AGRIEU

FAST.0150. course
Sustainable Agri-Food Production and Supply Chain Management

Responsible Research & Innovation (RRI) and Living Labs in AgTech projects

RiEcoLab

Responsible Research & Innovation (RRI) and Living Labs in AgTech projects

Overview

➢ **Introduction**

➢ **RESPONSIBLE RESEARCH INNOVATION (RRI)**

➢ **LIVING LABs (LL)**

➢ **RRI and LL: AgTECH GOOD EXAMPLES**

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Responsible Research and Innovation :

RRI

Responsible Research and Innovation (RRI) is a concept that gained particular visibility over the last decade in the European Union (EU)!

- a transparent, interactive process by which

  - societal actors and innovators become mutually responsive to each other with a view on

    - the (ethical) acceptability,

    - sustainability and

    - societal desirability

    of the innovation process and its marketable products,

- in order to allow a proper embedding of scientific and technological advances in our society

Responsible Research and Innovation

Over the last decades, many efforts have tried to reduce the distance between science and society, leading to a European-wide approach in Horizon 2020 called Responsible Research and Innovation (RRI).
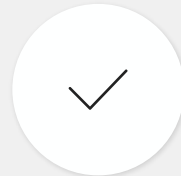
RRI seeks to bring issues related to research and innovation into the open, anticipate their consequences, and involve society in discussing how science and technology can help create the kind of world and society we desire for generations to come.

Policy Keys and Actors of RRI
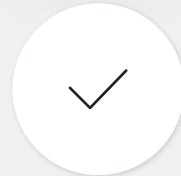
Principles of RRI

Clusters of RRI Process Requirements

Responsible Research and Innovation

These six pillars deserving attention largely affect the research dimension of RRI more than the innovation dimension

The European Commission has provided more concrete normative orientations in the form of six Policy Keys that RRI should foster:

- Ethics: Focus on research integrity and on science & society

- Gender Equality: Gender-balanced teams, gender-balanced decision-making bodies, and focus on the gender dimension in Research and Innovation (R&I)

- Governance: Governance instruments to actually foster shared responsibility in Research and Innovation.

- Open access: Free and early access to scientific information to facilitate improved quality of scientific research, fast innovation, constructive collaborations, and productive dialogue with civil society.

- Public engagement: All societal actors work together during the whole R&I process to align its outcomes to society's values, needs, and expectations.

- Science Education: Enhanced education process to better equip citizens with the necessary knowledge and skills so they can participate in R&I debates; and increase the number of researchers.

Responsible Research and Innovation

RRI entails engaging ALL ACTORS!

From...   **to...**

- individual researchers
- educators
- university administrators
- business innovators
- industry innovators
- policymakers
- governments
- civil society organisations and
- end-users

through **inclusive, participatory methodologies**

- in **all stages of R&I processes** and
- in **all levels of R&I governance**

Chapter 2

Responsible Research and Innovation

RRI aims to create a society where R&I practices strive towards sustainable, ethically acceptable, and socially desirable outcomes.
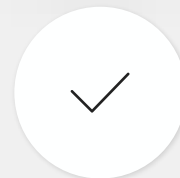
RRI does so in such a way that the responsibility for our future is shared by all people and institutions affected by and involved in R&I.

✓ **Policy Keys and Actors of RRI**

✓ **Principles of RRI**
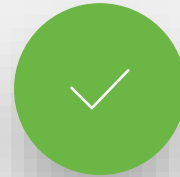
✓ **lusters of RRI Process Requirements**

Responsible Research and Innovation

Actors aiming at Responsible Research and Innovation commit themselves to the following principles:

Transparency: by engaging in open innovation, reflecting on and openly disclosing the purposes and potential implications of innovations, as well as the associated uncertainties.

Participation & Inclusion: by involving people of a broad diversity and different backgrounds on eye-level (inclusive innovation processes) and considering their needs.

