



INITIATIVE ON
Fragility to Resilience in
Central and West Asia



In-person training report on: Agronomic Data Collection and Management Tools for Better Agricultural Research

Organized by:

International Centre for Agriculture Research in the Dry Areas
(ICARDA), 3-6 September 2023.

Venue: Agricultural Genetic Engineering Research Institute (AGERI)

Prepared by: Samar Attaher, Layal Atassi, Khaled Al-Shamaa, Mina
Devkota, and Vinay Nangia



Background:

Agronomy research and development can improve yield, yield quality, and profitability; yield stability and risk reduction; utilization of resources efficiency (nutrients, water, and labor); and soil health. To boost crop productivity and agronomic benefits, these need to be integrated and combined with data from various sources for input into analytical models and decision support systems. By leveraging data pools, georeferenced datasets, and multivariate data sources, collaborative activities and data sharing across stakeholders provide insights efficiently. In this sense, it is critical to improve agronomic research techniques and contexts by utilizing digital tools that enable researchers to develop and share digital data sets that are FAIR (findable, accessible, interoperable, and reusable). When data is shared in accordance with the same community-agreed-upon standards, it is easier to reuse it throughout the data life cycle, and innovation is accelerated, as is the ability to deliver insights and management options to stakeholders, including the ultimate beneficiaries, who are often poor farmers. While the culture of data sharing is expanding, agriculture continues to lag in terms of making data interoperable and reusable, necessitating a significant investment to integrate and demonstrate the value of data that complies with the FAIR concept.

Excellence in Agronomy (EiA) and Fragility to Resilience in Central and West Asia and North Africa (F2R-CWANA) are “One CGIAR” Initiatives that aim for sustainable intensification and climate change adaptation in addition to building resilient agrifood systems in the region to support smallholder farmers by providing evidence-based data-driven agronomy solutions, while also having a positive impact on the CGIAR's impact targets of nutrition, health, and food security; poverty reduction, livelihood, and jobs; gender equality, youth, and social inclusion; climate adaptation and mitigation.

ICARDA collaborates with sister CGIAR centers to support the implementation of EiA activities, with two use cases in Egypt and Morocco representing irrigated and rainfed agricultural systems in the arid region, respectively. The two use cases are being developed in partnership with national research institutions, non-governmental organizations (NGOs), governments, and the private sector, with the goal of improving scientific knowledge, shaping practices, and informing policy. In the framework of EiA and CWANA regional initiative, ICARDA in partnership with EiA transferred team has organized a four-day capacity development in-person training course involving fourteen participants from Egypt. The main focus of the training was on the concepts and tools that can assist agricultural researchers in improving agronomic data development and management, as well as developing datasets that comply with the FAIR concept to meet the requirements of data-driven decision support solutions. working on agronomic research from different agricultural centres.

Objectives: The main objective of the training was to transfer knowledge about "open data" and "FAIR" principles, as well as their applications and tools for agronomic data production and management life-cycle. the major topics covered in the course were:

- Open-data & FAIR principles,
- Lifecycle of the data from agricultural experiments,
- Tools for data collection/acquisition from controlled field experiments,
- Tools for surveys,
- Basic data cleaning, processing, and analysis.
- Data visualization.



Training Outcome

Enhance the participant's knowledge of the available tools to use in every step of the data life cycle in the agricultural research, provide enough resources on where and how to start exploring and using open and FAIR data and tools to enhance research work efficiency, and improve the scientific quality of the participants' produced reports and delivered services.

Curriculum Development

The curriculum was developed by Layal Atassi, Khaled Al-Shamaa, and Samar from ICARDA (Detailed curriculum/course program is attached as Annex 1). The course applies a mixture of different methods of implementation that includes lectures, and practical exercises accounting for around 60% of the training time using appropriate software, tools, and apps. The training lectures were delivered in Arabic to overcome language barriers and simplify the training process. As a constant move toward digital transformation, no handouts were printed, and all course materials, including presentations dataset samples, and resources were supplied in English in digital forms, uploaded to cloud storage, and made available to participants to download and practice on their own.

Course Management

The in-person training course was held from 3 to 6 September 2023. The course was attended by 14 young and mid-career researchers (50% females, 50% males) from the Agriculture Research Centre (ARC) of Egypt (List of participants is attached as Annex 2). The participants were nominated by the ARC president after direct communications with the ICARDA-Cairo office. The course venue was the Agricultural Genetic Engineering Research Institute (AGERI), which is located in the ARC complex in Giza-Egypt. ICARDA supported the engagement of five participants from outside Cairo and Giza by covering their accommodation logistics and costs during the training period.

An invitation letter was sent to each participant with all the information related to the training, including the training flyer (Annex 3) and agenda, in addition to a registration form that was prepared using Google Forms. A Zero final assessment digital form was prepared and provided to the participants at the beginning and end of the training, and the overall course evaluation digital forms were prepared and provided to the participants at the end of the training. By the end of the training course, a certificate of completion has been sent to the participants who joined the training.

