Sustainability Science and Sustainable Development:

Questioning Research Approach and Practices in Innovating Solutions for SDGs

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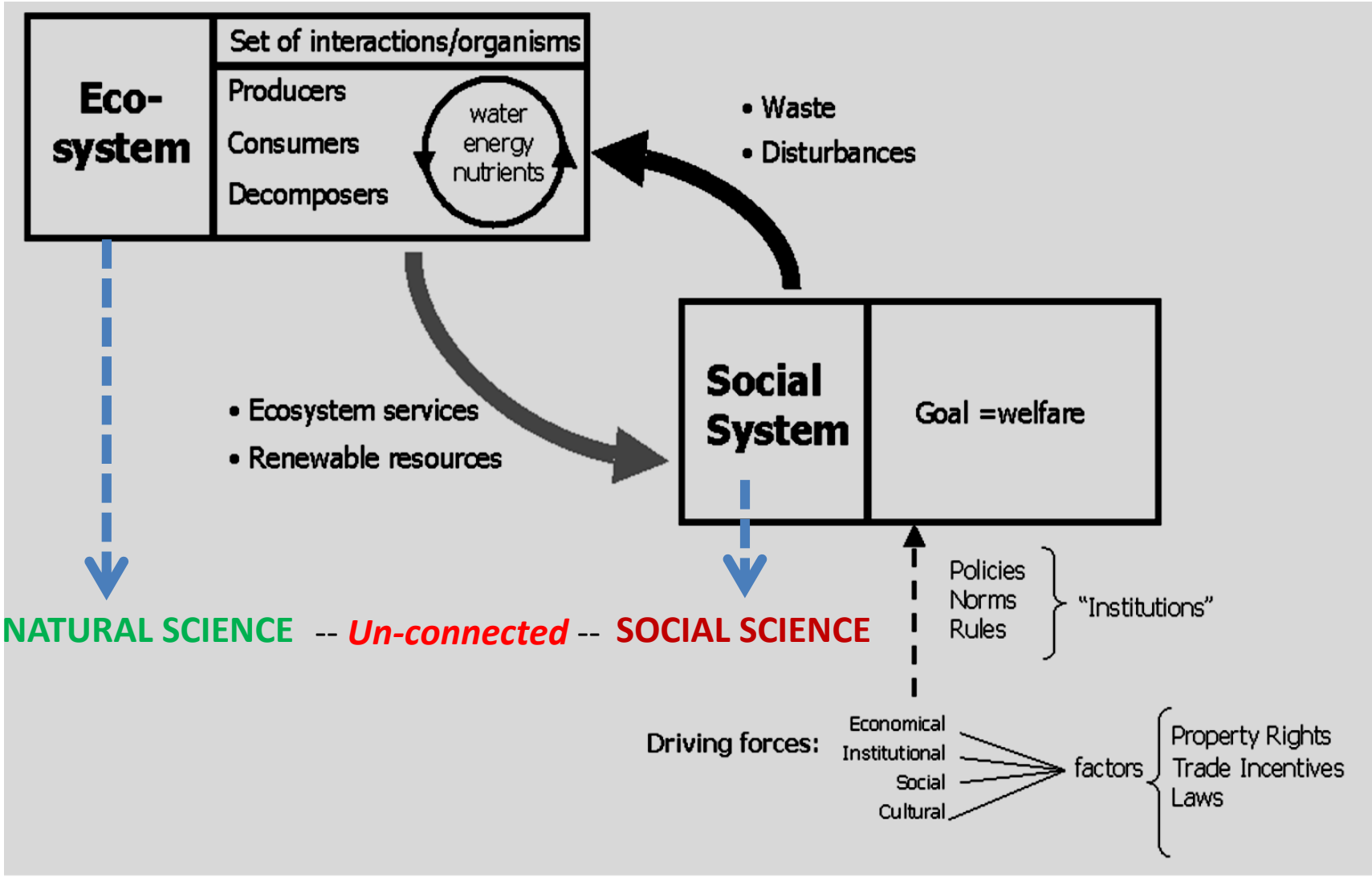
A presentation material for the Synthesis Workshop of Projects on
"Sustainabiliity Transformation Across the Region (STAR) and Science Harnessed for ASEAN Regional Policy (SHARP)"
Langkawi, Malaysia, 3 – 4 November 2016

Outline

- Introduction;
- Sustainability science;
- Obstacle for application and advancement in Sustainability Science;
- A Case: Research on Integrating Livelihood Improvement and Rehabilition of Degraded Land and Forest in Indonesia;
- Conclusion: Proposed Framework for Research Approach and Practices in Innovating Solutions to support delivery of SDGs

Introduction – 1.

