field experiment were showcased, with soil chemical analysis of the 6 field sites (Table 2), soil texture, enzymatic activity, and microbial nutrient stoichiometry, shown for untreated soil (before establishment of the field experiment). The design of the greenhouse experiment was described, explaining the pot design, where the pots were filled with sterilized sand and 40 ml dried soil. The explanation for this was to remove the background effect to create to create a small area in which roots could interact with soil and create a stronger signal (Figure 3). The layout of the experiment was also explained, with the different treatments showcased and the measurements and analyses of the soil planned or carried out were described. The first results from the greenhouse experiment were additionally shown, with the plant dry weight biomass in the different soil and plant. The enzymatic activities were shown as the first soil biological results from the greenhouse. The future planned lab work, data analysis and follow-up experiments were finally mentioned.

The MAP participants raised the below questions and provided suggestions around topic 2:

Q: Can this experiment be repeated in the actual field?
A: Yes, though the current results (from greenhouse) are a first proxy only. Main aim of this "reductionist" research: first proof of concept that forages can influence soil. Ideally, this could move into a systematic screening of forages and their potential functions in the soil (e.g. improving P enzymatic activity). North-South collaboration can help in advancing this type of reductionist research.

Q: What would happen if you put earth worms in the pots?
A: Interesting – maybe for Postdoc research.

Q: Incorporation of crop residues in the soil can improve acidity of the soils; are soil samples taken (and analysed) at different times of the project?
A: All plots have been sampled for a second time, awaiting shipment to Norway (96 samples). CEC, Carbon content, etc can have effect; maybe most important = N management. Growing plants can have positive or negative effect.

Table 2. Soil chemical data from the 6 different field sites

Site	pH	Corg %	Corg SD	Norg %	Norg SD	CEC	P	Mg	Al	S	Mn	Fe	Ni	Cu	Zn	Soil type	Soil Classification
Bahir Dar	5,56	1,9	0,1	0,2	0,01	37,28	1,7	290	1100	11	230	100	1,2	4,4	1,3	Silt Loam	Nitosol
Kudmi	5,526	2,64	0,17	0,24	0,02	33,43	1,3	540	930	9,6	120	150	4,5	6,1	1,6	Silt Clay	Nitosol
Abiyot Fana	5,26	2,1	0,13	0,19	0,02	36,43	1	230	1200	24	190	100	1,3	4,4	1,1	Silt Loam	Nitosol
Hawassa	6,632	1,75	0,16	0,17	0,02	47,08	120	300	590	9,8	150	120	1,1	0,6	12	Loam	Andisol
Boricha	6262	2,17	0,25	0,18	0,03	48,48	15	240	640	6,4	110	140	1,3	0,26	7,6	Silt Loam	Nitosol
Bilate	6,198	1,82	0,12	0,15	0,01	37,3	16	22	580	6,9	56	120	0,061	0,13	8,5	Loam	Nitosol
Method	pH (H_2O)	CN		CN		Ammo. acetate	Mehlich III										

S: In addition to microbial biomass, it would be interesting to identify specific microbes, e.g. presence/absence of specific bacteria which is important for sustainable production
A: True, meta-genomics would allow this – population ecology; within this project we focus on functional diversity – this is easier to measure. Available N can come from leaf or from N fixed by bacteria – innoculants currently on market are mostly for food crops. P status also strongly affects ability to nodulate, especially in acidic soils.

S: Microbial activity in soil must be influenced by season/time of taking the soil sample
A: Next step would be response of the soil in different conditions, seasons. For now, all soil samples taken at the same time – we can indicate when / in which season taken. Soil microbial communities are quite robust; potential lies in the soil; depending on conditions, some get more/less active.

S: Suggestion to change reference to Bahir Dar and Hawassa in the conclusions to the specific sites.