Governance: by capacity building for Responsible Innovation, fostering the links between innovation and Sustainability Management and implementing gender equality.

Anticipation: by assessing risks and wider impacts (risk management and due diligence), considering ethical limitations, welcoming early warnings of negative impacts and mitigating harms.

Sustainability: by orientating innovation towards Planet, People and Profit (triple bottom line) and increasing shared value (for the company and for society).
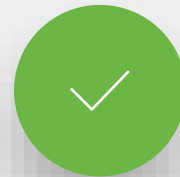
Responsible Research and Innovation

RRI outcomes emerge from process requirements, engaging in the practices of Responsible Research and Innovation for all stakeholders, leading them to become mutually responsive and share responsibility
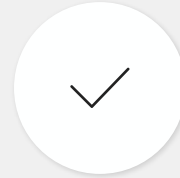
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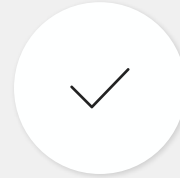
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What criteria must be met?

Responsible Research and Innovation

RRI-Tools (https://rri-tools.eu/), developed a framework to support in a dynamic, iterative manner, the RRI outcomes to find solutions for the societal challenges formulated by the European Commission.

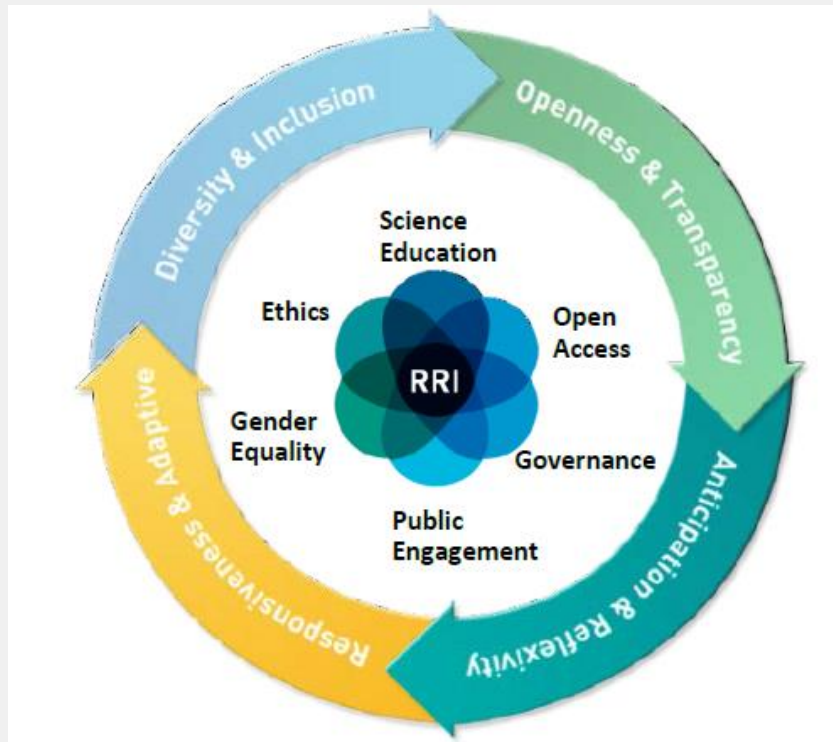**RRI Process Requirements developed by RRI-Tools**

Figure source: (Kupper et al., 2015)

Diversity & Inclusion
Diverse and inclusive RRI calls for the involvement of a wide range of stakeholders in the early development of science and technology.

Openness & Transparency
Openness and transparency are important aspects for the public to establish trust in science and politics.

Anticipation & Reflexivity
Anticipation both concerns understanding how the present dynamics of R&I practices shape the future and envisioning the future. Reflexivity is required to act adequately and be open to changes in direction.

Responsiveness & Adaptive change
Responsiveness means responding to emerging knowledge, perspectives, views and norms and is a condition for adaptive change. RRI requires a capacity to change in response to changing circumstances.