Life systems on earth and domains of sciences



Post 2015-Sustainable Development Goals (*SDGs*)

- **Goal 1. End poverty in all its forms everywhere.**
- **Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.**
- **Goal 3. Ensure healthy lives and promote well-being for all at all ages.**
- **Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.**
- **Goal 5. Achieve gender equality and empower all women and girls.**
- **Goal 6. Ensure availability and sustainable management of water and sanitation for all.**
- **Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all.**
- **Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.**
- **Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.**
- **Goal 10. Reduce inequality within and among countries.**
- **Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable.**
- **Goal 12. Ensure sustainable consumption and production patterns.**
- **Goal 13. Take urgent action to combat climate change and its impacts.***
- **Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.**
- **Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.**
- **Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.**
- **Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.**

Introduction - 3

- The **question** is that → can innovative solutions to sustainable development problems be **provided independently** by natural science or social science alone?
- **IF NOT, → how both is bridged and what is the framework?**

Sustainability Science

- ... is the scientific knowledge generated as the basis to formulate **science-based innovative solutions to the sustainability problems** and delivery of sustainable development goals (SDGs)..

- Elements of sustainability science:
  - **interdisciplinary** (trans-disciplinary; cross-disciplinary; or multidisciplinary);
  - **solutions oriented** (of SD problems/issues/challenges);
  - **optimising social and humanity potential** (through learning process approach);
  - **Maintaining continuation of benefits stream** (from ecosystem);
  - **aim at well-being for all**.

Introduction - 4

- This paper intended to contribute to the framing of research approaches and innovation practices to support delivery of SDGs.
- The argument put forward by this paper is that:
  - research approaches and innovation practices to support delivery of SDGs required participation in co-production of scientific knowledge and innovative solutions;
  - delivery of SDGs required networking, synergy and partnership (among community, government, universities/research institutes, and private sector) in implementing the innovative solutions.

About Sustainability Science - 1

- First, **un-sustainability partly caused by the *divided domain of natural and social sciences* and increasingly *fragmented disciplines* and tended to be *un-connected* each other and become less relevant** to help addressing the complex problems of sustainability (Spangenberg, 2002; Komiyama and Takeuchi, 2006; Benneth, 2013).
- Therefore, **there is a need to cross the disciplinary borders and reconnect science to society** through renovations of disciplinary approaches (Spangenberg, 2002).

About Sustainability Science - 2

- Second**, the aim of sustainability science is to formulate science-based innovatives solutions to the sustainability problems.** It is an interdisciplinary arena to satisfy society's need within the limit of nature carrying capacity (Bennet, 2013

- The **objectives of sustainability science are:**
  - **"(a) understanding the fundamental interaction between nature and society;**
  - **(b) guiding these interactions along sustainable trajectories; and**
  - **(c) promoting social learning necessary to navigate the transition to sustainability"** (Miller, Wiek, Sarewitz, Robinson, Olsson, Kriebel, and Loorbach, 2014: 239).

About Sustainability Science - 3

- Third, **there is a need for participatory approach in dealing with sustainability problems (by all related stakeholders),** (Miller, Wiek, Sarewitz, Robinson, Olsson, Kriebel, and Loorbach, 2014).

- **→ Sustainability science required a new approach in setting the boundary of analysis, assessing the impact of the interface between society and nature, formulating innovative solutions and its implementation.**

About Sustainability Science - 4

- **There is a need to *move from narrow analytic focus* (which is more experimental in approach) which has limited impact on solving problems** (Potschin and Haines-Young (2006).
- **→ *toward integrative stream of science* where broader and exploratory problem solving can be done based on multiple line of converging evidence and scales.**

About Sustainability Science - 5

- **It is implies that *combination of crititical and problem solving approach is essential* in doing research, ... formulation of solutions, and strategies for implementation** (Jerneck, Olsson, Ness, Anderberg, Baier, Clark, Hickler, Hornborg, Kronsell, Lovbrand, and Person, 2011).
- **→ The co-production of knowledge, reciprocal learning, and the applied aspects of science are very important in this context** (Spangenberg, 2002; Benneth, 2013).