Course Evaluation

After completion of four days of training, participants were asked to evaluate the course providing well structure questionnaire for different course.

This course used two levels of evaluation: 1) evaluating participant satisfaction (Course Evaluation by Participants), and 2) evaluating learning of participants (Evaluation of Participants by ICARDA).

Evaluation Method

The Course Evaluation by Participants was divided into two steps. The first was the topic evaluation, which was conducted at the end of every subject, and the second was the overall evaluation, which was conducted on the last day of the course.

The Evaluation of Participants (evaluation by ICARDA the Zero final assessment) was conducted by utilizing a pre/post-test, which was developed by instructors to assess participants' knowledge of each subject. The pre-test was conducted on the first day of the course (3 Sep 2023), and the post-test was conducted on the last day of the course (6 Sep 2023).

Evaluation Results

Course Evaluation by Participants:

1) Topic Evaluation

Open Data FAIR principles and tools and Creating field books for on-station and controlled field experiments: AgroFIMS, KDsmart.	Overall Score (1-5)
The trainers had command over the subject	4.5
The trainers managed to keep me interested throughout the training	4.6
The trainers were open to ideas and suggestions from trainees	4.6
The trainers managed their time effectively	4.8
The clarity of speech was evident	4.7
The language used by the trainers was appropriate regarding the impact on learning	4.9
The quality of the trainers' presentations and teaching materials was of a high standard	4.6
Importance of the agriculture experiments data	Overall Score (1-5)
The trainers had command over the subject	4.6
The trainers managed to keep me interested throughout the training	4.6
The trainers were open to ideas and suggestions from trainees	4.6
The trainers managed their time effectively	4.5
The clarity of speech was evident	4.6
The language used by the trainers was appropriate regarding the impact on learning	4.9
The quality of the trainers' presentations and teaching materials was of a high standard	4.7
Creating survey forms: DataScribe Hands-On session	Overall Score (1-5)
The trainers had command over the subject	4.6
The trainers managed to keep me interested throughout the training	4.6
The trainers were open to ideas and suggestions from trainees	4.6
The trainers managed their time effectively	4.8
The clarity of speech was evident	4.6
The language used by the trainers was appropriate regarding the impact on learning	4.8
The quality of the trainers' presentations and teaching materials was of a high standard	4.7
Creating survey forms: ODK, ONA, and Data collection tools: ODK, ONA... Hands-On ODK, ONA	Overall Score (1-5)
The trainers had command over the subject	4.8
The trainers managed to keep me interested throughout the training	4.8
The trainers were open to ideas and suggestions from trainees	4.9
The trainers managed their time effectively	4.8



The clarity of speech was evident	4.9
The language used by the trainers was appropriate regarding the impact on learning	5
The quality of the trainers' presentations and teaching materials was of a high standard	4.7
Data cleaning, processing, inspection, and validation	Overall Score (1-5)
The trainers had command over the subject	5
The trainers managed to keep me interested throughout the training	4.8
The trainers were open to ideas and suggestions from trainees	5
The trainers managed their time effectively	4.9
The clarity of speech was evident	4.8
The language used by the trainers was appropriate regarding the impact on learning	4.9
The quality of the trainers' presentations and teaching materials was of a high standard	4.8
Data visualization	Overall Score (1-5)
The trainers had command over the subject	4.6
The trainers managed to keep me interested throughout the training	4.5
The trainers were open to ideas and suggestions from trainees	4.7
The trainers managed their time effectively	4.8
The clarity of speech was evident	4.7
The language used by the trainers was appropriate regarding the impact on learning	4.6
The quality of the trainers' presentations and teaching materials was of a high standard	4.7

2) Overall Evaluation Result

Item		Overall Score (1-5)
I. Course Content	Relevant to job	4.4
	Understandable subject	3.9
	Clarity of objectives	4.1
	Level of lectures	4.5
	Discussions time	4.1
	Interaction with participants	4.1
	Overall rate	4.9
II. Schedule & Time Allocation	Lectures time	3.8
	Lectures usefulness	4.8
	Practice time	3.9
	Practice usefulness	4.3
III. Teaching Aids	Effectiveness of aids	4.5
	Clarity of slides	4.7
	Handouts and materials	4.8
IV. Administrative Arrangements	Pre-course communications	4.4
	Travel arrangements	4.1
	Accommodation quality	4.1
	Allowance on time	4.9

	Transportation	4.6
	Lecture rooms	4.6

Evaluating the Learning of Participants

A brief evaluation was conducted at the start of the course to indicate the participants' backgrounds and skill levels in relation to agronomic data management apps and tools. The following displays the evaluation results, which clearly confirm the premise that the "data collection" process is entirely manual, and spreadsheets are the dominating tool for data management and analysis, with skill levels ranging from "beginner" to "intermediate."