Measuring RRI Outcomes: Key Performance Indicators

Responsible Research and Innovation

Key Performance Indicators (KPIs) for Monitoring RRI could **help** *align RRI activities with key business drivers and processes,* **stimulate** *the continuous improvement of RRI "performances", and* **allow** *consideration of RRI aspects in regular sustainability reporting at the organisation level.*

	Item	RRI KPIs	Examples of quantitative parameters to measure KPIs
Anticipation & Reflection	1	Awareness of moral values	- Nr. of training sessions/meetings per year to learn and reflect on moral values connected to innovation strategy and core business
	2	Awareness of ethical issues of innovations	- Nr. of training sessions/meetings per year aiming to reflect on integration of social and ethical values into specific R&I/R&D projects
	3	Does the company embed moral values in its innovations?	- RRI principles formally integrated into the company's mission and vision (e.g. ethical code of conduct) - Nr. of R&I/R&D projects per year where moral values are actively and included into innovation strategies and technological design
Inclusiveness	4	Does the company (actively) anticipate social effects of its innovations?	- Nr. of R&I/R&D projects per year where internal/external stakeholders were involved from the early stages in product development - Nr. of consultancy initiatives with other innovators and external advisors to discuss and identify social impacts of R&I/R&D projects
	5	Stakeholder engagement	- Nr. of stakeholder engagement initiatives organized per year by the company - Nr. of R&I/R&D projects per year where active stakeholder engagement is foreseen into R&I/R&D plans - Nr. of R&I/R&D projects per year where engagement with end-users has been performed
	6	Gender Diversity	- Percentage of men and women involved in R&I/R&D function/teams in the company
Responsiveness	7	Transparency and accountability about RRI-relevant choices	- Formal communication strategy established at company level to ensure most relevant RRI choices are explained in key company documents and/or the website - Nr. of patents per year aiming to integrate non-financial values - Nr. of open access publications - Nr. of events or webpages or channels in social media (or similar) disseminating project results to the general public
	8	Learning mechanisms to address public and social values in product development	- Nr. of user-centered approaches per year formally integrated into the company innovation model (e.g. user-centered design, co-creation) - Nr. of user experience tools per year carried-out to respond (new) societal demands and developments
	9	Capacity to align to societal goals	- Nr. of R&I/R&D projects per year addressing socially/ethically-oriented products/services
	10	Active monitoring of RRI impacts	- Percentage of R&I/R&D projects per year that apply impact analysis strategies (e.g. risk management, ethical/social impact analysis, etc.) - Formal external auditing procedures (at least yearly basis) in place to monitor non-financial values of the company

Table T3.3.2.1. Key Performance Indicators for Monitoring RRI (Source: https://www.rri-prisma.eu/wp-content/uploads/2019/06/PRISMA_RRI_Exemplar_Roadmap_June-_2019.pdf)
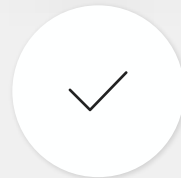
Living Labs & RRI

RiEcoLab envisions to develop Ecosystem Integration Labs (EILs) to be developed as a living-lab structure where responsible innovation can be co-produced.

Living labs have at first glance a lot in common with Responsible Research and Innovation (RRI). Nevertheless, living labs are various and not all approaches to living labs qualify as RRI.

Living Labs (LL) Definitions

LL Characteristics

LL RRI

What is a Living Lab?

"User-centred open innovation ecosystems based on a systematic user co-creation approach, integrating research and innovation processes in real-life communities and settings"

The European Network of Living Labs (ENoLL), a platform established in 2006 to foster ICT-based innovations around the world

"Physical regions or virtual realities in which stakeholders form public-private-people partnerships of

- firms,

- public agencies,

- universities,

- institutes,

- and users

all collaborating for the creation, prototyping, validating, and testing of new technologies, services, products, and systems in real-life contexts" *(Leminem, 2015)*

EIL

RiEcoLab envisions its Ecosystem Integration Labs (EILs) to be developed as

a living-lab structure where responsible innovation can be co-produced with quadruple helix stakeholders

in order to lead the path to impactful spin-offs/ startups/scale-ups.