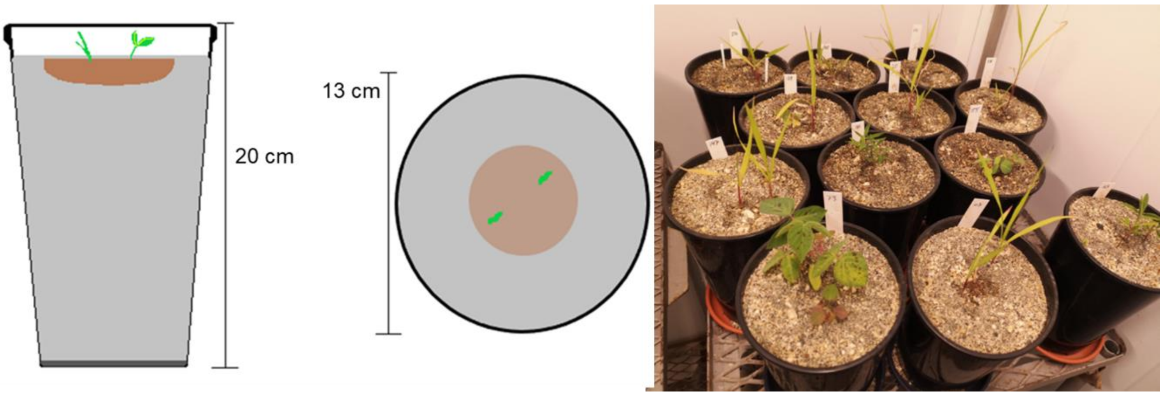

Figure 3. The measurements of the pots in the greenhouse experiment and the soil inoculum design used, and a photo of the experiment before harvest.

Topic 3: Large-scale farmer-led grassland testing

Mr. Mohammed Ebrahim and Dr. Kalkidan Mulatu from the Alliance Bioversity and CIAT (ABC), confirmed a similar finding on the multifunctionality of improved forages through their presentation entitled "*Identification of robust grassland species and mixtures through citizen science – experience from the field*" and the "*First results on the performance of the technologies tested in the tricot trial*" respectively. These presentations were made based on preliminary findings from the citizen science based, Triadic Comparisons of Technologies (TriCOT) approach which engaged around 300 farmers in North and Southern Ethiopia (Figure 4). Certain forage species and their mixtures (*Panicum maximum*, Mombasa, *Brachiaria* hybrid, Cayman, and mixtures of particularly Mombasa with *Desmodium intortum*) have been identified that have so far worked very well with smallholder farmers (Figure 3). These preliminary results will be tested in a second cycle with 300 new farmers, as well as with the continued harvest tests with farmers that are willing to keep their plots from the first cycle. The Mombasa and Brachiaria grass species are new to these regions. Mixtures of grass and legume are also very new under these conditions, and thereby an innovation. There seems to be a growing interest, and a demand for scaling these innovations to more farmers and regions.

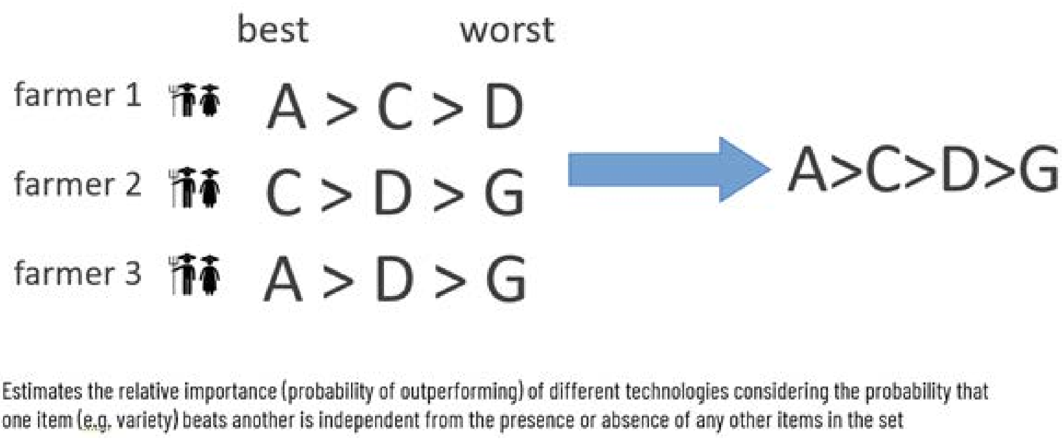

Figure 4: A graphic presentation of TRICOT based comparisons.