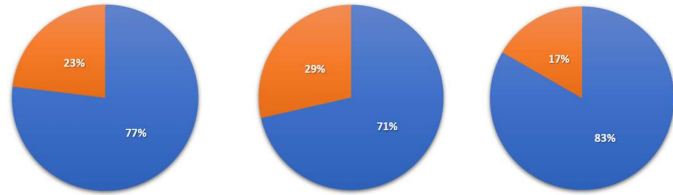
participants skills and backgrounds





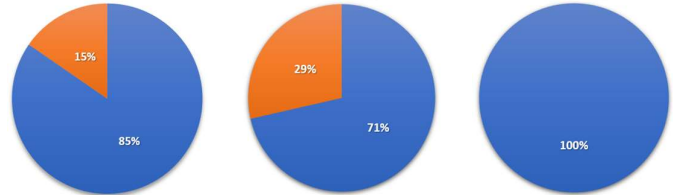
Experience in "DataScribe".

- No, I have no idea.
- Yes, I have some knowledge but never tried by myself.
- Yes, I used it once or twice before.
- Yes, I am familiar with such utility.



Experience in "AgroFIMS".

- No, I have no idea.
- Yes, I have some knowledge but never tried by myself.
- Yes, I used it once or twice before.
- Yes, I am familiar with such utility.



Zero-final assessment

Results of the Zero-Final assessments for the in-person training course

[1] "Open data" is...

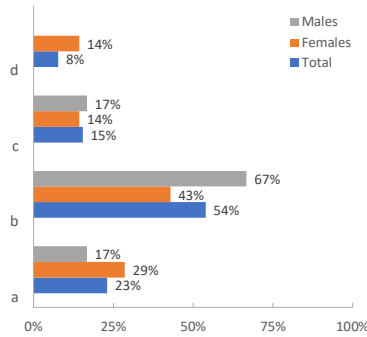
[a] data tables that have missing values.

[b] data sets that are available to all users with no or some restrictions.

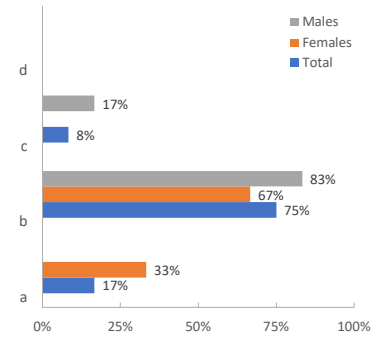
[c] data sets that are only available to authorized users.

[d] data files that can be opened from desktop applications (e.g. Microsoft office...).

Zero assessment



Final assessment



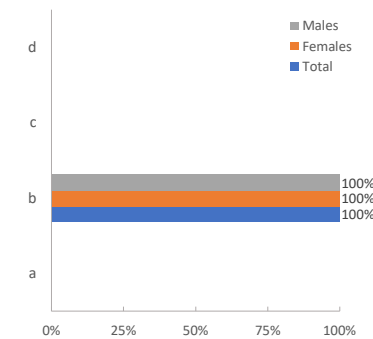
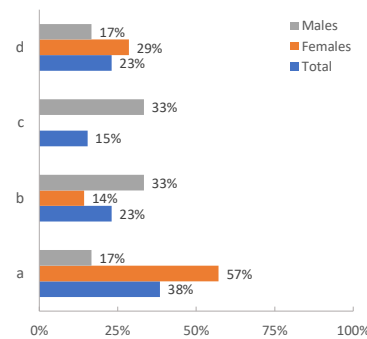
[2] "FAIR data" key concepts are...

[a] findability, availability, invisibility, and responsibility.

[b] findability, accessibility, interoperability, and reusability.

[c] Fixability, accuracy, integration, and reusability.

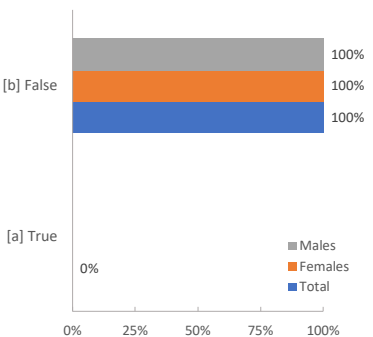
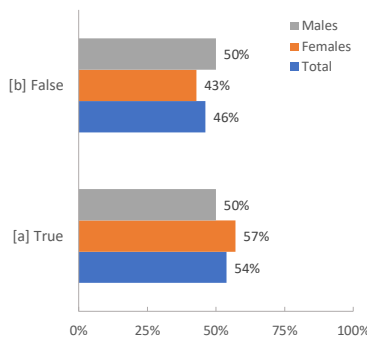
[d] none of the above.



[3] All "open data" sets are "FAIR"?

