REFLECTING ON CLEANED eXtRa TOOL DEVELOPMENT

CLEANED WORKSHOP REPORT



Aberdare Prestige and Royal Cottages, Nanyuki-Kenya.

12th – 15th March 2024

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Introduction

The CLEANED development core team from the Alliance Bioversity-CIAT and International Livestock Research Institute planned for a pause and reflection session in Nanyuki to deliberate on the CLEANED eXtRa progress. These discussions were part of the CGIAR research initiatives on Livestock, Climate and Systems Resilience (LCSR) and Sustainable Animal Productivity for Livelihoods, Nutrition and Gender Inclusion (SAPLING) and succeeded earlier workshops held in August 2022 at De Ferme Framboos, South of Leuven, Belgium and in March 2020 at Kapiti, Kenya. We express our gratitude to donors who contribute to the One CGIAR trust fund. This time, the team had four objectives to accomplish:

- Reflecting on the progress made including tool development, application and training
- Addressing and completing the pending commitments
- Discussing the long-term vision for tool development, dissemination of results and scaling
- Establishing the list of priorities and developing a concrete work plan for model development and application in 2024 and beyond

Before the team began discussions, An Notenbaert provided a quick recap of the Kapiti and Belgium workshops to keep the members on the same page. It was also an opportunity for the new members to understand the evolution of the tool and the path the core team has taken over the past few years.

Objective 1: Progress on tool development, application, and training

The team highlighted the key achievements of the last two years which include the development of a Qt-enabled graphical user interface and a CLEANED R package. At least three beta versions of the CLEANED-eXtRa were released before this meeting – showing the great efforts the team has made towards the tool development. Resource materials for the new tool e.g., user guide (English, Spanish & French), technical specifications, example farm database, and a narrative video were reported as ready. On the other hand, training and application of CLEANED Excel version in different countries was reported ongoing. Most applications were conducted in the SAPLING and LCSR priority countries for different

livestock systems and value chains. Notable assessments included out-scaling analysis for dairy systems in Tanzania, multispecies systems in Vietnam, and baseline assessments for Uganda and Kenya dairies. The tool was used to assess 20 municipal farms in Caqueta, Colombia and livestock farms in all provinces of Ecuador. Additionally, the team was working on several manuscripts for the dairy, multispecies, and pig systems. Although the team was eyeing to train on the new tool, capacity building on the Excel version was noted as ongoing. Full training has been conducted in Zambia, GIZ Tunisia, and the Ecuadorian Ministry of Agriculture. In Colombia, awareness creation has been carried out, and FEDEGAN expressed interest in full training. There was an emphasis to continue building the tool's capacity externally and internally for a widescale uptake of the innovation.

Objective 2: Completing the pending commitments

(i) Refinement of the existing modules

- *Water module*

The team received an update on the water module from Ricardo Gonzalez. The refinement process includes the identification of gaps in data availability and quality, spatial and temporal variability, crop scope, and irrigation efficiency. A workshop of key resource persons was already being planned to help in revising the water module. However, it was noted that the process could take a while to complete, so the revised module will appear in the next version of the tool.

- *Economic module*

While updating, Rein van der Hoek mentioned that some steps had been taken, including meetings with socio-economists to review and add additional indicators. However, the actual implementation of these changes has not happened, causing a delay in the completion of the module. The team agreed to follow up with the Tropical Forages socio-economists to expedite implementation before the end of 2024. This would ensure the integration of the module in its second release.

(ii) Sensitivity Analysis

Stephen Oloo updated on the sensitivity study for CLEANED eXtRa taking into account the feedback he received in an earlier workshop. This analysis aimed to identify input parameters

that have the most significant influence on the CLEANED eXtRa outputs. The analysis entailed using fixed farm & energy input variables to generate 500 iterations through Monte Carlo Simulation. A global sensitivity analysis using a regression-based method was applied to generate Partial Rank Correlation Coefficients (PRCC) between inputs and CLEANED eXtRa model outputs. Results were presented for the four environmental indicators i.e., Area required, water use, Nitrogen balance and Greenhouse gas emissions. The team was pleased with the results and considered them to be an important milestone that should be published. As the next step, the lead author, Stephen, was asked to complete the process, write a draft manuscript, and share it with the rest of the team for comments. It was also mentioned that the presentation slides could be uploaded to CGSpace before the paper is published.

(iii) New modules functionality

- *CLEANED Benchmark analysis*

Glarion updated on benchmark analysis of environmental impacts of various livestock systems in Africa. The team agreed to include the benchmark data table in the CLEANED outputs, in addition to publishing the analysis results. This will enable users to compare their environmental footprints against established benchmarks for impacts. Since the benchmark table was only created for the African region, the team realized the importance of expanding the literature to include tables from other regions where the tool works. It was also noted that francophone literature was excluded in the development of the benchmark yet forms a substantial share of Central and West Africa. In reaction to this, the team proposed working closely with a French-speaking colleague to review omitted literature and update the tables accordingly.