RiEcoLab : EIL = LL ← RRI

RiEcoLab, builds upon designing and co-creating

responsible innovation living labs based on responsible research and

innovation (RRI).

Living Labs & RRI

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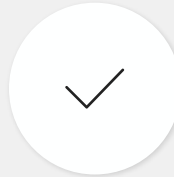
Living Labs (LL) Definitions

LL Characteristics

LL RRI

LL characteristics

LL provide real-life environments for conducting innovation activities, allowing to study not only the functioning of the innovation but also the interaction with societal actors.

The creation or set-up of LL is usually done by public-private-people partnerships (sometimes called 4Ps), including companies, researchers, government authorities, and users/citizens.

Users have a pivotal role in LL, which may include citizens and customers or future buyers of the product.

LL differ from just 'testbeds' or 'field trials' because the focus is not solely on testing and improving technological innovation but also on observing (and learning about) its impacts on society.

LL presuppose a relatively mature level of innovations: the innovations in LL are more mature than in-house R&D (where prototyping and field trials are more appropriate) but the innovations are less mature than would be found in pilot projects

Multiple stakeholders have a role in LL, and collaboration between them to realize technological and social innovation at the same time is considered important: co-creation is a term that is often used for this

Characteristics of Living Labs that support RRI

Not all LLs operate under RRI principles

LL ← RRI

- Participatory design, co-creation
- Multi-stakeholder
- Effort to include diverse stakeholders who do not necessarily agree
- Openness towards disagreement about value and acceptance of the innovation
- More attention to the exploration of a diversity of impacts, including unintended ones
- Development of shared vision on innovation future and contribution by the LL
- Incorporation of participative monitoring and evaluation
- Attention to legal issues of public policies and private accountability
- Attention to the collective learning concept

Living Labs & RRI
GOOD EXAMPLES

1. PA ADOPTION IN CHINA – RRI IMPLEMENTATION

2. SUSTAINABLE AGRI-FOOD SYSTEMS FOR SUSTAINABLE DEVELOPMENT (SASS) - RRI IMPLEMENTATION

3. LIVERUR – RURAL LIVING LABS

Good Examples
PAFIC Project, China

Problem: How can the adoption rate of Precision Agriculture (PA) be improved?
**Solution:** Employing RRI!

Stakeholder inputs into agrifood technologies at earlier TRL stages benefit the rate of adoption.

How?

Scientists >> can better understand end-user needs, as well as the process and impacts of technology adoption on (intended and unintended) societal outcomes.

End-users >> can better understand what can be delivered by the technology, and how the technology can potentially benefit them.

Stakeholder and end-user co-production throughout the technology development process >> helps build trust in the technology and enhances the perceived usability of the technology being developed.

Source: Clark, B., Jones, G., Kendall, H., Taylor, J., Cao, Y., Li, W., ... & Frewer, L. (2018). A proposed framework for accelerating technology trajectories in agriculture: a case study in China. *Frontiers of Agricultural Science and Engineering.*