[a] True

[b] False

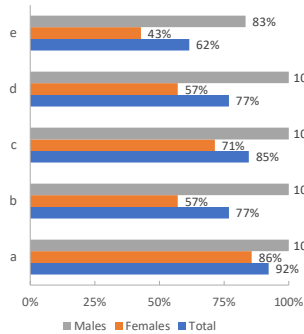




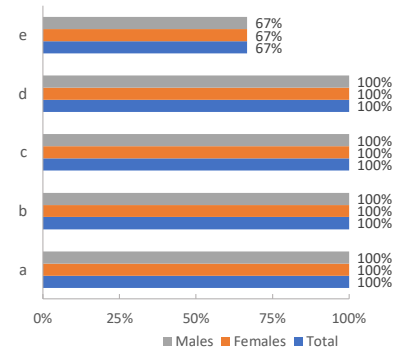
[4] Select from the following items the agronomic data...

- [a] georeferenced data of the field
- [b] soil salinity
- [c] germination dates
- [d] energy consumption
- [e] age of the farmer

Zero assessment

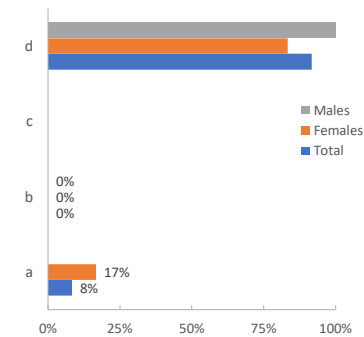
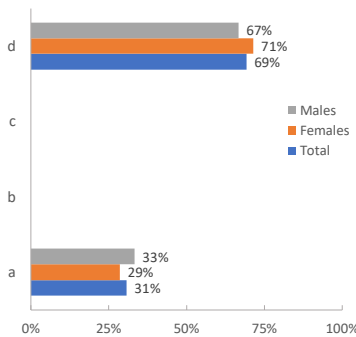


Final assessment



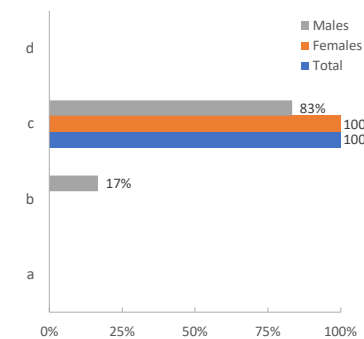
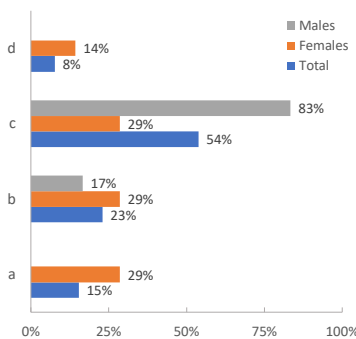
[5] "field books" are...

- [a] records of the field expenses
- [b] book about the history of the field
- [c] ethical regulation book
- [d] records of the applied on-farm practices



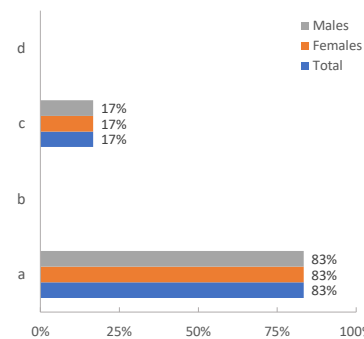
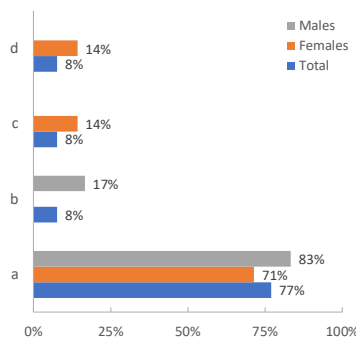
[6] "Data cleaning" is the process of...

- [a] organizing the collected data in nice and handy tables.
- [b] apply statistical analysis to the collected data.
- [c] fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset.
- [d] converting raw data into useful information.



[7] All agronomic data are...

- [a] both quantitative and qualitative.
- [b] qualitative.
- [c] numerical.
- [d] quantitative.





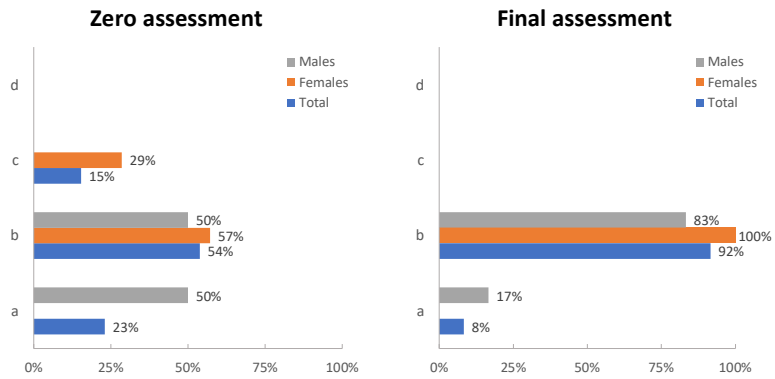
[8] The digital collection and management of agronomic data ...

