

LEAP-RE RE4AFAGRI

**RENEWABLES FOR AFRICAN AGRICULTURE:
"MODELLING EXCELLENCE AND ROBUST BUSINESS
MODELS TO THE BENEFIT OF SUB-SAHARAN AFRICAN
SMALLHOLDER FARMERS AND COMMUNITIES"**

**Introduction to IIASA-
WRI capacity building
workshops**

17th May 2023

Dr Giacomo Falchetta, Dr Edward Byers



LEAP-RE

Long-Term Joint EU-AU Research
and Innovation Partnership on Renewable Energy



RE4AFAGRI

Renewable Energy for African Agriculture



The LEAP-RE project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 963530.

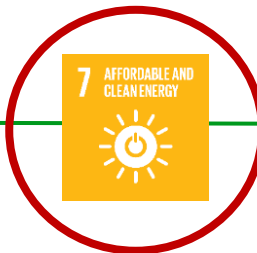
- 1) Introduction to the LEAP-RE RE4AFAGRI project**
- 2) Capacity Building Workshops**
- 3) Application process**
- 4) Input from WRI & NRF**
- 5) Q&A**

RE4AFAGRI's Objectives



LEAP-RE

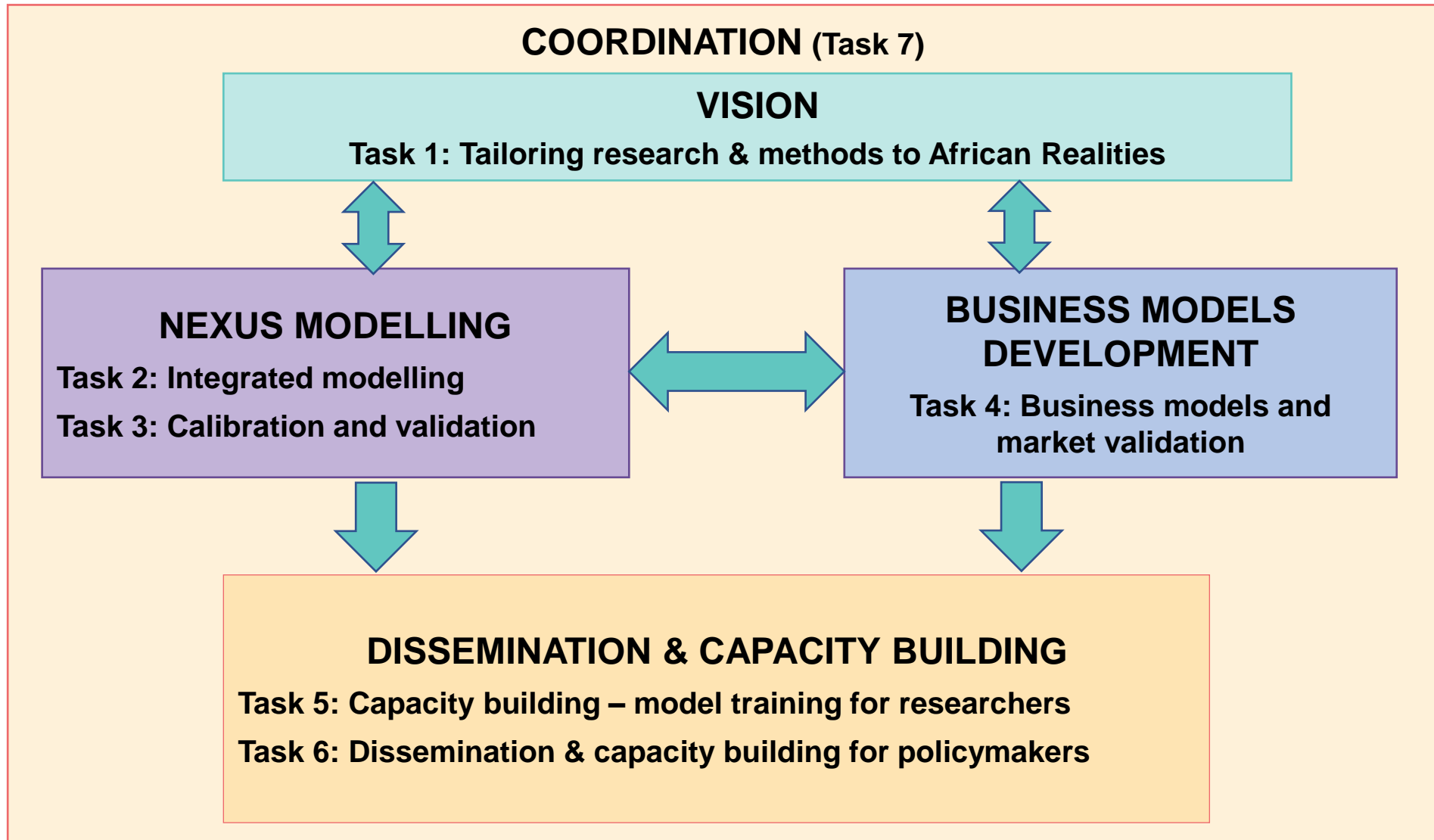
- Rainfed agriculture and **no electricity** in the community
- Low **productivity** and **raw crops** to wholesale
- **Poverty** and **inequality** trap
- Sustainable **irrigation** and **community-wide renewable electricity**
- Increased **productivity** & **local crop processing**
- Agriculture as **leverage** for reduction of poverty and inequality