- *Biodiversity*

The team proposed to create a “biodiversity results tab” and keep land requirement change as an indicator of biodiversity loss or richness. Feed crop species richness (number of different feed crops) is to be added as an indicator of agro-biodiversity among other diversity indexes. Initially, this section was mainly brought up in the discussion section of the outcome report and, not in the algorithm modules.

(iv) Modifying the CLEANED Framework

The team decided to review the current framework to adopt a more inclusive approach when evaluating the environmental impacts of livestock systems. Speaking at the workshop, Hanna Ewell, a Research Fellow from Wageningen University and Research, highlighted the importance of responsible scaling and inclusiveness in livestock systems. The team acknowledged her contribution to the social dimension of livestock systems and emphasized the importance of building an inclusive typology when assessing livestock systems, thus the birth of I-CLEANED eXtRa. This framework is designed to prioritise profitable, environmentally sustainable and inclusive livestock interventions. Furthermore, differentiated sets of scenarios will be developed and evaluated to help design livestock systems that meet the community's goals and the environment at large. The team decided to support the completion of the framework and circulate it widely among gender experts for their input. Following this, a discussion paper will be prepared, and thereafter a brief to be published on the CGSpace repository. Additionally, the team proposed testing the new framework as part of the activities for the LCSR Initiative subject to budget availability.

Objective 3: Long-term vision for tool development, dissemination of results and scaling

The departure of the GUI & R resource persons left a gap that needed an urgent fill. The team agreed to find a new set of programmers to expedite releasing a stable tool. In preparation for defining new terms of reference for the developers, everyone was encouraged to test and compile a list of suggestions to further improve the beta version. The team was reminded of the need to incorporate more functionalities in the second release of the tool. These include but are not limited to developing algorithms for extrapolation, water, economics, biodiversity, and silvopastoral systems in connection with the Tree biodiversity team. To ensure these are realized, mapping the current and future funding resources was highlighted as a strategic step going forward. The team suggested organizing a series of events to launch the tool to disseminate results and scale its use. It was important to expand the tool's reach within and beyond CGIAR centres to allow for organic growth. Other potential venues for pitching included multi-stakeholder workshops, high-level meetings, and conferences.

Objective 4: List of priorities & developing a work plan for model development &

application

To conclude the session, the team created a list of priorities that served as the work plan for 2024 and beyond. The list included pending, ongoing, and future work items, with timelines attached to each described deliverable. However, the list is not exhaustive as priorities may change over time – see Annex 1.

Conclusion and Way Forward

Indeed, the workshop objectives were achieved, and the course for the year was defined. The immediate and high-priority needs were to find a new set of programmers who would play a central role in realizing the shared vision of the team. To promote close collaborations, the preference was for these resources to be internally sourced. This was also intended to make the proposed bi-monthly meetings more productive. Lastly, the team's strong presence in Sub-Saharan Africa, Latin America, and Asia demonstrated the commitment to amplifying sustainability voices in livestock transformation.



Figure 1: The CLEANED team having discussions with the Kieni Dairy Cooperatives Operations Manager at the plant.

Annex 1: Workshop Agenda

Objectives
1. Reflect on the progress made
2. Address and complete the pending commitments
3. Discuss long-term vision
4. Establish priorities and develop a 2024 work plan for model development and application