[a] requires sophisticated high-price software.

[b] can be done using free and/or open-source applications.

[c] requires coding and programming skills.

[d] is not efficient, and the manual traditional methods are better.



Recommendations for future cooperation

The in-person training was a good activity to introduce the different agronomic data collection and management tools and provided the participants with enough knowledge and resources to explore on their own any of the provided tools that interest them the most and are sufficient for their work. It was interesting to monitor the real activity of the participants and the level of improvement while the participants showed a high level of engagement and tried to reflect the gained knowledge on their own work cases during the interactive discussions and hands-on training. By the end of the training, the participants raised the need to apply for more intense and longer courses covering the topics of agriculture data management and analysis, which enables more hands-on training and activities.

ANNEX 1

Training Curriculum In-person Training on Agronomic Data Collection and Management Tools for Better Agricultural Research, 3-6 September 2023

Time	Lecture	lecturer
Day 1 [Sunday, 3 Sept 2023] – Introduction and basic principles		
09:00-09:30	Opening.	Dr. Aladdin Hamwiah, Egypt Country Manager of ICARDA.
09:30-09:45	Course Introduction.	Layal Atassi- Geoinformatics researcher in the GeoAgro Team- ICARDA.
9:45-11:00	Open Data FAIR principles and tools	Layal Atassi
11:00-11:15	Coffee Break	
11:15-12:45	Importance of the agriculture experiments data, and minimum datasets for agronomy analysis and modeling.	Samar Attaher- Agronomist researcher in the Soils, Waters, and Agronomy team- ICARDA.
12:45-13:30	Lunch Break	
13:30-14:30	Creating field books for on-station or controlled field experiments [2]: <i>AgroFIMS</i> , <i>KDsmart</i> .	Samar Attaher
14:30-14:45	Coffee Break	
14:45-16:00	<i>Hands-on on AgroFIMS, KDsmart</i>	Layal Atassi and Samar Attaher
Day 2 [Monday, 4 Sept 2023] – Tools for data collection/acquisition		
09:00-9:30	Creating survey forms: <i>DataScribe</i> .	Layal Atassi
9:30-11:00	<i>Hands-on DataScribe</i>	Layal Atassi
11:00-11:15	Coffee Break	
11:15-12:00	Hands-on <i>DataScribe</i>	Layal Atassi, Samar
12:00-12:45	Hands-on <i>DataScribe</i>	Layal Atassi, Samar
12:45-13:30	Lunch Break	
13:30-14:30	Data collection tools [1]: ODK, ONA.	Khaled Al-Shamaa- Research Database Manager and Senior Analyst at ICARDA
14:30-14:45	Coffee Break	
14:45-16:00	<i>Hands-on ODK, ONA</i>	Khaled Al-Shamaa, Layal, Samar
Day 3 [Tuesday, 5 Sept 2023] – Data management		
09:00-10:00	Data cleaning and processing.	Khaled Al-Shamaa
10:00-11:00	Hands-on: Data cleaning and processing	Khaled Al-Shamaa, Layal, Samar
11:00-11:15	Coffee Break	
11:15-12:45	Hands-on: Data cleaning and processing.	Khaled Al-Shamaa, Layal, Samar
12:45-13:30	Lunch Break	
13:30-14:30	Data inspection and validation.	Khaled Al-Shamaa
14:30-14:45	Coffee Break	
14:45-16:00	Hands-on: Data inspection and validation.	Khaled Al-Shamaa, Layal, Samar
Day 4 [Wednesday, 6 Sept 2023] – Data management (full cycle)		
09:00-10:00	Data visualization: Strategies and tools	Samar Attaher



Time	Lecture	lecturer
10:00-11:00	Hands-on: Data visualization	Samar Attaher, Khaled Al-Shamaa, Layal,
11:00-11:15	Coffee Break	
11:15-12:45	Hands-on training for full cycle example: from data collection to visualization (with demo datasets)- part 1	Layal, Khaled, Samar.
12:45-13:30	Lunch Break	
13:30-14:30	Hands-on training for full cycle examples: from data collection to visualization (with demo datasets)- part 2	Layal, Khaled, Samar.
14:30-14:45	Coffee Break	
14:45-14:00	wrap-up and feedback	Layal, Khaled, Samar.
14:00-15:00	Closing	Dr. Aladdin Hamwih, Egypt Country Manager of ICARD.