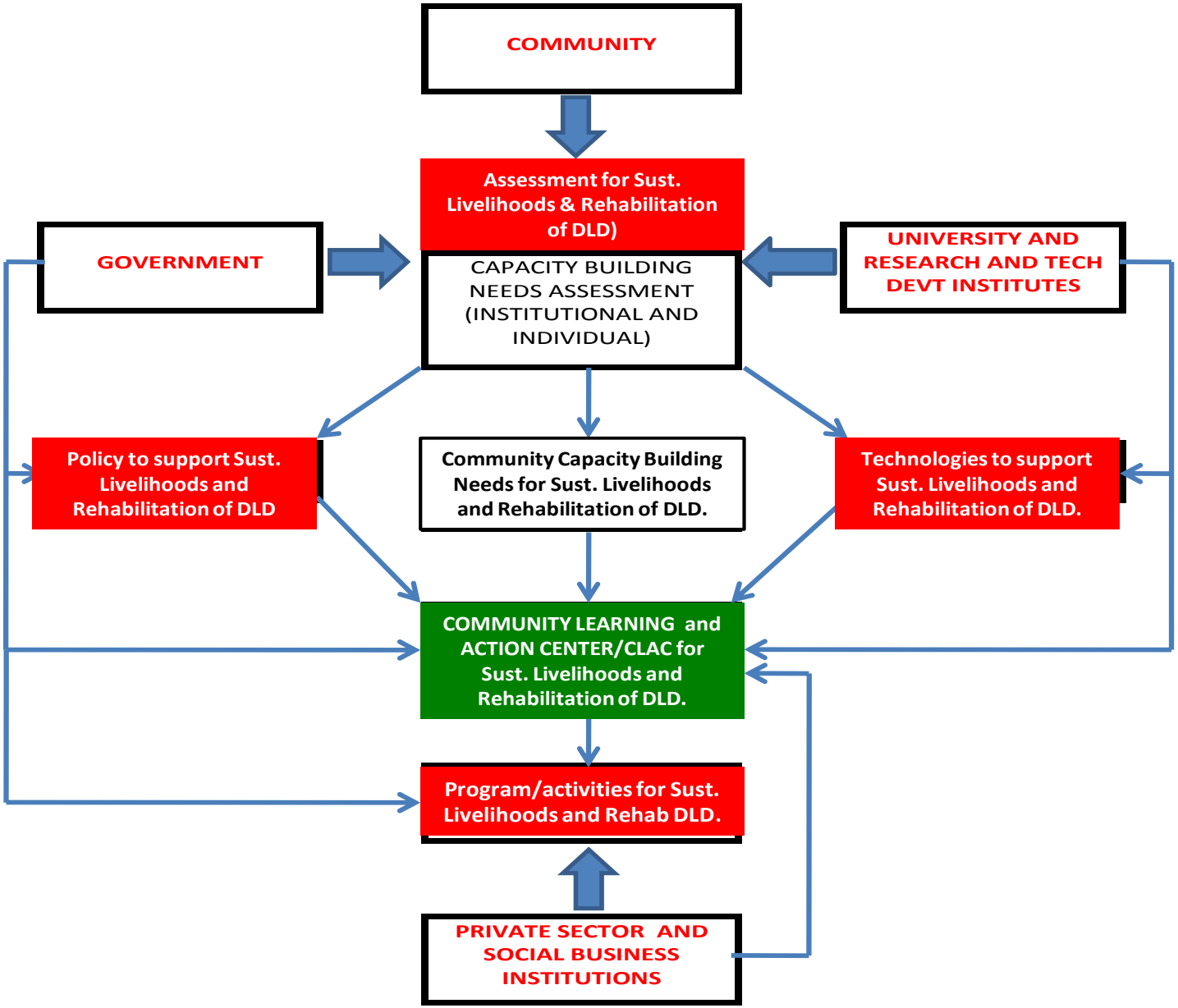
Obstacle for application of and advancement in Sustainability Science

