

Monitoring, Evaluation and Learning (MEL) Platform Developers Technical Retreat Report

Nairobi, Kenya
3-6 December 2019



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About the MEL Platform

Monitoring, Evaluation and Learning (MEL) is multi-center and multi-CRP online platform for integrated management, monitoring, and reporting of projects, from planning to budgeting, risks' assessment, knowledge sharing and more. It creates synergy between research and development partners, bridging competences in a results-oriented platform.



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MEL Platform Developers Technical Retreat Report

Nairobi, Kenya, 3-6 December 2019

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MEL Platform Developers` Technical Retreat 2019

December 3 to 6, 2019

Nairobi, Kenya

Executive Summary

The first MEL Platform Technical Retreat was participated by MEL development team members coming from Peru, Nigeria, Kenya, and Malaysia primarily responsible for the maintenance and enhancement of this online platform making sure that participating CG Centers, CGIAR Research Programs and Projects are able to perform integrated management, monitoring and reporting, planning and budgeting, risk assessment and knowledge sharing among others in an organized space as integral part results-based management. Sessions for the first two days were held at Tamarind Tree Hotel, Nairobi, Kenya, while Day 3 was hosted by ILRI campus in Nairobi.

The progress of the four-day activity was guided by a set of technical and team-related agenda including Building the Team and Tools, MEL documentation and loading performance, Compliance to EU General Data Protection Regulation, Introduction to MEL and its API, MEL interface and prototyping, and Live coding. Day four was allocated for city tour, and live coding activities. Aside from minutes-taking, video recordings also formed part of the documentation methods whereby the sessions were covered, and participant interviews were conducted focusing on personal introduction, the work they do with MEL in their respective CG Centers, how they are working with colleagues remotely and how the team is moving forward, and a dedicated group interview for women developers.

This technical retreat report presents a narrative of the progress of the discussions and action points proposed and carried per agendum, which are then summarized in four subsequent tables where agreed 2020 plans and responsibilities are presented, topics to complete the Coding standards document, followed by a detailed list of GitHub issues to be addressed, then finally by a list of MEL links to documents relevant to this technical retreat. These synthesized points will then serve as guide for the monthly routine meeting agreed by the team, and as benchmark to determine the progress in future evaluations, and in determining further plans.

Day 1: Round of Introductions & Team Building:

This agenda covers orientation on MEL Platform, rationale behind the conduct of this developers retreat, and setting of a conducive session atmosphere through participant introduction, and indoor teambuilding activities.

To formally open the four-day retreat, a round of participant introductions was remotely led by Cristiano Rossignoli (WorldFish, Malaysia), acknowledging the physical attendance of the following participants:

1. Li Jiuan Lee: L.Lee@cgiar.org (WorldFish: Malaysia)
2. Jacqueline Muliro: j.muliro@cgiar.org (WorldFish: Malaysia)
3. Patricia Bravo: P.Bravo@cgiar.org (CIP: Peru)
4. Kenneth Oraegbunam: K.ORAEGBUNAM@CGIAR.ORG (IITA: Nigeria)
5. Mohammad Salem: mohammad.salem@codeobia.com (ICARDA/Codeobia: Jordan)
6. Haretha Ali Jawdat Alsouqi: haretha@codeobia.com (ICARDA/Codeobia: Jordan)
7. Jones Baraza: Jones.baraza@cgmel.org (ICARDA: Kenya)
8. Muthoni Nguthi: m.nguthi@cgiar.org (ICARDA: Kenya)
9. Jake Carampatana: j.carampatana@cgiar.org (ICARDA: India) – Day 1 & 2

More participants joined personally on specific days and/or agenda, and remotely as listed below:

1. Jane Poole: j.poole@cgiar.org (ILRI: Kenya) – Day 3
2. Erick Rutto: e.rutto@cgiar.org (ILRI: Kenya) – Day 2 & 3
3. Harrison Njamba: h.njamba@cgiar.org (ILRI: Kenya) – Day 3
4. Sumaiyah Abdi Omar: info@lawyershub.ke (Africa Young Lawyers for Tech) – Day 2
5. Alan Orth: a.orth@cgiar.org (ILRI: Jordan) – Remote Day 3
6. Abenet Yabowork: A.Yabowork@cgiar.org (ILRI: Ethiopia) – Remote Day 3
7. Enrico Bonaiuti: e.bonaiuti@cgiar.org (ICARDA: Uzbekistan) – Remote
8. Cristiano Rossignoli: c.rossignoli@cgiar.org (WorldFish: Malaysia) – Remote
9. Claudio Proietti: c.proietti@cgiar.org (CIP: Peru) – Remote
10. Diego Paredes: d.paredes@cgiar.org (CIP: Peru) – Remote
11. Innocent Bikara: i.bikara@cgiar.org (WorldFish/ICARDA: Egypt) – Remote
12. Patric Lim: P.Lim@cgiar.org (WorldFish: Malaysia) – Remote Day 3

Mohammad Salem introduced MEL, which was developed in 2014 initially for the CGIAR Research Program on Dryland Systems (CRP-DS) and was later adopted by CRP on Roots, Tubers and Bananas (CRP-RTB), WorldFISH, and IITA, and starting in 2018 by CRP-Grain Legumes and Dryland Cereals. Among its features, MEL hosts a repository for documents, publications, and other materials for the products using the platform. MEL platform is currently maintained and operated mainly by ICARDA in cooperation with CodeObia.

Essential to the success of the retreat was to establish rapport among the team, most of whom were meeting for the first time. A three-part team building session which aimed to get to know

more aspects of each team member was held with the following parts (1) An activity where each participant shares the best day, and best 30 seconds of their life, (3) An activity where each participant lists three things about themselves, two of which are truths, and one line, after which the team guesses which is so, and (3) An charade game in pairs with the goal of coming up with a sketch as close as the one originally shown to the other partner.

Day 1: Collaboration: Enhanced communication, and Tools

The discussion for this agenda was opened by Muthoni asking if Zend Framework was still to be used for MEL and was confirmed by Mohammad. With the goal of encouraging exchange of innovative ideas, and collaboration among the developers, the discussion went into determining the most optimal mode and platform for communication. The initial platforms considered were; (1) GitHub- better for communication but some developers are not regularly checking unless mentioned), (2) Microsoft Teams, and (3) Slack- both similar having a feature that hosts discussions, but Teams being subscription-based and may not be accessible by the entire team by default. Subsequently, two major aspects of communication for this agenda were identified namely, (1) Issue-based collaboration; where the team settles retain a structure of collaboration on a per issue basis using GitHub, involving only mentioned persons to work on a particular task, and (2) A communication arrangement that is more regular, and where updates, accumulated issues, innovative ideas and agenda, and remote team building can be done. For the latter, the group proposed and agreed to hold monthly routine meetings, with one assigned monthly coordinator tasked to collate the issues for the incoming meeting and remind the team to submit points for discussion. The platform to be used had to be balanced between frequency of notifications received, and ease of accessibility.

Features and functionalities of MIRO, Balsamiq, NetBeans, IntelliJ, realTIME Dashboard, and Chrome Extensions as tools on offer to be used by the team were presented. In terms of purpose LJ summarized the tools as (1) GitHub: status of issues from creation to resolution, (2) Skype, Microsoft Teams: for quick individual and group communication, and (3) realTIME Dashboard: for visualization of processes being worked on by individual or group of developers. Live demonstration of coding with IntelliJ was led by Mohammad.

Points of action:

1. The team to agree on the recurring appointment for the routine meetings to be held on Skype; with Muthoni serving as coordinator for the first month, then rotating among the members.
2. Team members indicating to shift to IntelliJ, citing features to increase efficiency, and product key to be shared by Mohammad.