ANNEX 2

List of Participants

**In-person Training on Agronomic Data Collection and Management Tools for Better
Agricultural Research, 3-6 September 2023**

	Name	Affiliation	Gender
1	Eng. Abdelrahman Ali Ibrahim Mohammed	Assistant Researcher- Agricultural Engineering Research Institute-ARC.	M
2	Eng. Abo Bakr AL sedik Ahmed Aly Youssef	Assistant Researcher- Agricultural Genetic Engineering Research Institute-ARC	M
3	Dr. Ahmed Fouad Ahmed Thabet	Researcher-Plant Protection Research Institute-ARC.	M
4	Dr. Ahmed Gamal El-Deen Abd El Khalek Baddour	Senior researcher- Soil, Water and Environment Research Institute- ARC	M
5	Dr. Liela Mohamed Mohamed Ali	Researcher-Agricultural Engineering Research Institute-ARC.	F
6	Eng. Menna Tullah Ahmed Elsadany	Assistant Researcher- Agricultural Genetic Engineering Research Institute-ARC	F
7	Dr. Mokhtar Moragea Mokhtar Gab Alla	Senior Researcher, Wheat Research Department, Field Crops Research Institute- ARC	M
8	Dr. Mona Ismail Ewies Elsayed	Researcher- Central Research Lab of Statistical Design and Analysis -ARC	F
9	Dr. Mustafa Omer Mustafa Hassan	Researcher- Field Crops Research Institute -ARC.	M
10	Eng. Nourhan Atwa Ahmed Atwa	Research assistant, Agricultural Genetic Engineering Research Institute	F
11	Dr. Ola Ibrahim Mabrouk Ali	Senior Researcher- Plant Pathology Research Institute-ARC	F
12	Dr. Reda Ali Mohamed Ibrahim	Researcher- Food Legumes, Field Crops Research Institute -ARC.	M
13	Dr. Rehab Ahmed Mohamed Abd-Elrahman	Chief Researcher- Food Legumes, Field Crops Research Institute -ARC.	F
14	Dr. Wafaa Mahmoud Abd El-Bary Ismail	Assistant Researcher - - Agricultural Engineering Research Institute-ARC.	F

ANNEX 3

Course flyer



INITIATIVE ON
Fragility to Resilience in
Central and West Asia



ICARDA
Science for resilient livelihoods in dry areas



EIA
EXCELLENCE IN AGRONOMY
ADAPT INTENSIFY GROW

Training on Data Collection and Management Tools for Better Agricultural Research

Background

Agronomy research aims to enhance crop yield, quality, profitability, sustainability, and risk resilience. Digital tools enabling the sharing of FAIR (findable, accessible, interoperable, and reusable) and open digital data sets are essential for improving agronomic research techniques as agriculture faces challenges. Sharing research data based on community-approved standards accelerates innovation and benefits stakeholders, including impoverished farmers.

Objective of the training

Transferring knowledge about "open data" and "FAIR" principles, and their applications and tools for agronomic data production and management life cycle.

The agronomic data development and management training, organized by the International Center for Agricultural Research in the Dry Areas (ICARDA), is a pivotal component of the Excellence in Agronomy (EIA) and F2R CWANA for Sustainable Intensification and Climate Change Adaptation initiatives. With a focus on supporting young researchers and smallholder farmers, EIA aims to provide data-driven agronomy solutions that align with the CGIAR's impact targets, including nutrition, health, food security, poverty reduction, livelihood, gender equality, youth, and climate adaptation and mitigation.



COURSE OUTLINE

This comprehensive training event is designed to empower agricultural researchers with the importance of standardization of agriculture research data, essential tools and insights, fostering a deeper understanding of data-driven decision-support solutions in agronomy. By delving into the concepts of "open data" and "FAIR" principles, participants will gain valuable knowledge on how to effectively manage and develop agronomic data that adheres to community-agreed-upon standards. Moreover, they will explore a diverse range of digital tools and applications, enabling them to optimize resource utilization, improve crop productivity, and make informed decisions that positively impact farming communities.



EXPECTED OUTCOME

Upon completion of the training, participants can anticipate improvements in research work efficiency and the overall quality of scientific reports and services. By grasping the concepts of "open data" and "FAIR" principles, and familiarizing themselves with cutting-edge digital tools, researchers will be better equipped to develop and share FAIR-compliant datasets. This increased proficiency in data-driven decision support solutions can contribute to more effective agricultural practices and better-informed policymaking.

Examples of some presentations



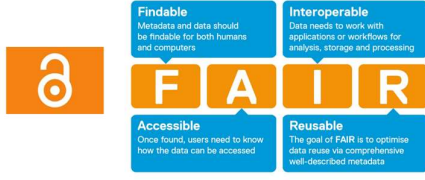

Open Data, FAIR Principles and Tools

Layal Atassi

icarda.org
International Center for Agricultural Research in the Dry Areas

cgiar.org
A CGIAR Research Center
CGIAR

Data must be open and FAIR



- Findable**: Metadata and data should be findable for both humans and computers
- Interoperable**: Data needs to work with applications or workflows for analysis, storage and processing
- Accessible**: Once found, users need to know how the data can be accessed
- Reusable**: The goal of FAIR is to optimise data reuse via comprehensive well-described metadata

icarda.org
Courtesy from One CGIAR EIA TRANSFORM initiative 2023

What is the use of metadata?


