

Feed database progress report 2022

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Project outline

The Alliance of Bioversity international and CIAT in collaboration with Mazingira labs-ILRI under the Livestock & Climate Initiative is developing a feed database to aggregate feed and forage nutritive quality parameters. The feed database will be an open access resource that will have multiple data sets targeting forage scientists, animal nutritionists, rangeland ecologists, farmers, and others. It will allow them to access and retrieve critical information and data for various forage materials and feeds. In addition, environmental and soil modelers will greatly benefit from the data resource in their calculations and assessments of livestock's interactions with environment and soil. The tool will comprise of nutritional data from various parts of the world i.e., Africa, Latin America, and Asia. It will include sample results done using NIRS and wet chemistry. This work is aimed at supporting availability of nutritional data that is key in formulating feed rations by nutritionist, scientists further elaborating the performance of various forage varieties in different agroecologies. The feed database will be a rich resource meeting the following objectives:

1. Aggregate existing feed and forage nutritional data from multiple parts of the world.
2. Having an up-to-date feed database that can continuously be updated with new feed nutritional data.

For researchers and modelers, the data base should:

- Inform on better feeding options for farmers using locally available resources.
- Provide information on the variations of nutritional aspects of forages in different agroecologies across differing climatic zones.
- Identify areas that are limited in information and knowledge hence need for research.



For final beneficiaries, the following benefits are expected:

- Better identification of feed resources and subsequent appreciation of their nutritional quality.
- Increased opportunities in crop livestock integrated farming systems
- Improved utilization of available feed resources while practicing good feeding practices.

Existing Feed database resources

The new feed database is expected to offer multiple benefits to many organizations and projects at large. It will be a major source of critical information that is used by various researchers, academics, nutritionists, modelers, and scientists. However as important as this information is, currently there are limited feed database resources available that have comprehensive feed nutrition data covering important information such as geolocations and overall climate descriptors of where the data was sourced from. While there are existing feed databases containing nutritional values for forage and feed materials, the main drawback is that most provide limited information on metadata such as collection site, agroecological zone, collected plant part, plant stage, management etc. These data are crucial to understand the mechanisms underlying different nutritional qualities of the same plant species and are necessary to develop feed management recommendations. Moreover, due to the current structures of existing feed databases, it can be difficult to include any additional information into the systems that it was not originally designed for.

One existing feed database resource is the sub-Saharan feeds composition database developed by ILRI (<https://feedsdatabase.ilri.org/>). The database provides nutritive quality information on various livestock feeds. The vision of creating the database was to support development and research actors to design best-cost rations for meat and dairy production on smallholder farms to provide better nutrition for livestock while increasing profitability from animal products and improving the livelihoods of smallholder farmers. The SSA feed database currently provides nutritive value from about 65000 samples analyzed at the nutrition labs of ILRI in Addis Ababa and elsewhere.

Another database for forage and feed data is Feedpedia (<https://www.feedipedia.org/>), which is a joint project from CIRAD, INRAE, FAO, and AFZ. It is an open access information system that provides feed chemical composition and nutritive composition from >1400 different feeds. It has mainly been utilized by researchers, students, policy makers, livestock farmers to help them identify, characterize the sustainable use of livestock resources. Feedipedia draws from ILRI's SSA feed database.

Components of the proposed new feed database

The data sheet will contain the following information (Annex 1):

- **Feed names**, including common names and scientific names
- **Description** of the plants or plant parts/products that were analyzed
- **Meta data** describing agroecology of where the sample was obtained.
- **Chemical composition and nutritive value**
- **Geolocation** including latitude, longitude, and altitude
- **Agronomic information** about the forage
- **Forage management** including fertilizing, manuring regimens
- **Method of analysis** used whether wet chemistry or NIRS. The lab that analyzed will also be included.

Opportunities of enhancing the feed database

- More data can be included by including willing partners who have data from trials and projects.
- Make the systems user friendly. Although it is assumed that the end users have technical information to understand the variable, making it simple is the goal.

Current status

- Feed data from ILRI's Mazingira lab have been collated for the years 2020-2022
- A task force leading the feed database project has been established
- Conversations with potential partners are ongoing



Alliance



Action plan for 2023

- Sourcing more data from various ILRI and Alliance trials to include in the database
- Discussion with potential users about optimal content, design, and functionality of the database
- Transition from data in Excel to an online tool with user-friendly user interface → parathionion of a database mockup
- Include more data sources from partners such as other CGIAR centers, national and international research organizations, universities.
- Meetings within partners to monitor progress of the feed database.



Annex 1: Components of the feed database columns

Metadata

Sample code (lab)
Sample ID (researcher)
Genus Species
Common name
Variety Annual/perennial
Collection year Collection month
Season
Country
County,
District
Sublocation
Agroecological zone
Elevation
GPS Latitude
GPS Longitude
Plant group
Harvesting stage (weeks)
Cropping system
Fertilizer
Fertilizer nitrogen (N)
Fertilizer phosphorus (P)
Fertilizer potassium (K)
Soil type
Irrigation
Project
Funding agency Researcher
Supervisor
E-mail researcher
StudentE-mail student
Publication
Analyzed plant part
Laboratory
Feed analysis method
Access (open or closed)
Other information
Mazingira sample code
Label on sample bags, in field books
Select from dropdown list
Select from dropdown list. If it's a timespan, put the first month.dry season, wet season
Village,
Town,
locality



meters a.s.l.
Soils Vertisol, Nitisol, Ferralsol
Select from dropdown list
Scientist in charge of activity
Student/ technician who collected sample
Select from dropdown list
Select from dropdown list
comments

Nutritional content

DM % of FW
ASH % of DM
N% of DM
CP % of DM
NDF % of DM
ADF% of DM
ADL % of DM
GE MJ/kg DM
OM % of DM
invitro DMD % of DM
Yield t/ha t DM/ha
ME MJ/kg DM



Annex 2: Timeline for Feed database activity

Timeline Feed database 2023												
Activity	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Report on progress	Yellow											
Meeting with ILRI Mazingira team		Yellow										
Interface transition		Yellow	Yellow	Yellow	Yellow							
Entry of existing data sets	Yellow	Yellow	Yellow	Yellow	Yellow							
Source for more data	Yellow	Yellow	Yellow	Yellow	Yellow							
Entry of additional data				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Mock feed database					Yellow	Yellow	Yellow	Yellow				
Complete database							Yellow	Yellow	Yellow	Yellow		
Reporting									Yellow	Yellow	Yellow	Yellow