- The obstacles to achieve it are (Komiyama and Takeuchi, 2006: 3-4):
- "(1) **complexity** of the problems and the **specialization of the scholarship** that seek to address them;
- (2) the **scientific discipline** that examines this complex problems have themselves **grown increasingly fragmented** in recent years, so much research is conducted from a highly restricted perspective with regard to both phenomena identification and problem solving; and
- (3) **piecemeal approach** which constraining the development and application of comprehensive solutions to these problems".
- → ***IN THE PAST efforts NOT SUFFICIENT to connect and integrate FRAGMENTED SCIENTIFIC DISCIPLINES AND PIECEMEAL APPROACH.***

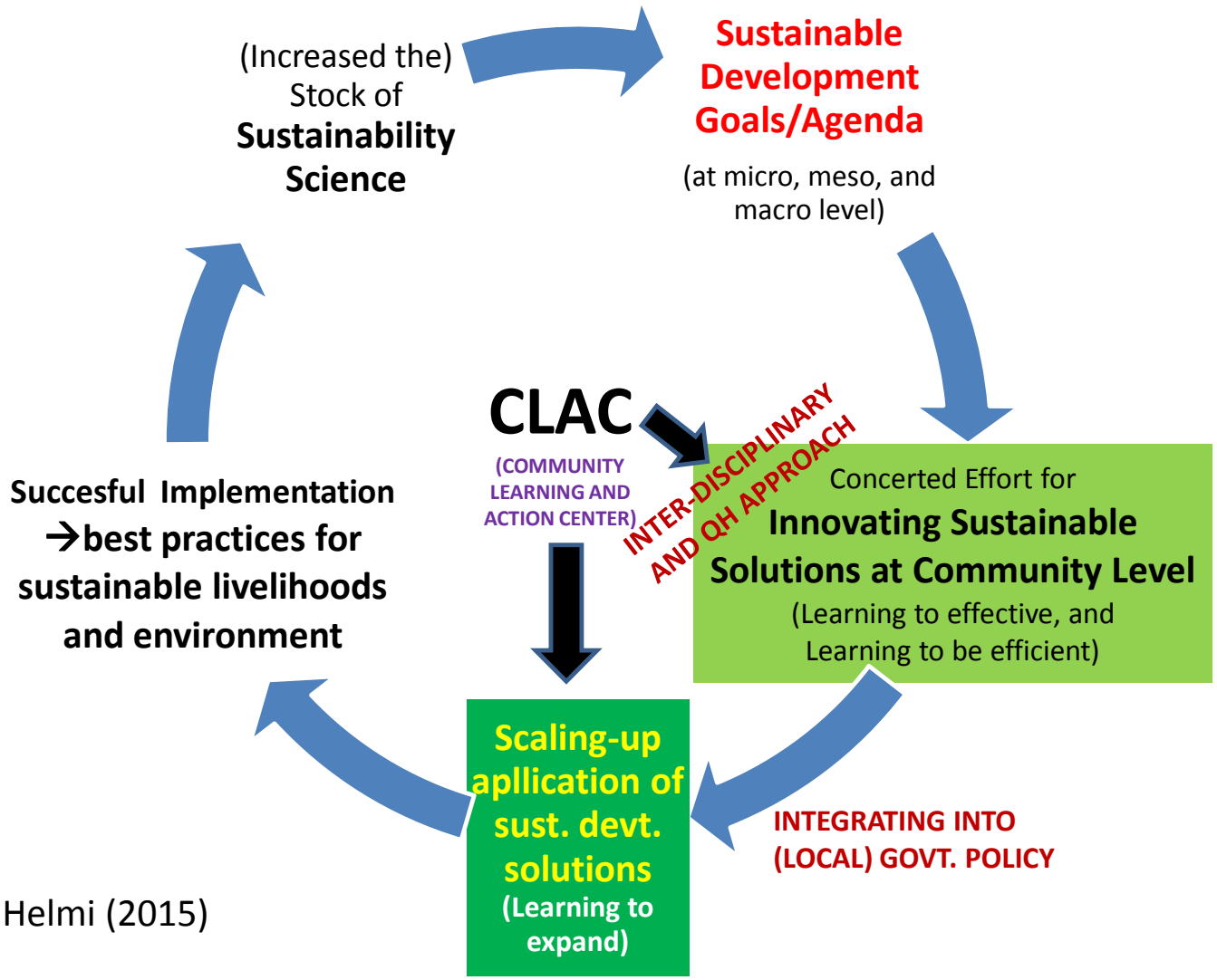
Research on Integrating Livelihood Improvement and Rehabilition of Degraded Land and Forest in Indonesia

- Located n three provincess (West sumatra, Yogyakarta, and West Nusa Tenggara/NTB).
- The focus is on the INTEGRATING livelihood improvement and rehabilitation of degraded land and forest.