Discovery
Provide a summary of the contents of data sets to facilitate the searching for those data sets by users.

Provide information on Contents of a data set

Give detailed descriptions of individual objects in a data set

Why metadata is important?

- 1) Exchange information between
 - One department
 - Organizations
 - Word wide web
- 2) Quality check
- 3) suiting for purpose



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FAIR principles: Findability, Accessibility, Interoperability, and Reusability

Findability: Title, Subject (keywords), Publisher, Date.

Accessibility: Metadata should be visible and linked with its corresponding datasets on the data portal.

Interoperability: Format. Many current schemes use Standard Generalized Markup Language (SGML) or XML to specify their syntax.

Reusability: Rights, Coverage, Temporal coverage, Description, Resolution, Spatial reference system.

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The Importance of Agronomic Data

Samar Attaher, PhD
Research Associate – Agronomist
Soil, water, and agronomy team (SWA)- ICARDA
Cairo, Egypt.

"Agronomic Data Collection and Management Tools for Better Agricultural Research" training course
3-8 September 2023
Giza, Egypt

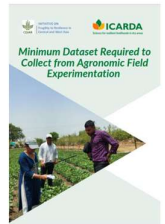


Minimum datasets for agronomy analysis and modelling.



- Climate
- Soil
- water
- Plant
- Practices

Minimum Dataset Required to Collect from Agronomic Field Experimentation

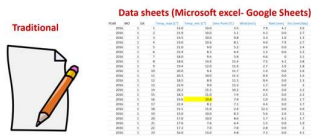


Agric. data standardization: - "Metadata" - "data about data"

Field Name	Field Type	Field Unit	Field Description
Area	Area	m ²	Area of the field
Soil	Soil	kg	Soil sample weight
Water	Water	mm	Water content
Plant	Plant	kg	Plant yield
Practices	Practices	kg	Fertilizer application

Creating field books for on-station or controlled field experiments


- Design the main table pattern for data collection along the season
- Document all applied practices in detail.
- Document the problems, sources of uncertainty, observations...




Traditional

Data sheets (Microsoft excel- Google Sheets)

Special digital applications





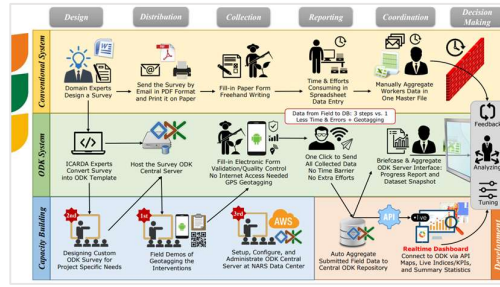

Open Data Kit (ODK)

New Technology on Data Collection

Khaled Al-Shamaa
Research Database Manager and Senior Analyst

EIA Course on Agronomic Data Collection and Management Tools for Better Agricultural Research, 4 Sep 2023

icarda.org | cgiar.org | CGIAR

Data Management in Excel

Khaled Al-Shamaa
Research Database Manager and Senior Analyst

EIA Course on Agronomic Data Collection and Management Tools for Better Agricultural Research, 5 Sep 2023

icarda.org | cgiar.org | CGIAR

Integrity Check using Pivot Table (2)

Rep	Block	Plot	Geno	Count of Plot	Column Labels	Grand Total
1	1	1	18	1	1	1
1	1	2	10	1	1	1
1	1	3	14	2	1	1
1	1	4	22	3	1	1
1	1	5	15	4	1	1
1	1	6	6	5	1	1
1	2	1	24	7	1	1
1	2	2	19	8	1	1
1	2	3	2	2	1	1
1	2	4	21	10	1	1
1	2	5	8	11	1	1
1	2	6	1	12	1	1
1	3	2	1	13	1	1
1	3	3	3	14	1	1
1	3	4	5	15	1	1
1	3	5	4	16	1	1
1	3	6	17	17	1	1
1	4	1	13	18	1	1
1	4	2	16	19	1	1
1	4	3	20	20	1	1
1	4	4	7	21	1	1
1	4	5	9	22	1	1
1	4	6	23	23	1	1
2	1	1	13	24	1	1
2	1	2	23	24	24	72
Grand Total				24	24	72

Summary Statistics using Pivot Table (2)