Day 1: Coding standards for MEL

To improve the quality of code structures in MEL, this agendum encourages the team to present aspects where coding can be standardized, clean codes, and agree on a reference material/guideline to maintain quality coding for MEL. A coding guidelines draft, was presented by Mohammad to the team, followed by clarifications and discussions. The team was encouraged to edit their inputs into the document in Teams. Among the highlights during the presentation included (1) Process of deleting codes not used, (2) Additional supporting materials to the coding standards draft location in Teams directory (Several documents in Teams > Coding Standards), (3) Versions of plugins (including Monybox) being used in MEL, where there is a need to develop a structure to document the version of normally used plugins in MEL. The team agreed that the solution for the reference material needs would be to setup a GitHub wiki where reference materials are stored, including plugins, third-party apps, installation guides, and important links. An existing GitHub wiki page was refitted to host the structuring of the contents well, the process involving: (1) Creating a sidebar to host the pages, then building the line-up of pages, and corresponding topics within each page, (2) Initial chapters identified as the following: Chapter 0: creating and assigning an issue; Chapter 1: getting started, installation, system requirements, cloning; Chapter 2: coding standards at both file and database levels; Chapter 3: Plugins list with links; Chapter 4: APIs; Chapter 5: Tips and tutorials.

Points of action:

1. The team to contribute inputs to the Coding Standards draft for finalization
2. Unused codes deletion process: The coders are to leave the code as it is if they are not working in that specific area, or consult and agree with the creator of the code to delete when not used at all
3. For plugin versions, versions and links to be included in the GitHub wiki to minimize searching the web every time.
4. Chapter coordination assignments:

Chapter	Lead
0	Jones
1	Mohammad
2	Mohammad (except for Windows installation)
3	Patricia, Jones
4	Mohammad, Haretha
5	LJ, Mohammad

Day 1: Open Discussion: Suggestions and actions from developers` perspective

As 2019 closes, the team discussed on how to close as many issues possible before 2020, and agreed to discuss at the subgroup level to determine issues to be (1) closed upon yearend with the current assignments, (2) closed upon yearend by exchanging tasks with other developer(s), and (3) reassigned to 2020 at the individual level.

To minimize searching back from the tables for the codes, Patricia suggested that a column for codes be added in the outputs table, i.e. codes to be saved at the output level, so that if the

output is changed, changes have to be applied at all levels. To this end, Patricia in cooperation with Mohammad will create a code from an element, then add a column for the code.

Muthoni, and Jones raised the aspect of enabling the search functionality to learn and feedback suggestions during search to complete keywords. As this has potential for implementation, Jones will work on the potential integration to MEL, conceptualization and initiation of collaborated work, with prerequisites around queries and searches in mind.

The concern on the usability of codes was raised by Haretha, particularly on enhancing usability, and minimizing duplication of codes. Patricia further discussed controllers referenced in a document which included AnalysisController, API controller, and Planning Controller. To address this aspect using the material presented, the team discussed and agreed to compile a list of all functions in one page, with corresponding description for each function across controllers. Further to this sub-point of action, the team agreed to adopt Patricia's drafted document for all 45 controllers.

Main points of action:

1. Set the code into the Output table
2. Exploring the potential and enabling of machine learning for search function in MEL; for both action points, the team will finalize the workplan, and assign responsibilities after discussion among the group

Day 1: User Feedback on MEL usage

Comments and feedback compiled are composed of inputs from MEL users shared during one-on-one trainings, group webinars, and consultations. Feedback from ICARDA/WorldFISH reported by Innocent included (1) complaints on the required amount of time to do reporting in MEL, which can't be primarily be solved from developer's perspective since it is based on what is set as information of importance, but can be addressed by internally assigning the planning and reporting in MEL to the most appropriate person who can provide the information needed in a timely manners e.g. the research who is directly conducting the experiment/project; (2) as incentive to use the platform, options to generate reports and documents for information inputted to MEL would also need to be explored, but considering that donors have different required formats.