Development Agents (DA's) from the Amhara and Sidama sites also provided their feedback and observation from the field. Apart from Desho and Desmodium, the forages in the TriCOT were new/unknown before in the implementation sites. It was also said that the project has provide new knowledge about forage options and on how to evaluate their performances (Table 3&4).

Table 3: Example of key traits assessed by farmers to evaluate forage performances.

Trait	Statement (Positive/best)	Statement (Negative/worst)
Establishment	Which option was easier to sow?	Which option was more difficult to sow?
Plant height	Which option has the tallest plants?	Which option has the shortest plants?
Soil cover	Which option is the best in covering the soil?	Which option is the worst in covering the soil?
Plant population	Which option has more plants (grass&legumes)	Which option has less plants (grass&legumes)
Grass population	Which option has more grass	Which option has less grass
Legume population	Which option has more legumes	Which option has less legumes
Weed population	Which option has less weeds	Which option has more weeds
Plant colour	Which option is greener/less green	Which option is less green
Disease resistance	Which option is more resistant to diseases?	Which option is more susceptible to diseases?
Pest resistance	Which option is more resistant to pests?	Which option is more susceptible to pests?
Drought resistance	Which option is more tolerant to drought?	Which option is more susceptible to drought?
Leaf-Stem ratio	Which option is leafier	Which option is less leafy
Nutrient requirement	Which option needs less fertiliser	Which option needs more fertiliser
Environmental co-benefits	Which option keeps more soil in place	Which option keeps less soil in place
Soil fertility improvement Yield	Which option contribute less for soil fertility improvement?	Which option contribute less for soil fertility improvement?
Yield	Which option has the higher yield?	Which option has the lower yield?
Harvesting	Which option is easiest to harvest	Which option is the most difficult to harvest
Livestock feeding	Which option do the livestock prefer first	Which option do the livestock prefer last
Transplanting	Which option is easiest to transplant	Which option is most difficult to transplant
Overall preference	Overall, which option was the best?	Overall, which option was the worst?

Table 4: Preliminary findings on preferences of forages across different data collection moments

Key trait	Data collection moment	High performance	Weaker performance
Soil Cover	Germination	Desho	Stylo, Cayman & Stylo, Mombasa & Stylo
Establishment	Germination	Lablab > Desho	Mombasa & Cayman & Desmodium & Stylo, Mombasa & Desmodium, Mombasa & Stylo
Yield	First Harvest & second harvest	Mombasa & Lablab > Desho	Stylo, Cayman & Stylo, Cayman Cayman & Stylo, Cayman , Stylo
Livestock Feeding	First Harvest & second harvest	Desho	Crotalaria, Lablab, Cayman & Stylo Lablab, Crotalaria, Cayman & Lablab
Drought Tolerance	First Harvest & second harvest	Desho	Crotalaria, Lablab, Cayman
Soil Cover	Second Harvest	Mombasa & Desmodium > Desho	Cayman & Stylo, Stylo, Cayman
Environmental Co-benefits	Second Harvest	Mombasa & Desmodium > Desho	Crotalaria, Cayman , Lablab
Overall Preference	Second Harvest Part II	Mombasa & Cayman & Desmodium & Stylo > Mombasa & Lablab > Desho	Stylo, Cayman & Stylo, Cayman

Observations were made by MAP participants regarding the complementarity of these results with on-station experiments. Suggestions were also forwarded regarding the need for addressing more heterogeneity in agroecology. It has also been advised that one must be careful with the conclusions, as for instance preference for Desho – could be influenced by previous experiences. Thus, a large dataset is needed for reducing errors and improving representativeness.