RE4AFAGRI project structure



LEAP-RE



RE4AFAGRI project partners



LEAP-RE



POLITECNICO
MILANO 1863



International Institute for
Applied Systems Analysis



UNIVERSITY of
RWANDA





IIASA is the **primary science institute for solving world-wide problems** in the areas of climate, environment and natural resources, energy, risk and resilience, population, societal dynamics, and transitions to new technologies.



WRI's Data Expertise



15+ years

Of experience building interactive data applications

950,000

Annual users on our most established data tool GFW

10+

Innovative platforms

≈40

Data products overall

WRI online data portals and tools



LEAP-RE

WORLD RESOURCES INSTITUTE | Data | **Data Lab** | Data Platforms | Reach an Expert | Open Data Portal | Open Data Commitment | Resource Library | [DONATE](#) | [Q](#) | [🏠](#) | [☰](#)

Global Forest Watch

Offering the latest data, technology and tools that empower people everywhere to better manage and protect forest landscapes.

[Launch Platform](#) [Visit Project](#)

Part of Forests

Aqueduct

Using cutting-edge data to identify and evaluate water risks around the world.

[Launch Platform](#) [Visit Project](#)

Climate Watch

Climate Watch offers powerful insights and data on national climate plans, long-term strategies and greenhouse gas emissions to help countries achieve their climate and sustainable development goals.

[Launch Platform](#) [Visit Project](#)

Part of Climate

Resource Watch

Resource Watch provides trusted and timely data for a sustainable future.

[Launch Platform](#) [Visit Project](#)

Part of Climate

Energy Access Explorer

A mapping platform that provides data and tools to advance affordable, reliable and modern energy for all people.

[Launch Platform](#) [Visit Project](#)

LandMark

LandMark is a global data platform of Indigenous and community lands to help communities protect their land rights and secure tenure.

[Launch Platform](#) [Visit Project](#)

Ocean Watch

The Ocean Watch open data platform delivers science to policy makers developing sustainable ocean economies and operationalizing integrated ocean management.

[Launch Platform](#) [Visit Project](#)

Water, Peace & Security Partnership

The Water, Peace and Security (WPS) Partnership was founded in 2018 to pioneer the development of innovative tools that identify and address water-related security risks.

