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A multi-criteria analysis framework for future GGW projects

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The Great Green Wall (GGW) projects now meet the challenges of the three Rio conventions and more broadly the Sustainable Development Goals (SDGs). They must therefore be consistent with the logic of national and sub-regional policies for the Restoration-Conservation-Protection of Natural Capital (RCPCN), and Local Economic Development of the terroirs. The decompartmentalization of sectors, actors and disciplines is necessary so that the effects of the actions carried out can benefit both societies and ecosystems in a sustainable manner and do not generate undesirable or uncontrolled effects.

Crossing our disciplinary views and taking advantage of our experience in interdisciplinary scientific research co-constructed with a wide diversity of actors, we have synthesized the evaluation criteria for sustainable management projects in Sahelian territories in Figure 1. We propose it as a conceptual framework for the multi-criteria analysis of GGW projects.

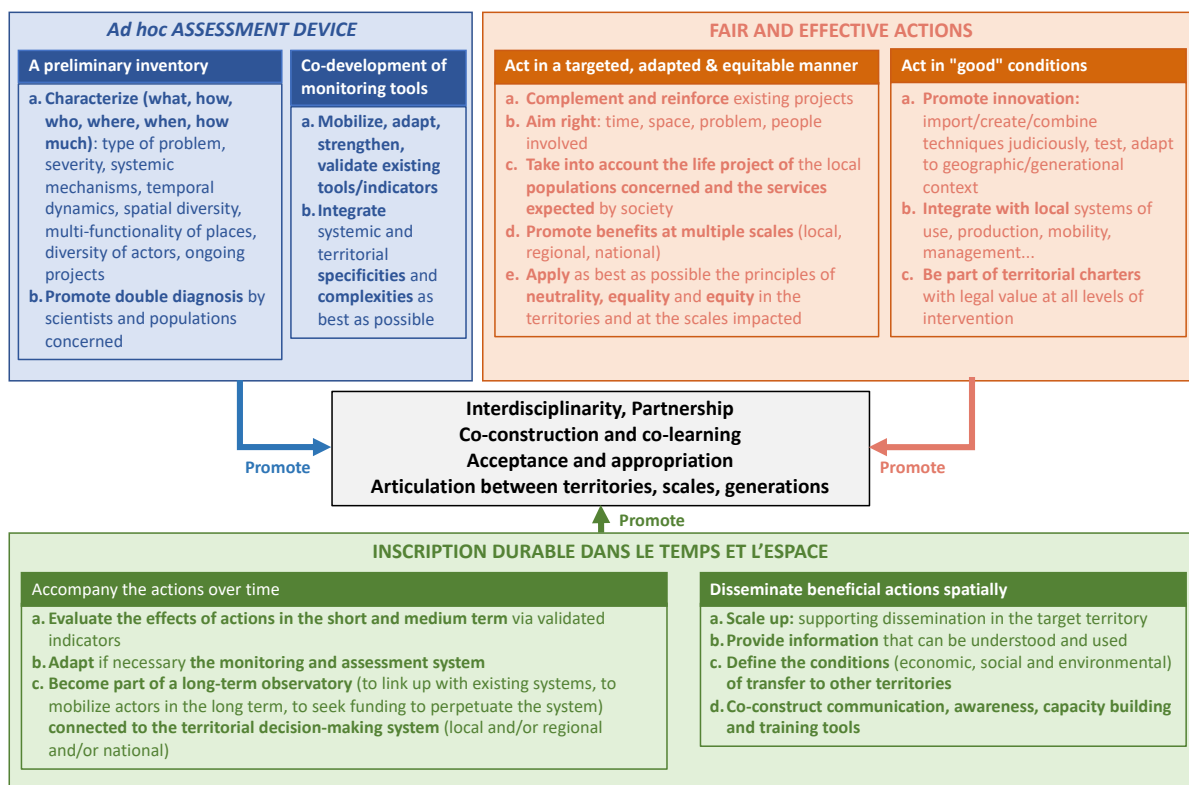


Figure 1: Conceptual framework for multi-criteria analysis of GGW projects

This conceptual framework for multi-criteria analysis of GGW projects is based on 3 requirements.

Scientific requirement → Reliability

A systemic frame of reference

Figure 2 is a systemic representation of the spheres of the agro-eco-socio-system that respond to societal and climatic pressures and are expressed in time and space on the territories (Fargette & al., 2019¹, Simon & al., 2014²). The objectives of the five pillars of the GGW are reformulated and positioned according to an organization *in fine* into seven major sectors of action.