Topic 4: Assessment of potential (multi-dimensional) impact of scaling preferred forage options

The presentation by Mrs. Meron Eshete, a researcher at ABC, addressed that the out-scaling of well performing varieties from trial plots to farm and landscapes requires an advanced understanding of smallholder mixed farming systems, that are extremely varied, considering different biophysical and socio-economic factors. Typologies are seen to be a good starting point in the research of farm performance and rural livelihoods since they can capture the characteristics and heterogeneity of farming systems. Thus, different farm optimization recommendations are to be provided for different types (Figure 5).

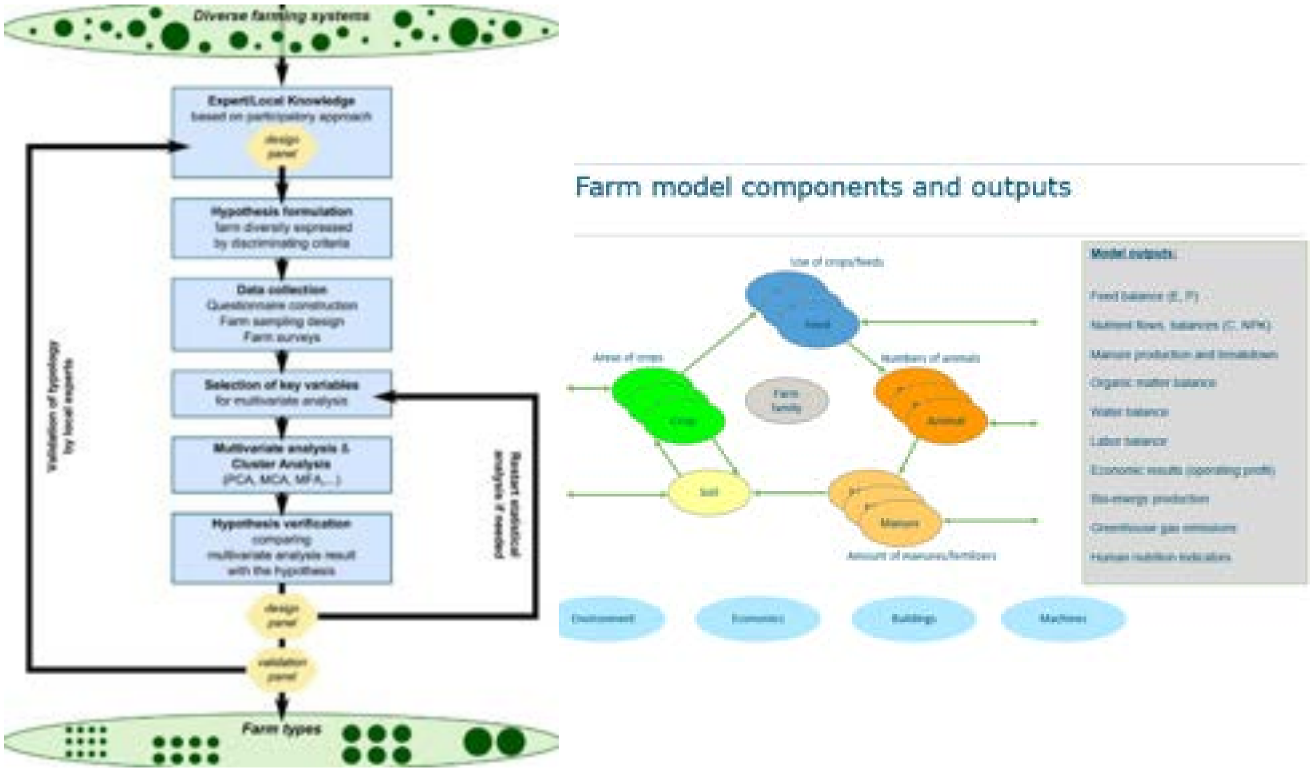

Figure 5: Farm typology and FarmDesign frameworks adopted to the study.