Date and time	Session Activities	Resource person
Tuesday 12 March - Travel		
10:30am	Assemble at ICIPE grounds	All
11:00am	Depart to Nanyuki	An/Emmanuel
1:00 pm	Snack/refresh stopover - Nyeri town	All
2:30 pm	Stopover - Kieni dairy cooperative	Emmanuel
4 :00pm	Arrival at Royal Cottages in Nanyuki	Emmanuel
Wednesday 13th March - Reflecting on progress		
8:30 - 9:00	Welcome (Ice breaker) and Objectives	Emmanuel
9:00 - 9:30	Recap: Belgium workshop/August 2022 virtual meeting	An
9:30 - 9:50	Update on CLEANED trainings, manual and publications	All
9:50 - 10:10	Stakeholders feedback on CLEANED methodology and assumptions	Rein and Emmanuel
Coffee/tea		
10:40 - 11:00	CLEANED eXtRa progress	Emmanuel and Stephen
11:00 - 11:30	Manoeuvring CLEANED eXtRa GUI	Glarion
11:30 - 12:30	Quick testing and feedback	Glarion
LUNCH		
14:00 - 14:30	Update on sensitivity analysis + discussion on implications	Stephen
14:30 - 14:50	Update on water module + discussion on next steps	Ricardo
14:50 - 15:10	Update on economic module + discussion on next steps	Rein
Evening coffee/tea		
15:30 - 16:00	Update on benchmarking + discussion on next steps	Ricardo and Glarion
16:00 - 17:00	Update on G-CLEANED + discussion on next steps	Emmanuel and Hanna
Thursday 14th March - Visioning and addressing pending commitments		
8:30 - 9:00	What change do we want to influence with CLEANED? What impact do we want to see?	An guides open discussion
9:00 - 10:00	How do we get there? (keeping opportunities in OneCGIAR initiatives in mind)	An guides open discussion
Coffee/tea		
10:30 - 11:00	Compile list activities, outputs, outcomes (short vs. long-term)	An guides open discussion
11:00 - 11:20	Decide on break-out groups (topic + expected deliverable)	Emmanuel
11:20 - 12:30	Technical working Group 1: Stepwise guide to CLEANED approach - writing session (TBC) Technical working session 2: CLEANED paper - writing session (TBC)	All
LUNCH		
14:00 - 15:30	Technical working Group 1: Stepwise guide to CLEANED approach - writing session (TBC) Technical working session 2: CLEANED paper - writing session (TBC)	All
Evening coffee/tea		
16:00 -16:45	Progress reporting from technical working groups / any adjustments needed?	Ricardo/Stephen
17:00	Sunset stroll and dinner at Nanyuki town	Emmanuel
Friday 15th March - Priorities and work plan		
8:30 - 10:00	Final touches - pending work	All
Coffee/tea		
10:30 - 11:00	Decisions and way forward	An
11:00 - 12:00	Timelines and responsibilities	An
LUNCH	-	All
Departure	-	All

Annex 2: Work plan for model development & application

Priority Areas	Who?	Supported by	Timeline
Consolidate CLEANED team			
Coopt Hang "officially" as a CLEANED team member	An		March
R programmer - check with CA team (Evan - keep Manjari Singh in mind too)	An	Ricardo, Emmanuel	March
Bi-monthly progress (recurring outlook invitation)	An		March
Review of budget	An	All	March/April
Plan for maintenance (and continuously improvement) of the tool			
i. GUI -- talk with Carlos, check with Digital Inclusion Lever	An	Emmanuel, Ricardo	
- request CLIMOB MoU and advice from Lever Director Digital Inclusion (incl. "business model)	An		March/April
- decide and implement on long-term "outsource model" for GUI maintenance	An	All	May
- start arranging an extension of the current service provider contract to finalise version 1	Emmanuel		April
- final hand-over meeting with Carlos	An		April
ii. R programming -handover meeting	Emmanuel	An, Ricardo	May
iii. Translate GUI in French and Spanish	Rein		
- identify who will implement in GUI	UI programmer		
i-CLEANED eXtRa version 1			
Testing			
Test GUI logic and function	All	All	March
Compare Excel vs R results	Rein	Emmanuel, Glarion	April
Compile list of issues to address (Short- and Long-term)	Emmanuel	All	April
Model improvements			
GUI: Ensure livestock categories not editable in parameters	Emmanuel	Mr. Bot	
GUI: Add "compare enterprises" button and functionality	Emmanuel	Mr. Bot	

READ ME sheet in output excel	Stephen	Emmanuel	this week
Benchmark table sheet in output excel	Stephen		next week
add Excel for "compare scenarios option"	Stephen		done
Other issues identified through testing	R programmer and GUI support		End of May
Awareness creation -- towards scaling			
Update CLEANED website			
- Database of repository farms	Emmanuel	Glarion	June
- new cases	Emmanuel		
-- links	Emmanuel		June
-- briefs/blog style (after OICR documentation)	Hannah	Emmanuel	June
- Links to sensitivity analysis ppt, iCLEANED brief, …	Emmanuel	Stephen	June
- Provide access to Excel step-by-step guides	Emmanuel	Rein	June
Increase visibility of the website			
- engage communications team	An	all	June
Re-activate CLEANED email	An		March
Manage CLEANED email	Emmanuel		on-going
Ensure CLEANED present in initiative stakeholder engagement processes	All		on-going
Put it on the agenda in the new MegaPrgorams	All		on-going
Present at an Alliance Webinar on CLEANED	Glarion	Ricardo, Emmanuel, Hanna	June
Follow up in Colombia - FEDEGAN	Ricardo	Juan Andres	March
Follow up in Ecuador (MoA and FAO)	Rein		March
Launch i-CLEANED eXtRa	An	all	First week of July
- check CGIAR science week side event	An		
- advertise widely (e.g. EHB platform, ABC communications team)	An	all	
- make it happen	An	all	
Plan and implement IPSR	Rein	An, Emmanuel	June -