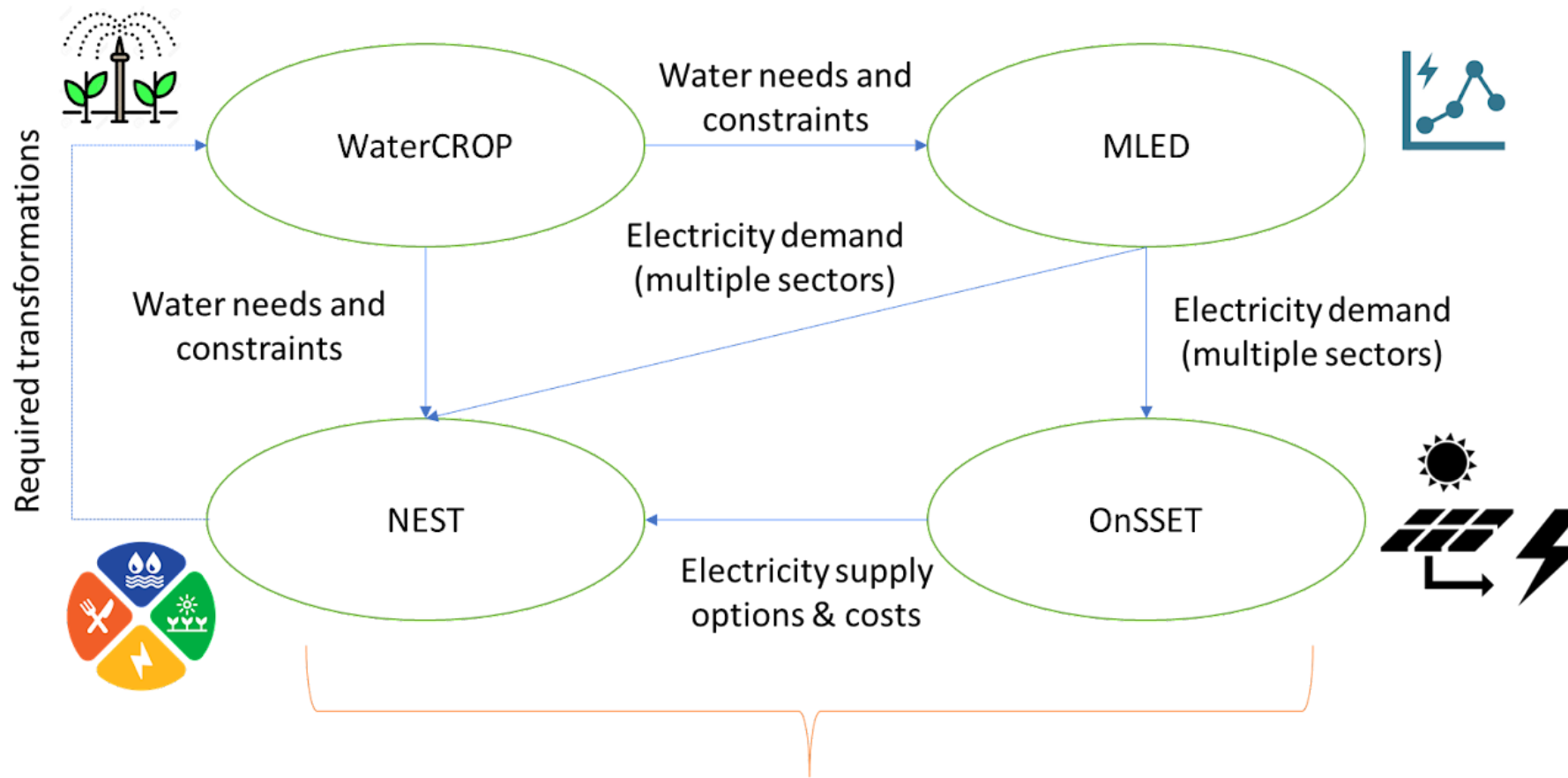
[Launch Platform](#) [Visit Project](#)



THE RE4AFAGRI modelling platform



LEAP-RE



Infrastructure and investment requirements estimated and impact analysis

RE4AGRI – WRI Workshops - 2023



LEAP-RE

2 back-to-back workshops – Addis Ababa, 16-20th October 2023

<https://iiasa.ac.at/events/oct-2023/re4afagri-iiasa-and-world-resources-institute-wri-joint-workshops>



WRI offices, UNDP complex

1. **High-level course** on tools, assessment and policy analysis of the water-energy-land nexus in SSA – **HYBRID FORMAT (in Addis Ababa AND online)**
2. **Technical course** on WEL-nexus modelling tools – **IN PERSON ONLY**

Approx 30 participants

Free to attend

Online capacity building – end 2023 / Q1 2024
- 4 months, 4 models
- Weekly online sessions
- based on #2. Technical course