From CRP-GLDC/ICRISAT, the feedback shared by Jake included (1) Crowded reporting page i.e. merging of Activity report, and Output report, and activities under single CoA merged in one page, (2) A number of bug cases, (3) Relatively dense information requirement especially when uploading documents, (4) Duplication of interfaces e.g. Edit and Edit Details when uploading and processing for approval documents for reporting, and (5) a suggested feature to notify the uploaders (not just the approving admin) to tweet once their open access document has been approved; e.g. a button may be added to the button groups where they can tweet open access documents.

From IITA, Kenneth also shared inputs from MEL users including (1) too many tabs to reach the reporting page, and (2) comment that the activities in IITA are project-based, while the ones in MEL are cluster-based. To the latter point, Enrico clarified that the structure in MEL follows results-based management where Outputs are contained in Activities that are grouped into Clusters of action.

Points of action:

1. Generating document for reports and inputs in MEL: Developers to discuss how to develop this feature, considering different formats required by donors. MEL Knowledge Portal (dashboard type, with printable format) presented as an existing point to address some requirements of this point
2. Edit and Edit Details functionality duplication aspect: Mohammad to look into possibly merging the elements in both interfaces, but also considering how much of the information to capture, and in what way.
3. Document uploaders to tweet: Developers to think about incorporate a Tweet button into the document reporting page, also notifying the uploaded once the open access document is approved.
4. Too many tabs to reach reporting: Mohammad to create breadcrumb, to compare this to MARLO, where the user can follow a comparable process.

Day 2: Recap for Day 1

Prior to discussing the agenda for Day 2, a recap of the highlights from Day 1 was led by Cristiano. On MEL user feedback, it was reiterated that a number of concerns were taken for consideration and application by the developers, but issues e.g. “time consuming and requiring more effort” should be addressed from user’s side. Cristiano concurred saying that more frequency of MEL usage can improve expertise in MEL and make them more comfortable using the platform. GitHub was confirmed by Mohammad as still the most optimal tool to be used by the team for collaboration and forum.

Day 2: MEL Loading performance

The team discussed on the loading performance of MEL website which included eight sections:

1. AJAX calls repeated 5 to 6 times, and can be improved by using sockets as alternative, or by cleaning the codes and minimizing repetitions, further discussion to be continued under MEL API.
2. loading page to be moved as global function (not all pages)
3. For generic functions, helpers can be created to call from anywhere, and identify common functions that can be created as helpers. For point 3, Mohammad pointed out that getting data e.g. CRP and Center mapping data should not be added as a function (only fetch, not to be a function). Further, depending on GitHub mentions, each developer is invited each week to look at new code/pool requests (n=4-5 weekly), which can be made simpler by listing the new functions to be reviewed to minimize going deep into each code;
4. Generic variables: tables for several dropdowns are currently stored in html. For this point, Patricia presents a table already drafted and hosted in platform HEIDI, in which all

types for different levels are saved. The group is open to adopt the table or not, but Mohammad comments that it is not a good practice to create table for e.g. 5 records (5 CRPs); but a table can be used to host more items, and not just for e.g. CRPs. In response to a question, Patricia explained that in order to accommodate diversity from different centers having different options on dropdowns, a different group can be created (a group of rows) and that the table can be used by developers as they want by adding row groups. When this table is adopted, the advantage lies in not needing to update the html when adding a dropdown, but the developer can just do the changes in the database (table). As this will not affect the frontend if not adopted by the entire team, usage of the tables hosted by HEIDI is voluntary.

5. The database is loading slower since it is fetching more rows than needed, analyzing more data than it needs. To address this, EXPLAIN command can be used to analyze the queries, and tables can be indexed to minimize searching time subsequently increasing database loading speed. The EXPLAIN function can be used to show how the query is processed e.g. for the query if indexing is not used for a table, then 500 records are run to find the intended information.
6. Schema and Index Optimization requires well-defined or normalized database structure. Query returns results slower when a lot of ADJOIN and CONDITIONS are used, thus GROUPBY is to be avoided to make the query faster.
7. Dos and DONTs of queries: (a) Do use smallest data type i.e. instead of using VARCHAR or CHAR, it has to be looked into by the developers to consume less space on disk, in memory, and in the CPU cache. Depending on the judgement of the developers, they can decide which to use between these two. (b) Don't use NULL if possible; define fields as NOT NULL since a nullable column uses more storage space and required special processing using MySQL.
8. Keeping track of last modifications and modifiers of tables: Log tables are used to sort this information, cycle of having LOG tables removed is 6 to 8 months, and use back-up to go back to deleted LOG tables

Point of action:

1. There was group consensus for each developer agreeing to review code requests, look and see what has been done, if there are new functions, and to familiarize with new work.