The MAP participants raised the below questions and provided suggestions around topic 4:

Q: At a national level there have been 16 farming systems identified (10 of those are mixed systems), why do we need to do this new classification?
A: These exercises are more detailed as they consider differences at a smaller scale, not only on biophysical case, but also Including household-level factors too.

S: Low income HH often have higher crop diversity ("crops are everything"), while high-income HH are often market-oriented and specialisation. It may be important to re-check the current results around this.
S: Scenario suggestion on converting (food or cash) crop to forage crop – will only be feasible in some contexts or for some HHs
A: FarmDESIGN approach is to be used to consult on optimization options responding to specific objective (e.g. income, food security)

Topic 5: Synthesis and outreach

Project outreach approaches (e.g., blogs, workshops) that the project used to communicate activities and to synthesize similar works around the multifunctionality of forages were presented by Dr. Wuletawu Abera from ABC (Figure 6).

Figure 6: Examples of outreach documents

An overview was presented regarding a synthesis/review document being developed to quantify the multifunctionality of forages, derived from published literature, but also to be acquired from gray papers and unpublished documentations across different research centers (Figure 7). Thus, experts were invited to contribute their findings generated around quantitative evidence of forages towards land restoration indicators, for co-development of the synthesis document.

Figure 7: Word cloud generated from literature search returns linking forages with restoration.

The MAP participants raised the below questions and provided suggestions around topic 5:

Q: Farming systems are heterogeneous & feed sources are different – is this considered in the systematic review?
A: All studies are geo-located so that we know which farming systems are represented. We expect to find knowledge gaps which will direct us to new research needs.

Q: Interesting to review existing evidence, but need to work on the search strings, e.g. include other terms ("soil fertility", "compaction", "soil water infiltration"), working with *s, "forage*" + all the varieties, …
A: Agreed. Search strings are to be refined using these suggestions and more.

Q: Many people mention livestock as main contributor to land degradation, e.g. erosion range 40-100 ton/ha/year. How to think differently about this?
A: The paper aims to document do we know/have data on how to change this and use forages as an innovation to reduce this?

S: Language around livestock-degradation needs to change, as the issue is on the way that we manage livestock that *can* cause degradation, but it is also the entry point for looking for solutions and transform production systems.

S: there is a strong need to change the "tone" of how we talk about livestock and degradation, here crop-tree-livestock integration is very important.

Plenary session

An open discussion/plenary session was reserved at the end of the MAP meeting to discuss key topics of interest and to provide opportunities for general questions, observations, and suggestions around the topic. Dr. Solomon Mwendia and Dr. An Notenbaert from ABC forwarded few points to guide the discussion.

Discussion topic 1: What could be options/interventions interesting to scale?
A: Growing forages to improve subsequent food crop production, and to connect that to what is happening below-ground

S: Different forage technologies for addressing feed shortage as well as as input for land restoration

S: We need to follow a holistic approach to research (from soil to crop/plant to farm to landscape) - connecting science of discovery to science of delivery

S: Technologies selected need to be compatible with different systems and household types

Discussion topic 2: What hindrances are likely to be encountered when trying to scale out/up promising interventions? What could be opportunities to tackle these challenges?

