Stockholm Environment Institute

Policy coherence around energy transition and agricultural transformation in Rwanda

SEI policy brief. June 2018

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Photo (above): Fisherman on the Akagera river tends to his nets © OLIVER JOHNSON / SEI

Rwanda challenges and vision

Through its Vision 2020, Economic Development and Poverty Reduction Strategies, National Strategy for Transformation and Prosperity, and Green Growth and Climate Resilience Strategy, Rwanda has set out clear intentions to ensure sustainable development through two key avenues: sustainable land-use and natural resources management to enhance food security and preservation of biodiversity and ecosystem services and achieving energy security and low carbon energy supply, while avoiding deforestation. This policy brief highlights some of the hotspots where resource use competition between sectors might flare up as resources become increasingly scarce in the future.[1]

Policy interactions around natural resource management in Rwanda

Understanding conflicts and synergies between the different government policies in Rwanda is key for achieving sustainable development and Vision 2020. From our mapping of policy interactions in Rwanda, shown in Figure 1, several policy objectives seem to be both positively and negatively impacting each other. For example, it was clear that achieving energy transition goals might constrain certain agricultural transformation objectives – particularly if water for hydropower was prioritised over water for irrigation – but others might be reinforced through increased energy access. Similarly, achievement of agricultural transformation objectives could constrain hydropower generation if irrigation water is allocated to upstream fields, but higher agricultural production might lead to more agricultural residues that could be used for biogas or pellet production.
To better understand the potential impacts of these positive and negative interactions, we quantitatively modelled the impacts in different future situations (or scenarios).