Day 2: GDPR Compliance

With MEL being a transboundary platform, being used by product managers, administrators, and focal points around the globe, it is taking a course towards being compliant to the General Data Protection Regulation (GDPR) of the European Union which is concerned on how personal data are being treated online. Countries have differences in how personal data is defined, and which kinds of data they classify as personal, dictates how and who are affected on the actions of data controllers and ownership. Collecting personal data should be lawful, fair and transparent; limited for its purpose; adequate and necessary; accurate; not kept longer than needed; and uphold to appropriate levels of integrity and confidentiality. Data collected must be processed

with user via the execution of a contract, by a controller with legitimate interests, and with legally regulated uses e.g. in direct marketing; public interest or vital need.

For users of particular websites, and social media services where personal data is normally collected in extensive forms, data can be requested, and a level of trust is maintained, aided by a term of use that personal data is handled properly. Data for publication contributors must always be used with consent every time, unless the type of permission allows multiple uses; but for journal publications, once it is published, co-authors can no longer withdraw the item or the set of personal information that went with it. Currently, there is no global body tasked to check if websites are being GDPR-compliant, but tests can be individually done, and also by checking the fine print of website use. Further, as ISO and GDPR are regulated by different entities, and differ in terms of operational principles, being compliant with the former does not necessarily mean being compliant with the latter, and vice versa.

Institutions mindful of being responsible personal data managers need to establish GDPR compliance at the beginning and must designate corresponding officers for Data protection impact assessment, data protection officer. They can lead the internal adoption and implementation of data protection policies which covers putting written contracts in place with organizations that process personal data on your behalf; implementing appropriate security measures; recording, and where necessary reporting personal data breaches, and define data breached at the context of certain countries, or demographics.

As best practice, entities managing personal data must carry out Data Protection Impact Assessment early into the process, and properly disclose to clients how data they are providing are to be used and assure anonymity in profiling activities. With GDPR being extensive and encompassing, MEL team is recommended to think among the group, at which compliance scale of the GDPR, MEL would sit, and which aspects of GDPR would be applicable to MEL as a monitoring and document repository platforms compared to full-scale social platforms. Further, in the case of MEL where sometimes the institutions or MEL team registers them to MEL in their behalf, the team must develop a solid mechanism where consent of the person who will use the account is obtained at the registration level, and for other actions which require such.

For MEL platform to be successful in becoming GDPR compliant, it has to organize and safely secure data, collect minimal data while respecting internal privacies, create and properly maintain a data inputting and editing/deletion mechanism, create expressed content, layer opt-in form, train as much as possible all staff on GDPR or local privacy laws via a consulted or in-house data protection officer, and acquire only data from third-party information sources that are GDPR-compliant.

Day 2: Introduction to MEL and its API

Several aspects when operating MEL takes advantage of services from other tools including AgroVoc for keywords, and GitHub for bug reporting, and collaboration, and task monitoring. Donor reports are extracted from MEL through endpoint, querying elastic search in the API. MEL acronyms were proposed to be compiled and included in the GitWiki by Mohammad, and Jones.

With the participation of CRP-GLDC Communications Officer for this item, the following issues were raised (a) GLDC Documents in GLDC websites not appearing in MELSpace which was clarified by explaining that publications appear in a particular repository depending on which space it was approved to. As follow-up actions, Satish will coordinate with Muthoni for further explanation on direction of documents and API's involved, and to cooperate on a solution to this issue. Further, GLDC website revamping to be discussed and planned with Satish, Mohammad, Muthoni, and Jones.