IAASA-GEF-UNIDO Zambezi workshop in Lusaka, 2019

Workshop structure



LEAP-RE

| | Workshop #1 | Workshop #2 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| | High-level course on tools, assessment and policy analysis of the water-energy-land nexus in SSA | Technical course on WEL-nexus modelling tools |
| Content | <p>Introductions to RE4AGRI & WRI projects</p> <p>Lectures and hands-on activities on WEL nexus modelling approaches, GIS and web-based tools and data platforms, including:</p> <ul style="list-style-type: none"> • WRI Aqueduct, AgriAdapt, • RE4AGRI Modelling Platform | <p>Advanced tuition on 2/3 of the 5 models: ONSSET, M-LED, WaterCROP, NEST, WRI Energy Access Explorer</p> |
| Target participants | <p>Broad: policymakers, researchers, analysts, academics, working in assessment and planning in the water resources, agriculture & irrigation, and energy sectors.</p> <p>Typically those in mid-career stage and/or with Masters degree equivalent.</p> | <p>Advanced: As for #1, but requiring computer programming skills in a high-level language, e.g. Python, R, Matlab, Julia, etc.</p> |
| When, duration | Monday-Tuesday, 2 days, HYBRID FORMAT (in Addis Ababa AND online) | Wednesday-Friday, 3 days, IN PERSON ONLY |

Workshop 1 - High-level course on tools, assessment and policy analysis of the water-energy-land nexus in SSA

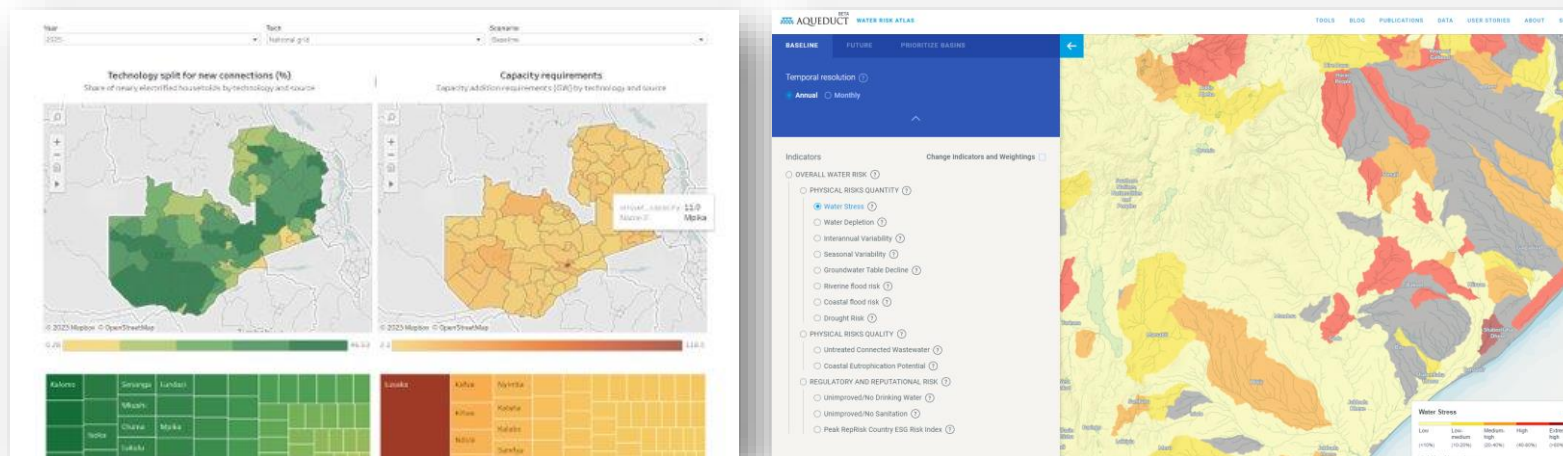


LEAP-RE

What: Lectures and hands-on activities on WEL nexus modelling approaches, GIS and web-based tools and data platforms

- WRI [Aqueduct](#), [AgriAdapt](#),
- RE4AGRI Modelling Platform – concept, output data, and the RE4AFAGRI dashboards

Aim: learn how spatial datasets and model outputs can benefit public and private decision makers along the WEF Nexus; real-world use examples of data-informed planning



What: Advanced tuition on selected models, with two tracks to select from:

- ENERGY track: ONSSET, M-LED, [WRI Energy Access Explorer](#)
- NEXUS track: WaterCROP, NEST,

Aim: Understanding the models, their structure, code, and input/output data; crash course on model configuration & run; focus on new scenarios and country-studies development.