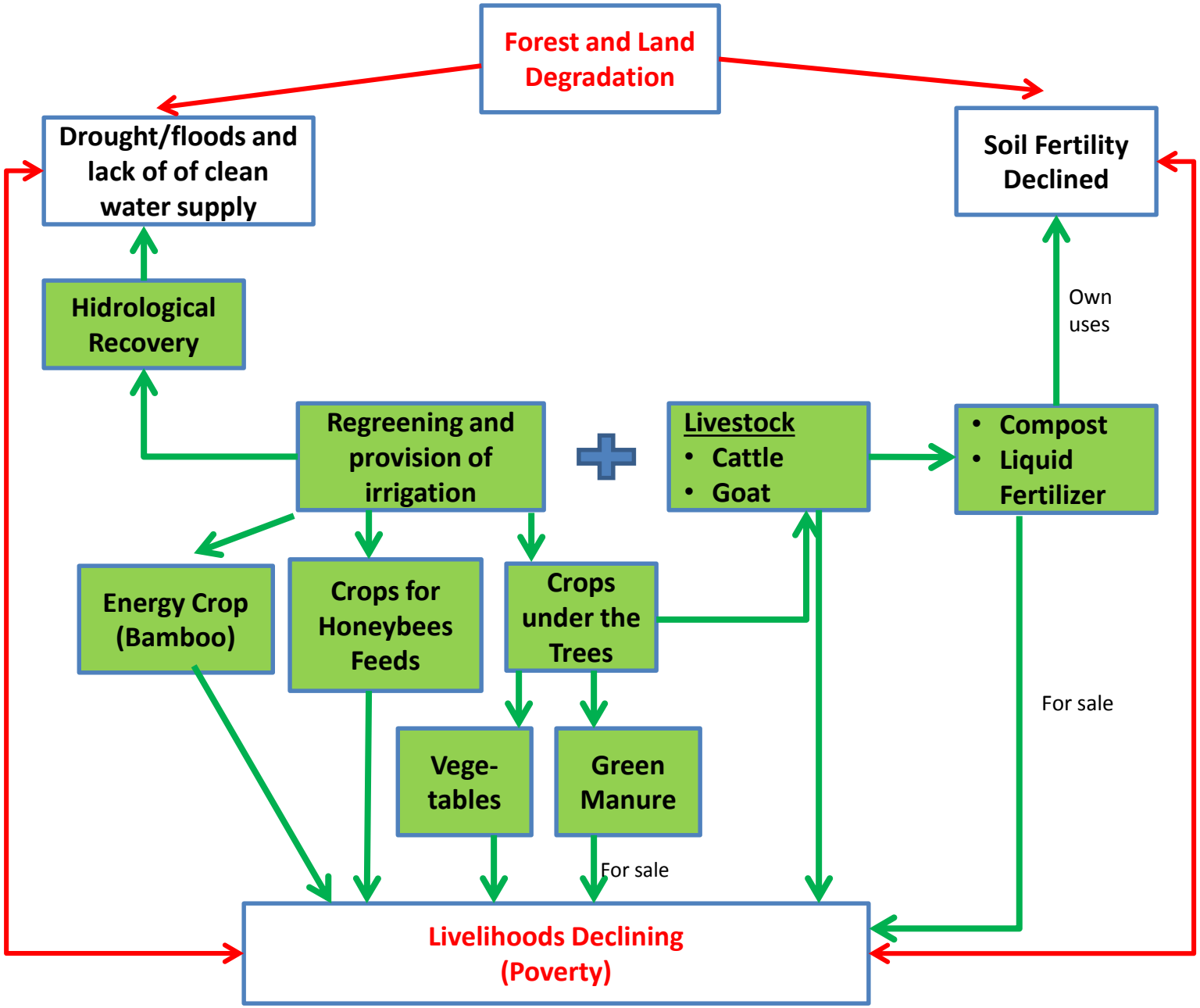
Research framework.