Good Examples
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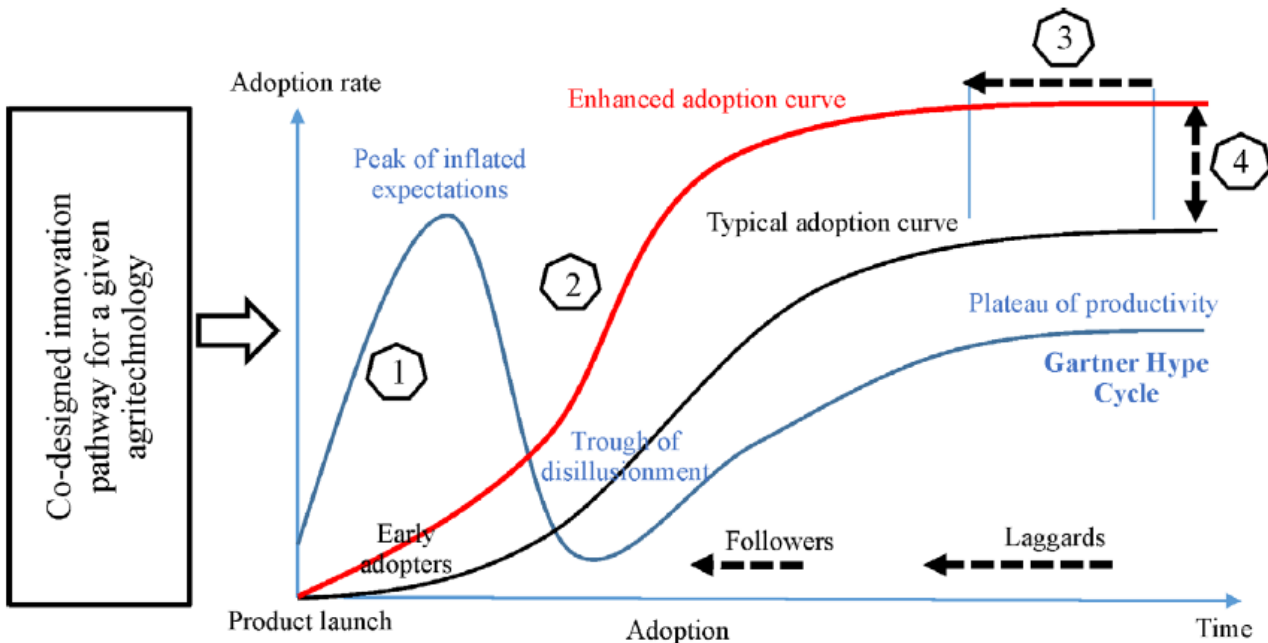
Fig. 1 How effective co-design is predicted to accelerate technology adoption

Good Examples

Sustainable Agri-food Systems for Sustainable Development (SASS), Africa

Problem: Multidisciplinary work is hard!
**Solution:** Using RRI tools and strategies to improve collaboration between researchers from different fields

AIM of the research: to define practical actions to improve the well-being of the African population by acting both on the structure of agricultural supply chains, on the nutritional quality of agricultural products, and on the related food consumption strategies.

Three RRI tools were tested:
Peer Connection Meetings, Theory of Change Table, Field Missions

Four process requirements of RRI were used to evaluate the adopted tools:
- ✓ Diversity & Inclusion
- ✓ Openness & Transparency
- ✓ Anticipation & Reflexivity
- ✓ Responsiveness & Adaptive change

Source: Tricarico, L., Galimberti, A., Campanaro, A., Magoni, C., & Labra, M. (2020). Experimenting with RRI tools to drive sustainable agri-food research: the SASS case study from sub-saharan Africa. Sustainability, 12(3), 827.