S: We need to protect and restore land – so that land can be productive
S: Seed availability is a key issue. Both shortage and issues are also many seeds have been handed out for free through NGO's

S: Incorporation of participatory forage selection and community led seed production. Multiplication of seed production (e.g. by smallholder farmers) can be supported by different partners; different business models exist (e.g. through farmer cooperatives; focus on perennial forages are perennial and vegetative multiplication; also a role for private sector)
S: TRICOT approach and selection of farmers to capture full heterogeneity (soil, etc) to be adjusted
S: There is a need to reaching many people and it is advised to be done step-by-step, through demonstration, etc. Here, involving multiple stakeholders (incl. Farmers, researchers, extension) is essential.
S: Supporting capacity and skills at different levels is essential. Especially addressing poor extension system (incl. for seed production). It is advised that training and capacity development are provided in collaboration with research centres (incl. for basic seed production), addressing key issues such as hharvesting time of different crops and forages in the mixtures.
S: Create evidence on benefits of improved forages in terms of livestock productivity and income

The MAP meeting was concluded with a closure speech and appreciation of participants by Dr. Marit Jørgensen's, program manager of EthiopaGrass project.

Visit to smallholder farmers in the Sidama region of Ethiopia.

The livestock numbers in Ethiopia are among the highest in the world and almost all farmers hold some cattle or other livestock. Most of the feed for the livestock is derived from free grazing on overgrazed rangeland and from crop residues. This aggravates the ever-rising problems with soil erosion and soil degradation. Cultivating forage, and the use of improved forage species is not widespread in Ethiopia. Growing improved forage species could improve feed provision for livestock, while at the same time counteract soil degradation. The EthiopiaGrass project tests new forage species in mixed-farming systems that can provide a high-quality feed while simultaneously improve soil quality. Although the benefits of grass-legume mixtures regarding forage productivity and quality are well known under temperate conditions, this is less explored under tropical conditions.

The grass and legume species are tested in mixtures and single stands, both in controlled field experiments, and in large-scale farmer led testing involving more than 600 farmers to understand farmers' choices and preferences.

In late April 2023, we visited several smallholder farmers in the Bilate Zuria district in the Sidama region of Southern Ethiopia, close to the big Lake Hawassa in the Rift Valley. The farmers visited are participating in the farmer-led testing where each of the farmers are evaluating and ranking the best and worst of a set of three different forage species or mixtures that they have received from a pool of 14 different options. The farmers have ranked these options according to a set of predetermined criteria – e.g., how well they establish and cover the soil, yield, preference by livestock, drought tolerance, and other environmental co-benefits.

The rainy season had started some weeks before we visited, and the vegetation was incredibly green. Their farms were relatively small – around 2-3ha on average but were diverse with maize intercropped with beans and potatoes, with coffee and fruit trees in between. Considering their farm size, it was not obvious that smallholder farmers would allocate a small portion of their land (about $12m^2$) and labour to experiment with forage cultivation, but fortunately, farmers were interested to participate in this.

Each farmer has three experimental plots for the tricot trial, and the forages were at waist-high at the time we visited, and farmers were very enthusiastic about the forage quality and quantity. Particularly they liked the grass-legume mixtures since it gave more milk when fed to the cows. A lot of neighbours also came by and were interested in how to get access to these options. With scaling of the experiment neighbouring farmers will be reached to test the varieties in their farms. Still, seed supply is a big challenge to be solved. However, a short-term and small-scale solution is for farmers to vegetatively propagate the forages for larger areas and share splits with neighbours.

The first analyses of results after one year of experimenting show that the diverse mixture of two grasses and two legume species was the overall most preferred option by farmers. Most preferences were influenced by the forage traits related with soil cover, environmental co-benefits, and quantity. The experimentation will continue until the coming year, and this will provide a solid foundation for both selecting the best options and continued adaptation and scaling of the technologies.

Farmer with plots of legume-grass mixture(left) and discussion with farmers (right).
Photo: Marit Jørgensen

Parts of the project group: From left – Shimelis Raji (Hawassa Univ.), Wuletawu Abera (Alliance Bioversity-CIAT), Bimrew Asmare (Bahir Dar University), Kalkidan Mulatu (Alliance Bioversity-CIAT), Marit Jørgensen (NIBIO), Mohammed Ebrahim (Alliance Bioversity-CIAT),
Back: Peter Dörsch and Niklas Wickander (NMBU).