Day 2: CGIAR One Corporate System

One Corporate System (OCS) of the CGIAR is a management tool for financial budgeting and forecasting, and research life cycle management at the downstream level for costing and project administration. Ten CG centers initially joined the program, but eventually fragmentation in terms of degree of alignment to OCS, i.e. each center wanting to implement their own versions of OCS subsequently generating ten different implementation styles. The current aim is to bring back emphasis in maintaining a single commonly-adopted format of OCS across all centers by supporting whatever solution is chosen (to the direction of One CG initiative), and revisiting the decision 10 years ago to go for OCS at its blanket aspect, but this time identifying and using a range of best practices harmonized across centers, and using API to integrate.

The challenges in the work towards this current aim is that centers have implemented different combinations of functional streams and organizations along the results chain. Early harmonization efforts among OSU, OCS, and MEL included efforts to get the outputs from OCR to MEL/MARLO), but the situation was made more complicated by multi-CRPs, in addition to CG Centers. Initial considerations were focused on Centers but not much on crosscutting elements e.g. CRPs, CC themes.

Now, the course of actions is to harmonize the hierarchy and migrate to MEL and MARLO; sample case: OCS hierarchy: Main project > Project > BUS, Activity, Work order; MEL hierarchy: FP > CoAs > Activity, Project > Output, with consideration to whether organizing them for either finance-based structure, or work-based structure. In line with this, a proposal to the steering committee was made to harmonize at the BUS to Cluster of activities level to progress.

Day 3: MEL repository user experience, MEL integration

MEL overall loading experience must be improved, since it can be slow especially trying to get records under Knowledge Evaluation. A mechanism of sending notifications if something needs to be approved (as in OCS), and when someone is assigned to a task would also be very useful for prompt attention for the concerned team member. And in tasks involving several people, it was recommended that a log of who has viewed a particular item so that assigning issues can be made easier. Naming of files in DSpace has to be standardized in such a way that the names do not appear as a messy array of characters.

MEL is an intermediary between open repositories, and information can be harvested from and deposited into MEL, items can also be migrated between DSpace and MEL. For DSpace there is a default metadata schema and the CG Core metadata schema. The CG Core metadata schema is used to unify things across the centers, and each field has a description that informs of the activities being done. To move from CKAN to Dataverse, Use a CKAN-based data portal and review data systems. Recommendation was made to MEL to move from CKAN to Dataverse to address the issue of falling behind in terms of source code implementation and the lack of manpower.

Harvesting from DSpace is explained on REST API command to (a) GET to list the items, (b) POST to add & edit the new item, and (c) DELETE to remove the item. A demonstration was made on uploading from MEL to DSpace, and harvesting from DSpace to MEL, and vice versa.

Day 3: CG Core and Metadata schema

Dublin core in DSpace Implements Qualified Dublin Core, and partially implements DCTERMS which are available for describing items in DSpace. DSpace uses crosswalks to express metadata in other formats. This is a refinement on previous attempts by other repositories like CKAN and Dataverse. The CG Core vision is to have a core schema for meaningful metadata interchange between CGIAR centers for harvesting of repositories as means of syndication, increased interest in reporting and impact assessment, and build cool things like AReS Explorer and GARDIAN to see all research across the CG in one place. So far, there exists the Core initiative 2015 with the formation of Metadata Working Group, and CG Core v2 review by ILRI, ICARDA, IITA and WorldFISH in Jordan during the first half of 2019. The technical limitation when adopting this to DSpace is the abundance of hard-coded reference in DSpace 5.x and 6.x, which are impossible to move away from some fields, and DSpace also uses a flat schema. CG Core v2 is doing a public test with CGSpace server running CG Core v2 as of November 2019. For reference, specific DSpace 5.x code modifications are available on GitHub. In terms of GDPR compliance, CG Core v2 is not collecting private personal identifiers, not collecting identification information on browsing habits, and is working with open access information.