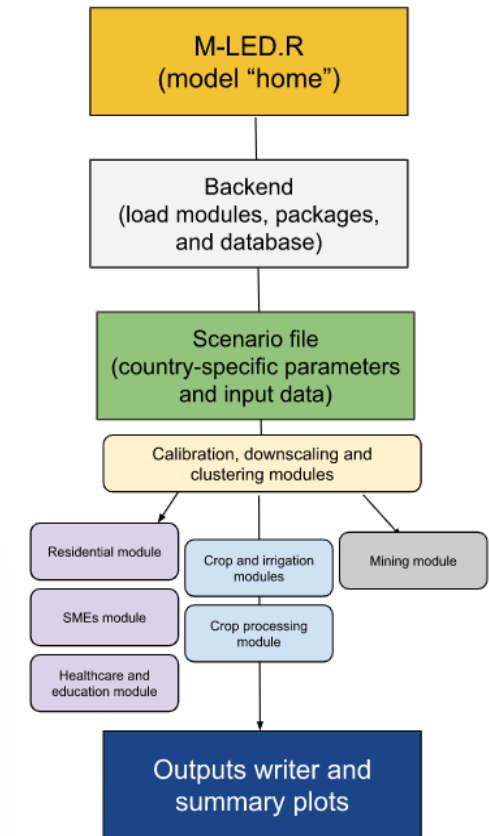
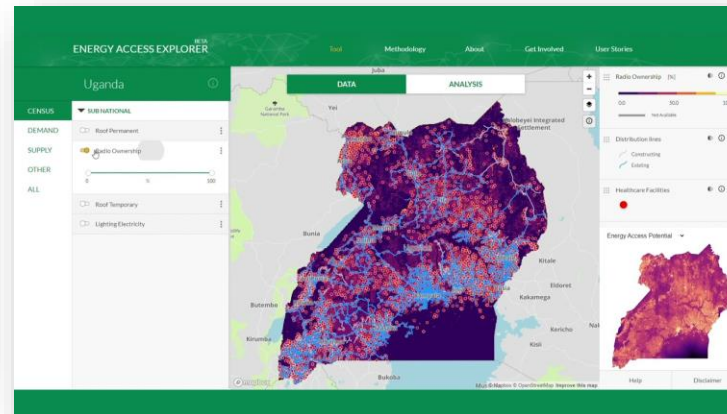
```
@system EnergyBalance(Weather) begin
**
c: leaf_thermal_emissivity => 0.97 ~ preserve(parameter)
o: stefan_boltzmann_constant => u"o" ~ preserve(u"W/m^2/K^4")
λ: latent_heat_of_vaporization_at_25 => 44 ~ preserve(u"kJ/mol", parameter)
Cp: specific_heat_of_air => 29.3 ~ preserve(u"J/mol/K", parameter)

Δw(T, T_air, RH, ea=vp.ambient, es=vp.saturation): leaf_vapor_pressure_gradient => begin
es(T) - ea(T_air, RH)
end ~ track(u"kPa")
E(gv, Δw): transpiration => gv*Δw ~ track(u"mmol/m^2/s")

H(Cp, gh, ΔT): sensible_heat_flux => Cp*gh*ΔT ~ track(u"W/m^2")
λE(λ, E): latent_heat_flux => λ*E ~ track(u"W/m^2")

ΔT(R_net, H, λE): temperature_adjustment => begin
R_net - H + λE
end ~ bisect(lower=-10, upper=10, u"K", evalunit=u"W/m^2")

T(T_air, ΔT): leaf_temperature => (T_air + ΔT) ~ track(u"C")
Tk(T): absolute_leaf_temperature ~ track(u"K")
end
```



SSA – Regional Member Organization of IIASA



LEAP-RE

- Expanding the reach of the in-person and capacity building plans
- Promoting the best researchers from the network:
 - Identifying promising candidates and informing selection process
 - Funding, sponsorship, bursary opportunities via the Science Granting Councils Initiative
- 17 countries: <https://iiasa.ac.at/members/ssarmo>



- Deadline – 31st May 2023 23:59 CET
- **Info and application form**
 - **Your professional background**
 - **Current work and skills**
 - **Funding needs**
 - **Upload CV / Resumé**
- Selection and funding matching process during June
- Notification of participation early July.

Female candidates strongly encouraged to apply

For what?

- Attendance is free
- Refreshments & lunch provided

Additional costs

- Accommodation
- Local travel
- Regional travel
- Breakfast / dinner etc
- Visas & associated costs

Funding opportunities

via RE4AFAGRI project
via SGC I member countries

We will aim to match sponsorship opportunities to applicants.

Partial bursaries may be offered (e.g. Travel only)

Applicants should not book anything without an official invitation letter.



4) Input from WRI & NRF

5) Q&A