Rep	Block	Plot	Geno	Average of Yield	StdDev of Yield
1	1	1	18	4.45	0.23
1	1	2	10	4.22	0.26
1	1	3	14	6.31	0.31
1	1	4	22	5.27	0.28
1	1	5	15	6.28	0.31
1	1	6	6	4.67	0.33
1	2	1	24	5.42	0.37
1	2	2	19	5.87	0.40
1	2	3	2	5.42	0.37
1	2	4	21	5.42	0.37
1	2	5	8	5.42	0.37
1	2	6	1	5.42	0.37
1	3	2	1	5.42	0.37
1	3	3	3	5.42	0.37
1	3	4	5	5.42	0.37
1	3	5	4	5.42	0.37
1	3	6	17	5.42	0.37
1	4	1	13	5.42	0.37
1	4	2	16	5.42	0.37
1	4	3	20	5.42	0.37
1	4	4	7	5.42	0.37
1	4	5	9	5.42	0.37
1	4	6	23	5.42	0.37
2	1	1	13	5.42	0.37
2	1	2	23	5.42	0.37
Grand Total				4.51	0.28

Data Analysis (Descriptive Statistics - input)

The screenshot shows the 'Data Analysis' dialog box in Excel, with 'Descriptive Statistics' selected. The input range is set to the data table shown in the previous slide.



Data visualization

Samar Attahr, PhD
Research Associate – Agronomist
Soil, water, and agronomy team (SWA)- ICARDA
Cairo, Egypt.

Agronomic Data Collection and Management Tools for Better Agricultural Research training course
3-4 September 2023
Giza, Egypt



Data visualization is the representation of data through use of common graphics, such as charts, plots, infographics, and even animations.

Data and information visualization (data viz or info viz) ...is the practice of designing and creating **easy-to-communicate** and **easy-to-understand** graphic or visual representations of a **large amount of complex quantitative and qualitative data and information** with the help of static, dynamic or interactive visual items.

Typically based on data and information collected from a certain domain of expertise, these visualizations are intended for a broader **audience** to help them **visually explore and discover**, quickly understand, interpret and gain important insights into otherwise difficult-to-identify structures, relationships, correlations, local and global patterns, trends, variations, constancy, clusters, outliers and unusual groupings within data (**exploratory visualization**).



INITIATIVE ON
Fragility to Resilience in
Central and West Asia



Key Topics in the Courses

- Embracing Open Data & FAIR Principles
- Understanding the Lifecycle of Agricultural Experiment Data
- Mastering Tools for Data Collection in Controlled Field Experiments
- Utilizing Effective Survey Tools
- Essential Data Cleaning, Processing, and Analysis Techniques
- Unleashing the Power of Data Visualization

About Open Data & FAIR Principles

The training sessions emphasize the importance of "open data" and "FAIR" principles in agronomic research, enabling data accessibility, reusability, and collaboration. Implementing these principles enhances scientific work in agriculture. Open and FAIR data assets have transformative effects on research, enabling efficiency, interdisciplinary collaboration, and the derivation of insights. They allow scientists to leverage data pools and new data science capacities for innovation and effective responses to global challenges.

Eligible participants

Young researchers (PhD students- 4 years maximum Postdoc) working in agronomy.

Course duration and venue:



3rd to 6th September 2023



Agricultural Genetic Engineering Research Institute (AGERI)- ARC
headquarters in Giza, Egypt

Registration Link






<https://forms.gle/gJT1JQsd79ZbDonr9>



ANNEX 4

Publicity

LinkedIn posts

3 September 2023: ICARDA account on LinkedIn	4 September 2023: ICARDA account on LinkedIn
<p>  ICARDA: International Center for Agricultural Research in the ... 53,401 followers 1w • Edited • </p> <p>  Seeds of knowledge sown, digital tools sharpened! Participants of our "Data Collection and Management Tools for Better Agricultural Research" training course are equipped with new insights & cutting-edge digital tools and are gearing up for a future of enhanced research efficiency and impactful scientific reports. As they wrap up their learning journey, these researchers are better prepared to develop and share datasets that meet the highest standards. The ripple effects of their increased data proficiency will contribute to more effective agricultural practices and informed decision-making. 🌱 #ResearchExcellence #DataDrivenSolutions </p> <p> Thanks to everyone who made this #ICARDAtraining such a great success! 🙌 Vinay Nangia, Ph.D., Aladdin Hamwiah, Samar Attaher, Layal Atassi, Ajit Govind, Mina Devkota, Khaled Al-Shamaa, CGIAR & CGIAR Excellence in Agronomy Initiative & CGIAR Initiative on Fragility to Resilience in CWANA (F2R CWANA) 🌱 </p> 	<p>  ICARDA: International Center for Agricultural Research in the ... 53,401 followers 1w • </p> <p>  Day 2 at our training on "Data Collection and Management Tools for Better Agricultural Research"! Experts from the ICARDA: International Center for Agricultural Research in the Dry Areas are leading sessions on open data and the "FAIR" principles (findable, accessible, interoperable, reusable data) in agronomy research. Our dedicated team of professionals drives innovation for sustainable farming & climate adaptation and helps participants to create real-world solutions for global agricultural challenges. 🌱 #ICARDAexpertise #AgriculturalInnovation #SustainableFarming </p> 