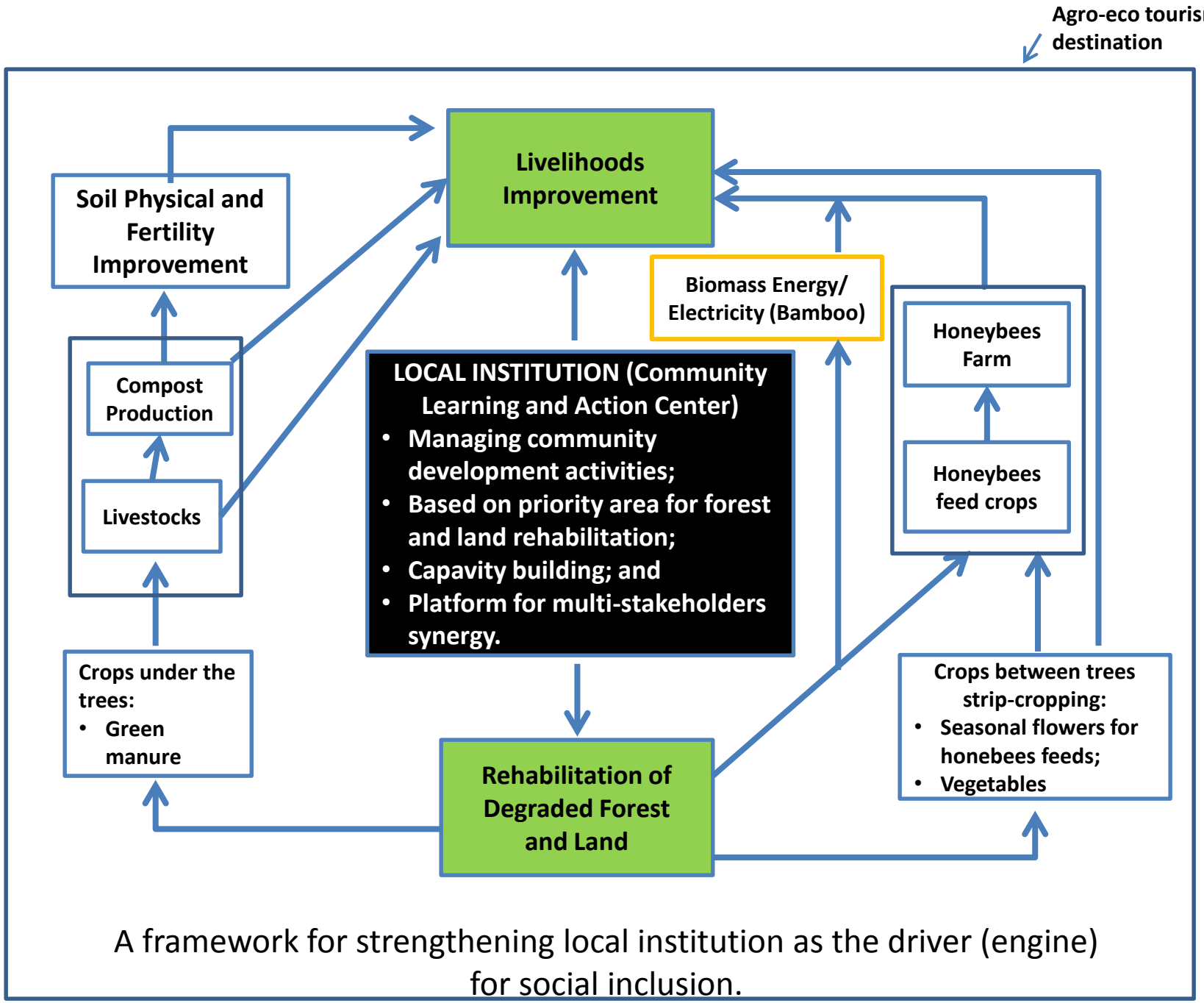
Framework for application of SS to support delivery of SDGs - 1