Day 3: AReS and Altmetrics

Agricultural Research E-Seeker (AReS) was developed to generate visualizations of metadata, integrated insights, and increased value from available information. This tool aggregates publicly usable information from different repositories e.g. DSpace and Altmetric, to generate visualization and reports, which in some cases exposes inconsistencies and data quality issues but is nevertheless great to encourage data cleaning. Suggested improvements to this tool include automation to increase reports for different users and promotion for wider usage.

Altmetrics are metrics that are complementary to traditional citation-based metrics. Altmetrics data explain both about the volume and nature of attention research receives online, i.e. the attention score is quantitative measure of the quality and quantity of attention research outputs receive once they are published online. Sources of attention include social media, news outlets, blogs, Wikipedia, and policy mentions. One advantage of Altmetrics is that it applies to more than journals and books, is faster to accumulate, and help researchers understand how their research is being discussed and used by policy makers, the public and the broader research community. A free API is available to get information.

Day 3: MEL Interface and Prototyping

A prototyping tool was demonstrated by Patricia for when the MEL team needs it in the future. Issues and improvement points for the MEL interface included improvement of the loading page, display of status prompts for each action, more elaborate and clearer wording for alerts (e.g. “system failure” is vague), that the system should speak the user’s language, improved processes when exiting processes and standardizing the language among “close, exit or cancel”, consistency and standards, error prevention, reduce the user’s burden when it comes to remembering an action (recognition rather than recall), proper aesthetic and minimalistic design, a feature allowing users to recognize, diagnose, and recover from encountered errors, and documentation features.

Table 1. Summary of points agreed within the agenda for 2020 planning, and responsible persons.

No.	Agreements	Related item	Responsible
1	<p>Monthly meeting among developers:</p> <ul style="list-style-type: none"> a. the meeting should be coordinated by one of the developers each month b. the coordinator should collect points and issues to discuss c. each developer can comment about new features or changes moved to production d. set the date of the next meeting 	Communication	Mohammad
2	<p>Tools:</p> <ul style="list-style-type: none"> a. GitHub as a default tool to communication with users b. Teams instead of slack c. IntelliJ as a default IDE d. Other tools are optional for developers 	Tools to collaborate	All developers
3	<p>Coding Standard document</p> <ul style="list-style-type: none"> a. Add new agreements into the document b. Create a wiki page for the standards 	Deleted unusable elements	Patricia
4	<ul style="list-style-type: none"> a. Revise all the pull request that Mohammad move to production in order to know which are the new changes in DB and new features into MEL 		All developers
5	<ul style="list-style-type: none"> a. Identify tables and view that are not using anymore, then contact to Mohammad to delete from DB. b. Valerio identify some tables and is needed to be deleted. c. If in the timeline there is a table or view that someone identify that are not used anymore communicate to Mohammad to delete it. 		<p>Identify: All developers & Valerio</p> <p>Mohammad: responsible to delete</p>

No.	Agreements	Related item	Responsible
6	Create a wiki sidebar to host the pages, then build the line-up of pages, and corresponding topics to host: <ul style="list-style-type: none"> a. Chapter 0: Creating an issue, assigning an issue b. Chapter 1 (getting started): Installation, system requirements, cloning; c. Chapter 2: Coding standards (file level, database level); d. Chapter 3: Plugins (list with links), e. Chapter 4: API's; f. Chapter 5: Tips and tutorials 	GitHub wiki	Chapter 0- Jones; Chapter 1- Mohammad, Chapter 2- Mohammad (except for windows installation); Chapter 3- Patricia, Jones; Chapter 4- Mohammad and Haretha; Chapter 5- LJ, Muthoni (Mohammad)
7	<ul style="list-style-type: none"> a. Developers can assign or reassigned issues between the team, is possible to exchange issues. b. Previously coordination with the PMO. 	Knowledge exchange	All developers
8	<ul style="list-style-type: none"> a. Nominate a developer to study the GDPR Compliance and certification course 	GDPR Compliance	Muthoni & Patricia
9	<ul style="list-style-type: none"> a. Update MEL ReadMe 	GitHub Wiki	Muthoni & Mohammad

Table 1 continued.....