Good Examples

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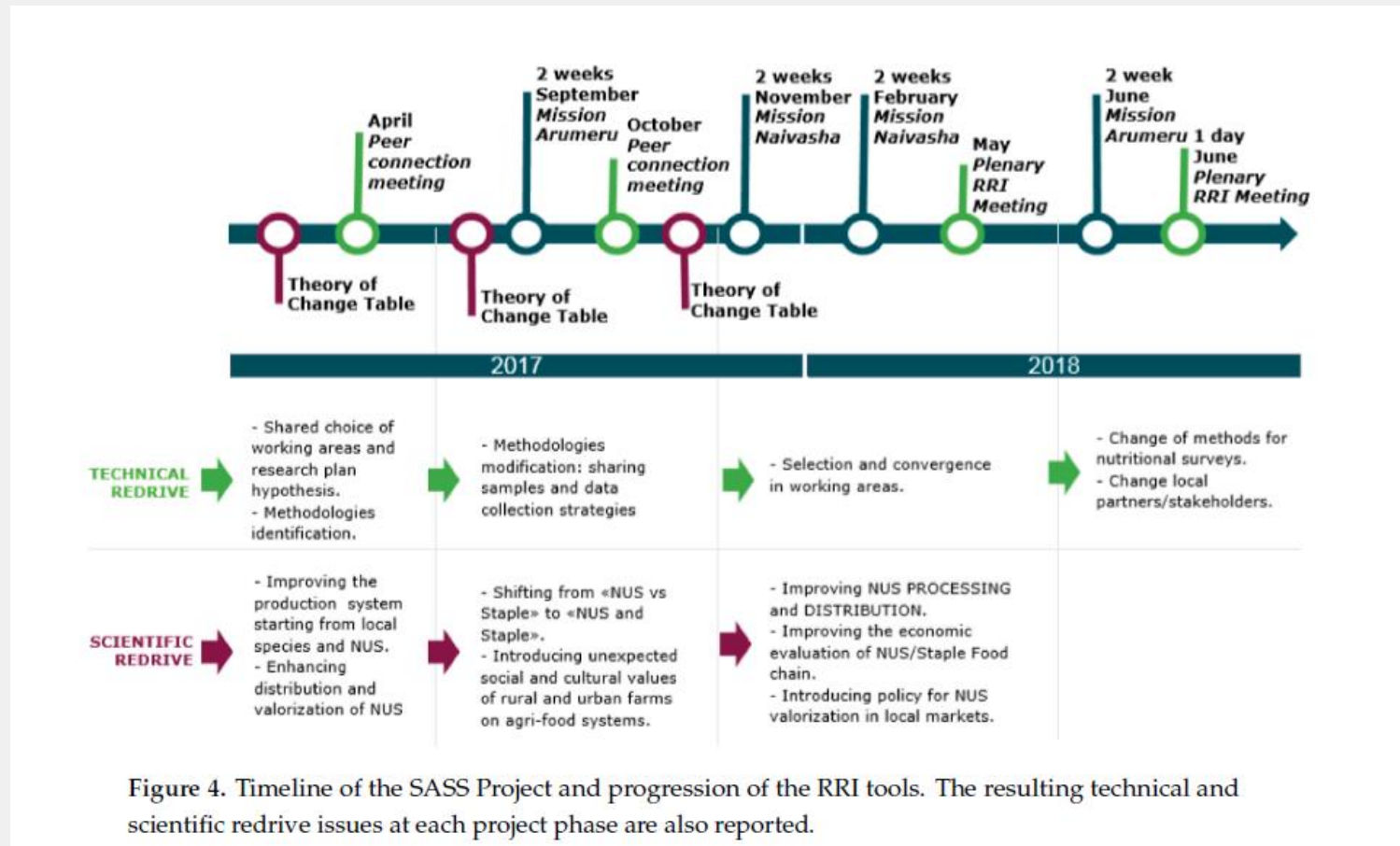
Figure 4. Timeline of the SASS Project and progression of the RRI tools. The resulting technical and scientific redrive issues at each project phase are also reported.

Good Examples

LIVERUR Project, EU

AIM: to support businesses, projects and initiatives in designing innovative business models in rural areas, moving towards a Circular Economy and including all important stakeholders by following the Living Lab approach.

20 countries – 20 rural living labs to explore innovative business models in rural context

Circular economy

Innovative Business Model

Living Labs Methodology

Source: Project website available at https://liverur.eu/

References

This training material has been prepared based on the document :
"**RiEcoLab Toolkit 3:** Embedding **Responsible Research Innovation** (RRI) in the innovation spin-offs/start-ups/scale-ups strategy of HEIs" .

Refer to the Toolkit for the complete set of References

Visit our Ecosystem Integration LAB and learn more:
https://**riecolab-agtech-eil.yasar**.edu.tr/

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Thank you!