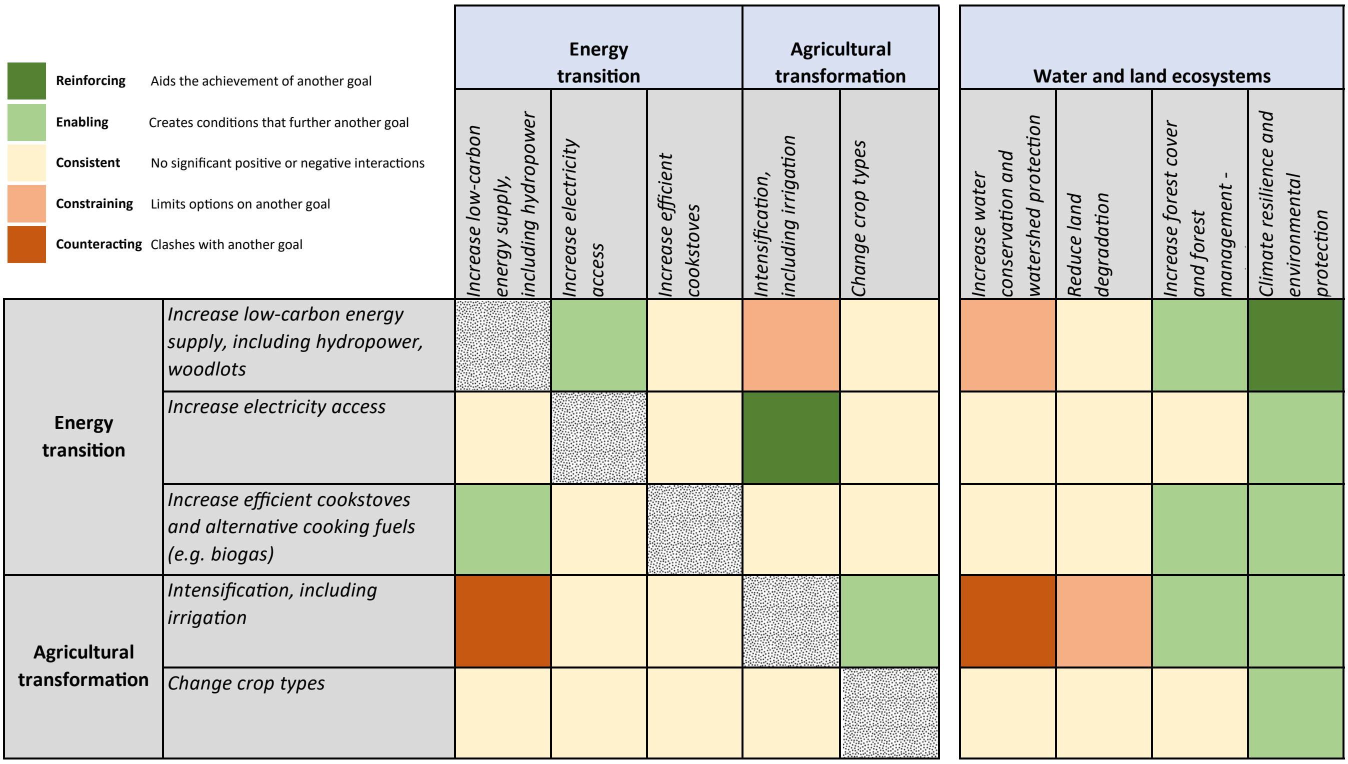
Scenario modelling

Our quantitative assessment sought to dig deeper into some of these potential synergies and conflicts around natural resource use by modelling development pathways related to the water, food and energy sectors up to 2050. These pathways corresponded to business-as-usual practices (Reference scenario), weak implementation of national plans (Pessimistic scenario) and full implementation of national plans whilst ensuring sustainable use of natural resources (Optimistic scenario). All scenarios included two climate change sub-scenarios related to a dryer or wetter climate.[2]

Our modelling – undertaken in tandem with a team of technical experts in Rwanda – showed that in all future development scenarios, pressure on land, biomass resources and water ecosystems

1 For more in-depth discussion around the insights presented here, please see the project report at:
2 The data and assumptions used in this scenario modelling can be found at: https://www.sei.org/publications/rwanda-nexus-scenarios-tech-note/

Figure 1. Policy coherence



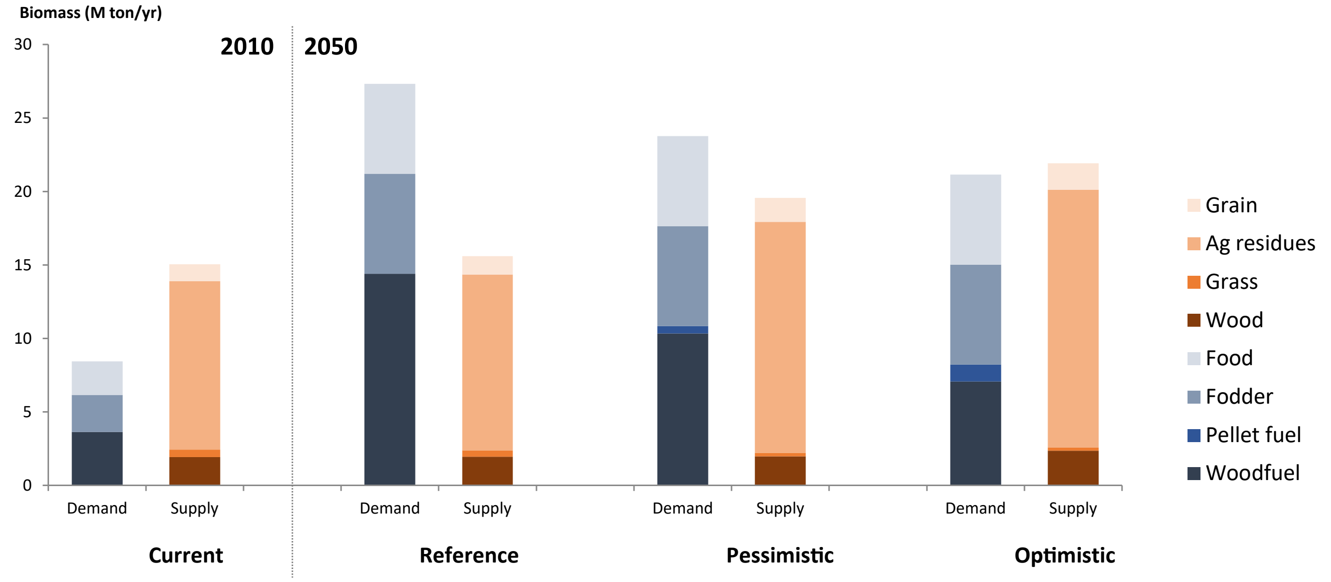
continues to remain severe, driven by high population growth and a changing climate. Even in the Optimistic scenario, where a concerted effort is made to replace biomass as a main source of cooking fuel, the demand for fuel wood is still twice as high as supply (Figure 2). As a result, the prospect of unsustainable forest biomass use continues to pose a high risk for deforestation and forest degradation, which is contrary to the policy coherence analysis initial findings. In addition, a segment of future energy production is expected to be generated from peat, and approximately 100 000 ha of wetlands are planned for conversion to agricultural lands, posing a major threat to wetland ecosystems (see Figure 3).

Rwanda has set out clear intentions to ensure sustainable development

Finally, much more coordinated planning on infrastructure development between the energy and agriculture sectors is essential to ensure water and land resources are managed effectively in the future and to ensure new infrastructure investments are not wasted. Our findings show that if 40% of farms are modernized and equipped with irrigation facilities, the demand for water only for irrigation will exceed its total availability in rivers and lakes by a factor of three. Thus, an agriculture transformation will have to include strategies that account for very limited water availability. Similarly, basing energy transitioning largely on increased hydropower generation may not be a feasible option; however, other clean energy sources, such as pellet generation from agricultural residues, may play an important role in the process.