This holistic and organized representation should allow a GGW project to specify which sector each of its actions addresses and which objective(s) it meets. It can also help situate, complete if necessary, and articulate the GGW projects so that individually and/or collectively they best meet the overall ambition. Finally, it can serve as a dashboard for the Pan-African Agency or national GGW agencies or as a catalyst for joint actions by project leaders.

¹. https://www.researchgate.net/publication/330422838_The_relationship_between_Man_and_his_environment_a_systemic_approach_of_the_viability_of_System_Earth_In_Coviability_of_Social_and_Ecological_Systems_Reconnecting_Mankind_to_the_Biosphere_in_an_Era_of

². (hal-03024750)

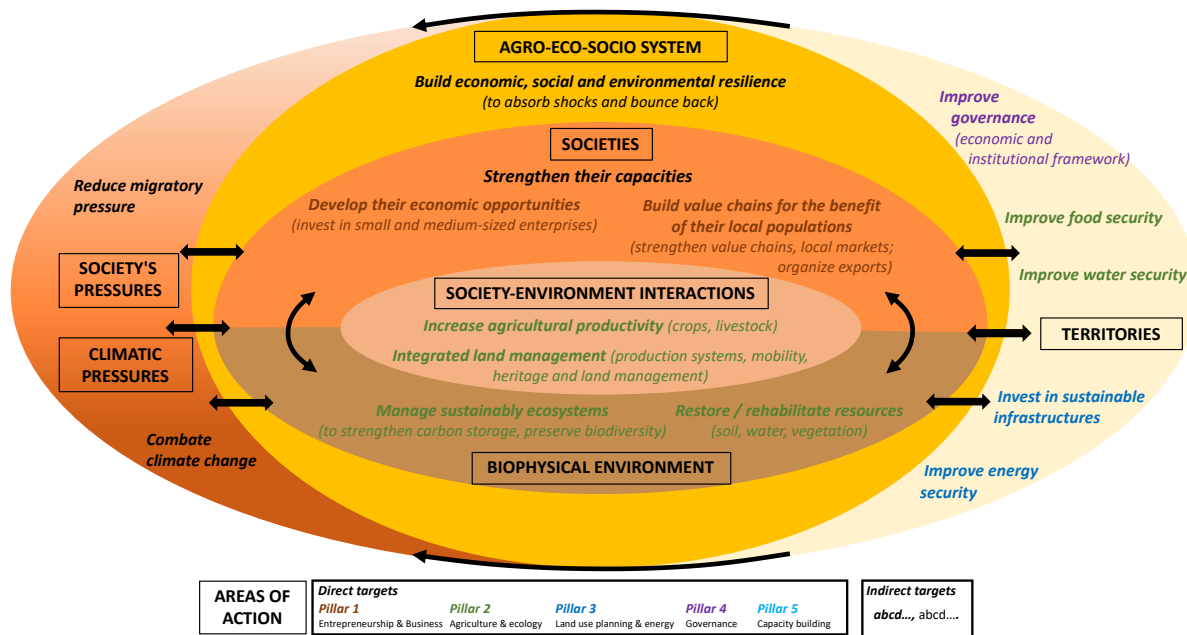


Figure 2: Holistic and organized representation of GGW actions and projects

Validated monitoring indicators

GGW projects must have a list of indicators to monitor the effects (direct and indirect) of each action it implements. This list should be proposed before the project is supported; it can be consolidated during the project; and it should remain relevant after the project is completed. The direct indicators make it possible to assess whether the project is achieving its objectives. Indirect indicators assess whether the project is not producing undesirable effects with respect to non-targeted GGW objectives. The list of indicators for any GGW project should thus cover all of the areas in Figure 2 and provide the means for the project to monitor the extent to which it is achieving its objectives:

- **mitigates/regulates societal pressures**, e.g. population growth, forced migration, political/security/security crises, changing consumption patterns, **and climatic pressures**, e.g. rising temperatures, intensity and irregularity of rainfall patterns, frequency of extreme events, ...;
- **increases the adaptability of societies**, e.g. mobility/solidarity/intra and inter-community equality, diversity/inter-connection/structuring of networks of actors, ...;
- **rehabilitates biophysical environments**, e.g. dynamics of nutrient flows and stocks, growth of stock/production/availability of renewable natural resources, improvement of their quality;...;
- **improves/optimizes society-environment interactions**, e.g. integrated land management (afforestation/timber protection, management of renewable natural resources, adaptation of technical itineraries, land management, valorization of local knowledge/trades, greening of cities, negotiated land rights, ...), sustainable agricultural intensification (productivity of agro-ecological practices, combination of practices, e.g. agroforestry, agricultural diversification, ...);
- **viability of the agro-eco-socio-system**, e.g. resilience of sociosystems (capacity for innovation/investment/control, ...), ecosystems (biological capacity of the land, water retention capacity of the soils, ...), agrosystems (capacity of the land to feed the population, ...); virtue of the agro-eco-socio-system (maintenance of functions, speed of replenishment of stocks, ...);
- **makes territories more operational**, e.g. improved governance (participation, control, regulation), security (food, water and energy).