Source: Helmi (2015)

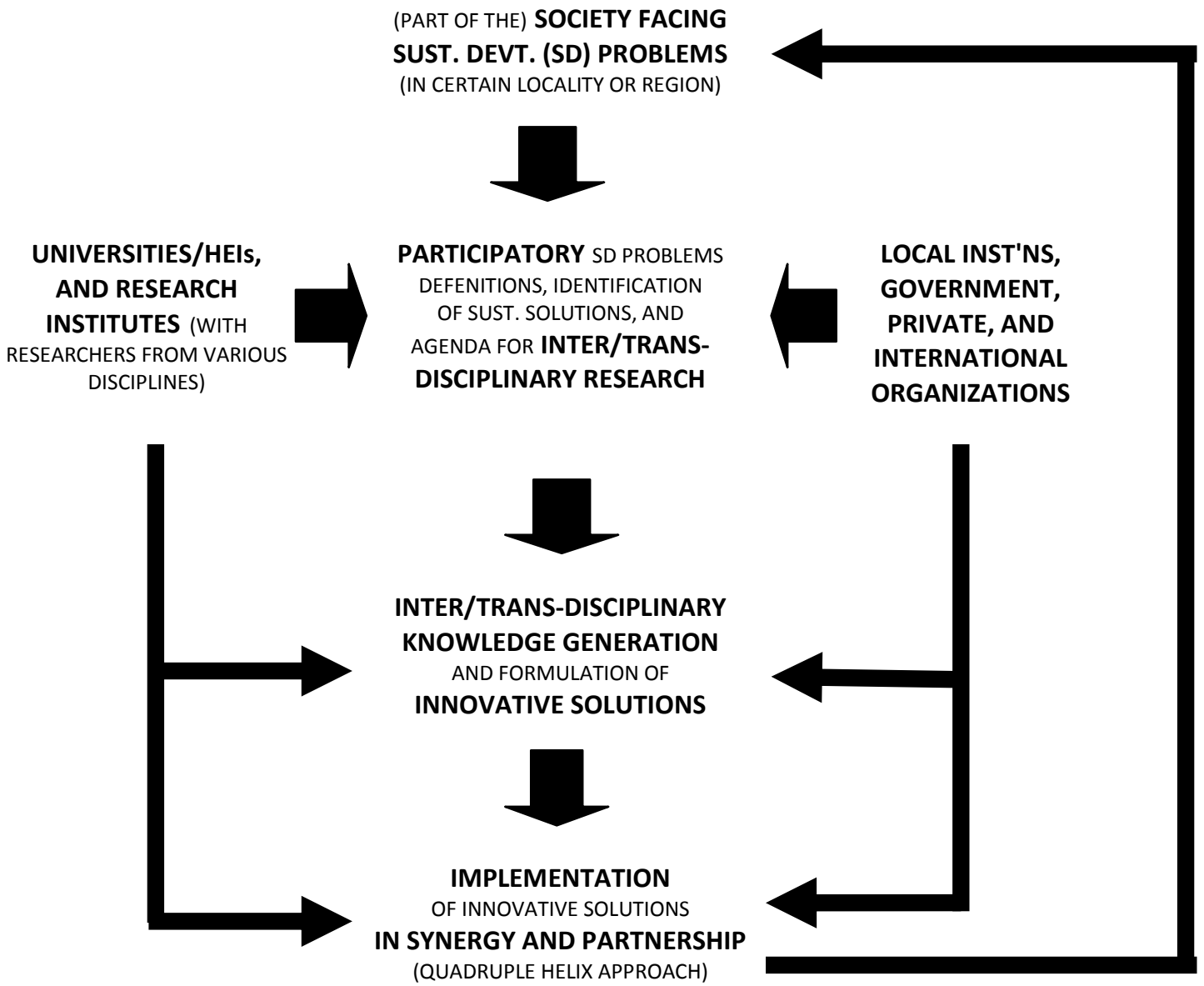


A framework for integrated livelihood improvement and rehabilitation of degraded forest & land



A framework for strengthening local institution as the driver (engine) for social inclusion.

Conclusion: Proposed Framework for *Research Approach and Practices in Innovating Solutions to Support SGGs*– 2



THANK YOU