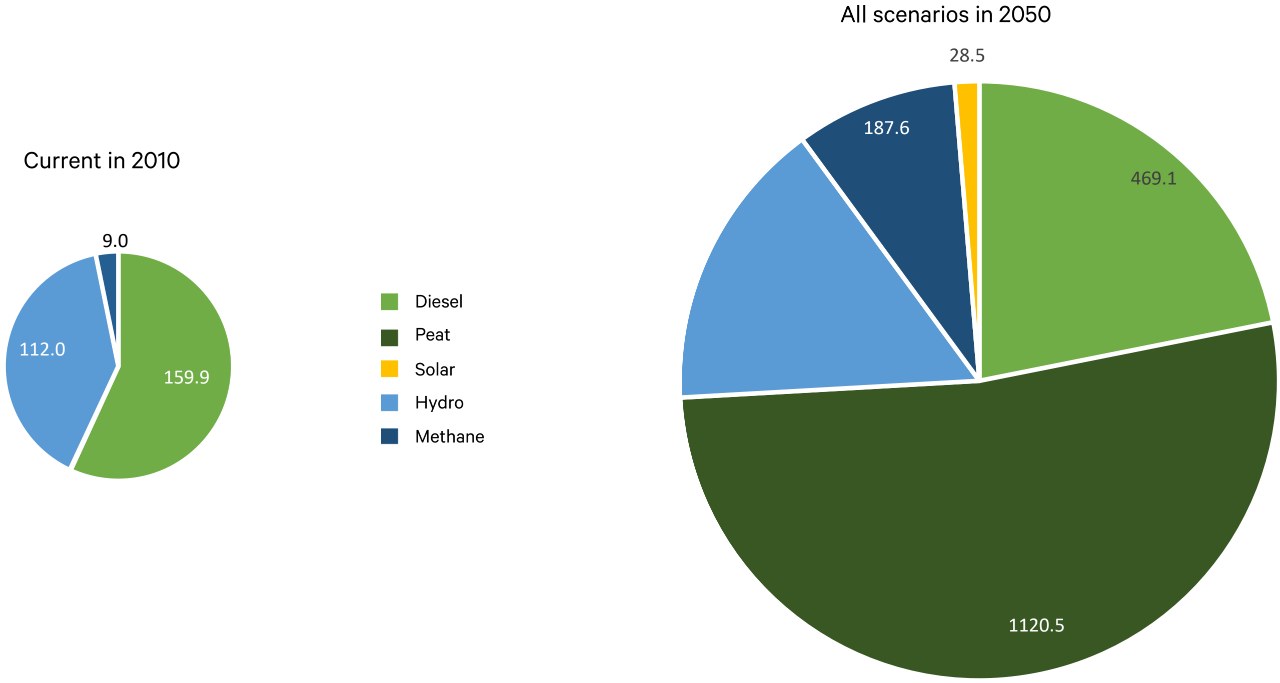
This ongoing competition for limited resources calls for more strategic resource allocation planning at the central level to: develop policies and policy mechanisms that lead to meeting national targets and avoid negative externalities; establish platforms for multi-stakeholder involvement and dialogue; and implement technologies that enable sustainable and efficient resource use.

Figure 2. Different scenarios in biomass supply-demand in 2010 and 2050



Note: Biomass energy demand includes demand from all sectors, not just households

Figure 3. Electricity mix in 2010 and 2050 (in GWh)



Note: Electricity generation in 2050 in all scenarios is the same for all fuels except hydro.

Farming Rwanda's hilly landscape © PHILBERT NSENGIYUMVA / ARCOS

Conclusions/recommendations

Rwanda's ambition to pursue a climate resilient green growth development pathway are laudable. Already, significant work is underway to make this pathway a reality. However, the disconnect between sectors at the national and district levels poses a considerable long-term threat to sustainable resource use and ecosystems preservation. Without more strategic planning, multi-stakeholder dialogue, up-scaled support for disseminating existing solutions, and continued landscape monitoring and evaluation, the country may squander its natural resources, which are vital to the prosperity of future generations.

This report presents results from a project on how the water-energy-food security nexus approach can help promote climate-resilient decisions and model actions in the three selected landscapes along Akagera Basin, undertaken by the Albertine Rift Conservation Society (ARCOS) and the Stockholm Environment Institute (SEI) and funded by Rwanda's Green Fund (FONERWA) and the Swedish International Development Cooperation Agency (Sida). For more in-depth discussion around the insights presented here, please see the project report at www.sei.org.

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