Some monitoring indicators can be harmonized across the GGW intervention area to facilitate the reporting of GGW actions at the regional or national level. Others, on the other hand, must remain specific to the field and scale of action in order to contextualize and adjust the actions carried out as best as possible. These indicators, generic or specific, must remain operational.

Each monitoring indicator must be validated by an explicit co-construction (guaranteeing its systemic relevance and its appropriation by all actors), a calibration and tests carried out by action zone (guaranteeing its

reliability and sensitivity to the context). The landscape analysis method described by Loireau et Fargette (2022³) can be a tool for this co-construction and contextualization of monitoring indicators for local projects. Whatever method is used, it must mobilize the knowledge and know-how (on the state and functioning of the systems) of research actors, but also of development operators and users of the territories. The indicators must be reproducible and shareable. Each data collection and analysis protocol useful for producing an indicator must be defined clearly enough for operators to be able to "routinely" collect these data and then produce the monitoring indicators. The operator, whether from research, development or the general public, must have been trained. The operating methods (in terms of acquisition, processing, sharing, dissemination and storage) of the monitoring system must be discussed and defined with the actors involved (see partnership requirement); the creation of a dedicated multi-stakeholder committee can help in this.

The evolution of the measured indicators must constitute the dashboard that allows the project leader, as well as their donor, to i) evaluate the effects of the GMV projects and their actions in the short, medium and long term (see temporal requirement) and ii) readjust the projects if necessary.

Partnership requirement → Territorial anchorage

The GMV projects must produce effects that interest the territory's actors, *i.e.* the managers as well as the users whose life project and well-being depend on the territory, its management and its resources. They must therefore respond to a need expressed by these actors and be anchored in territorial life and decisions. This is why the operators of a GMV project must dialogue with all the actors in the territory. There are at least two ways to carry out this dialogue:

- 1) mobilize users or decision-makers as a source of information or even as an operator (*i.e.* involved in its governance or actions);
- 2) create conditions favorable to discussion during the project creation, execution and evaluation phases. The participatory approach⁴ (Pretty, 1995) is a guarantee of success for the territorial anchoring of a GGW project where each actor becomes a partner.

It favors two tools, co-construction and co-learning. The first involves the different actors, from the creation of the project to the communication of its results; the second crosses local knowledge (acquired through experience, transmission) and scientific knowledge (acquired through experimentation, analysis) for mutual enrichment (Watts et Scales, 2015)⁵.

A GMV project must be able to provide evidence of this process of territorial anchoring: *e.g.*, composition of members, time devoted to multi-stakeholder exchanges, type of co-construction/co-learning practices, type of information dissemination at which stage of the project, contribution of monitoring indicators to the reporting of countries to international conventions, integration of training modules in local authorities, schools and universities.

Spatial and temporal requirement → Continuity

A GGW project must be a long-term project, taking an interest in the before and after of the project. Indeed, it must establish a preliminary diagnosis to know the state and the regime of the system on which it focuses, take into account the historical and contemporary processes, the time in which it takes place (*i.e.* the generational context) and seek to benefit future generations. It must create the conditions for monitoring the short, medium and long term trajectory of the territories directly and indirectly impacted by its actions. In addition to these temporal requirements, there are spatial requirements. Each action of a GGW project must target the spatial scale best adapted to the resolution of the problem addressed. It must adapt its actions to the geographical context(s) in which it is deployed, prioritize the most fragile areas and ensure that other territories are not negatively impacted.

The conditions for disseminating the beneficial effects of the actions carried out to other territories must also be defined. These requirements are a guarantee of the temporal and spatial continuity of a GGW project. Any GGW project should be able to provide evidence of this commitment to time and place.

The systematic involvement of research or scientific expertise actors in the implementation and evaluation of a GGW project would increase the chances for a GGW project to meet these three requirements in the best and shortest possible time. These requirements can also be seen as a guide for project operators and funders.

³. <https://doi.org/10.46298/iimis.8762>.

⁴. [https://doi.org/10.1016/0305-750X\(95\)00046-F](https://doi.org/10.1016/0305-750X(95)00046-F)

⁵. <https://doi.org/10.1111/gec3.12212>