Table 2. Summary of points to be added to coding standards document in 2020, and responsible persons.

No.	Points to be added to coding standards document	Related Item	Responsible
1	e. Create a list about all the plugins that are used in MEL and add a link to the official reference, indicate the version	Plugins	Mohammad
2	Documentation: f. Documenting new and past functions from the controllers. g. Add a comment in the head of a function. h. Format proposed: <example>	Documenting	All developers: documenting, Patricia: generate the documentation (NDocs) Patricia: Mohammad: Upload the documentation into a public folder
3	a. Avoid adding options into html for dropdowns b. If the dropdown is used in more than one section is necessary to create a new table for the dropdown information	Data	All developers
4	a. Avoid fetching more rows than needed. b. Use explain command to analyze the query. c. Revise index in the queries. d. FetchMany get all the columns and query prepared can selected columns. e. Doing a lot of Joins and conditions causing queries to return results slower; f. Avoid using "GROUPBY" can make the query faster	DB performance	All developers
5	a. Instead of using VARCHAR or CHAR, has to be looked into developers to consume less space on disk, in memory. b. VARCHAR (1) use 2 bytes, CHAR (1) use only 1 byte. define fields as NOT NULL. c. A nullable column uses more storage space and requires special processing inside MySQL (exceptions: for nullable columns).	DB performance	All developers Note: suspend 5c until further info

Table 3. Summary of proposed issues to be addressed by responsible persons in 2020.

No.	List of Proposed Issues	Github Issue no.	Related Item	Responsible
1	Create a new column in output table to save output code	8869	Plugins	
2	Enable the search functionality (based on machine learning)	8870	Machine learning	
3	Output and deliverable reporting: improve the loading time and set the main information to be showed	8871	Reporting	
4	Donors Reports: Create a customizable report	8872	Reporting	
5	Activity and output report: revise the interaction, crowded reporting page, propose a new interface	8873	Reporting	
6	Reporting: Edit and edit details, identify if it is possible to join in one interface	8874	Reporting	
7	Use sockets for discussion module (avoid ajax calls)	8875	Performance	
8	Create a status column for deliverables	8876	Performance	
9	Create a status column for outputs	8877	Performance	
10	Login section: Do the double validation in login section	8878	Security	
11	Improve File naming: the file name is changed, and it becomes an array of characters that looks messy on DSpace.	8879	Usability	
12	Messages into MEL platform: Revise titles and alert messages to be changed	8880		

Table 4. List of presentations, and relevant documents available online

MEL Developers Retreat 2019 Agenda	https://hdl.handle.net/20.500.11766/10597
MEL Developers Retreat 2019 Report	https://hdl.handle.net/20.500.11766/10598
Group photo, Day 2	https://hdl.handle.net/20.500.11766/10599
MEL Documentation	https://hdl.handle.net/20.500.11766/10603
Development tool: Balsamiq	https://hdl.handle.net/20.500.11766/10604
Development tool: Miro	https://hdl.handle.net/20.500.11766/10605
Development tool: Prototyping	https://hdl.handle.net/20.500.11766/10606
Drupal web services, APIs	https://hdl.handle.net/20.500.11766/10607
GDPR Compliance	https://hdl.handle.net/20.500.11766/10608
MEL Loading Performance	https://hdl.handle.net/20.500.11766/10609
Moving from CKAN to Dataverse	https://hdl.handle.net/10568/106927
OCS MEL Data Integration	https://hdl.handle.net/20.500.11766/10612
ARes and Altmetrics: How we use them at ILRI	https://cgspace.cgiar.org/handle/10568/106042
Core v2 Schema from the DSpace Perspective	https://cgspace.cgiar.org/handle/10568/106045
Making ILRI Code Open	https://cgspace.cgiar.org/handle/10568/105514