workshop			October
Uganda and Tanzania	Rein	An, Emmanuel	
OICR update			
i. connect with PISA/MELIA (Sophie Alvarez)	Rein	all	March
ii. Track and document outcomes ~ guidance MELIA team	all		September
--Touch base with Dikoka (Zambia)	Ricardo		
iii. Write the OICR	Rein/Intern	all	October
Capacity development			
Materials			
Produce step-by-step manual focused on the tool (English, French, Spanish)			
- Review manuals and training materials	Rein, Emmanuel		March
- Excel version - translate to english	Rein		April
- Adapt excel step-by-step for eXtRa	Emmanuel	Rein	May
Develop process guide for i-CLEANED	Emmanuel	Glarion	June
- Include "process" in user guide	Emmanuel	Hannah	
- Include explicit biodiversity-related interpretation of e.g land footprint in interpretation of results section	Hannah	Glarion	June
- include benchmarking table in manual/technical guide	Emmanuel		
- Separate out "technical specifications"	Emmanuel	Rein	June
Actual trainings			
i. FEDEGAN (TBC)	Ricardo	Juan Andres	mid-year?
ii. Uganda	Emmanuel		September
iii. Ad-hoc ones (maybe: Senegal)	TBD		
CLEANED application cases			
SAPLING applications			
i. Uganda dairy - incorporate stakeholder feedback	Emmanuel	An, Ricardo	first week of April
ii. Uganda pigs - finalise and submit paper	Emmanuel	An, Ricardo	end of May
iii. TZ Dairy - focus on dissemination of results	Emmanuel	Ricardo, An	December
iv. Multispecies Vietnam	Hang	Emmanuel, Mary	
- paper	Hang	Emmanuel, Mary	August
- dissemination	Hang	Emmanuel, Mary	December
v. Kenya dairy - influence thinking	Emmanuel	Peggy, An	December

vi. SR Mali - establish if there is demand	Rein	national partners, ILRI	December
LCSR applications			
i. Colombia (Caqueta) - assessment	Ricardo	Juan Andres	
- assessment	Ricardo		April
- dissemination	Ricardo		December
ii. TZ dairy - dissemination - together with SAPLING	Emmanuel	Ricardo, An	
iii. Tunisia - expand assessment to different provinces	Rein	GIZ, Ministry	
- confirm	Rein		March
- assess (tbc)	Rein		December
iv. Senegal - confirm potential interest from NGOs	Rein		March
SI-MFS application			
i. Ghana SPS	Rein	Barbara V, FORIG	June
ii. Laos SPS	An, Emmanuel	Riina, Simon, Soy	December
Others			
i. Ecuador (TBC)	Rein		
Incorporate more functionalities in next version of CLEANED eXtRa			TBD after launch
i. "small" improvements:	R programmer	An, Emmanuel, Rein	
- Work on flexible LS categories	R programmer		
- include check on DM intake (e.g. <= x% of LW)	UI programmer		
- issue identified during testing	UI programmer		
ii. Benchmarking	R programmer	An, Emmanuel, Rein	
- logic/algorithm	R programmer		
- implementation in R	R programmer		
- adjustments to GUI	UI programmer		
- add benchmarking tables for LAC and Asia	UI programmer		
iii. Outscaling/extrapolation	R programmer	An, Emmanuel, Rein	
- logic/algorithm	R programmer		
- implementation in R	R programmer		
- adjustments to GUI	UI programmer		
iv. Water			

- water workshop	Ricardo	Rein, An	May
- logic/algorithm	Ricardo		
- implementation in R	R programmer		
- adjustments to GUI	UI programmer		
v. Economics			
- get feedback from Stefan, potentially Stephen Mailu, Fernando and Kenneth	Ricardo	Rein, Emmanuel, An	March/April
- logic/algorithm	Ricardo		
- implementation in R	R programmer		
- adjustments to GUI	UI programmer		
vi. Silvo-pastoral (in connection with Tree Diversity Team)			
- Improve SPS function in CLEANED	Rein	An	December
- Meeting with Miguel Romero	Ricardo		March
vii. Biodiversity			
- Decide on a few new indicators (e.g. tree and feed crop diversity)	Ricardo	An, Rein	
- implementation in R			
- adjustments to GUI			
Publications			
Develop sensitivity analysis paper (+ database)	Stephen	all	
Benchmarking paper	Glarion	Ricardo	April
Expand benchmarking to include francophone literature	Rein	Glarion	
I-CLEANED justification and "framework" - brief or working paper	Hannah	Emmanuel, An	End of April
"General" CLEANED paper	An		
- online input in outline	An	all	March
- allocate sections	An	Rein	April
- write	All	all	May
- submit	Rein	An	June
Nicaragua national-level paper	Rein		
Pigs Uganda	Emmanuel		
Vietnam multi-species	Hang	Emmanuel, Mary	submitted to Animal Production Science
Heifer Nepal	Emmanuel	James, Mary, Heifer, An	
Ensuring future funding	An	All	On-going

Varia			
- GHGe calculations in Evert's tool	An		