SUSTAINABLE AGRICULTURAL INTENSIFICATION?

2018

Time to rethink sustainable intensification of agriculture - evidence reveals mostly unsustainable outcomes for people and nature

The research

Sustainable agricultural intensification appears in the United Nations Sustainable Development Goals (SDGs) as a key strategy for ending hunger (SDG2) and achieving sustainable use of terrestrial ecosystems (SDG15). Yet, it is not clear whether such twin benefits - for both human wellbeing and ecosystems - are actually achieved, especially in low and middle-income countries. The bulk of research on agricultural intensification has a relatively narrow focus on specific subcomponents of either human wellbeing (e.g. income) or ecosystem services (e.g. biodiversity). Only recently has there been a growth in literature exploring outcomes for both well-being and ecosystems. We have synthesised this literature in order to learn from the emerging findings and develop a research and policy agenda to help define and support sustainable intensification.



Key messages

- Sustainable intensification of agriculture is seen by many as a flagship strategy for helping to achieve global food security whilst avoiding further environmental impacts. However, the expected 'winwin' outcomes, benefitting both human wellbeing and ecosystems, are poorly documented. We therefore analysed how agricultural intensification affects both ecosystem services and human wellbeing in low and middle-income countries.
- 2. Current forms of agricultural intensification typically increase food production, but seldom improve other facets of wellbeing and tend to have negative impacts on important ecosystem services regulating water, soil or climate cycles.
- 3. Intensification efforts tend to favour better-off farmers at the expense of poorer ones, especially when it involves a change in crops and a transition to monoculture farming.
- 4. Hence, there is an urgent need for research that examines the complex tradeoffs associated with increasing agricultural production and that provides recommendations for how agricultural intensification strategies can become genuinely sustainable.



Figure 1. The agricultural intensification process and its possible outcomes. From Martin et al. (2018).

Our research

Our research has looked at the combined outcomes for people and nature of agricultural intensification (Figure 1). We have done this by reviewing previous studies published in the peer reviewed scientific literature that analyse how agricultural intensification affects both wellbeing and ecosystem services in low and middle-income countries. We also discussed the research results with eighteen expert practitioners working on agricultural intensification or conservation practices. We used these interviews as a validation of our findings by asking the experts to compare our results with their own experiences with outcomes of agricultural intensification.

The findings

Overall, our results show that:

- A gricultural intensification seldom leads to sustainable development: negative ecosystem service and wellbeing outcomes are reported at least as frequently as positive ones.
- Negative outcomes for both ecosystem services and wellbeing are particularly found in cases where agricultural intensification involves a change to monocultures, especially associated with coffee, shrimp, maize, and other cash crops, or where it involves reduced length of fallow periods.
- Vulnerable population groups are most often on the losing end as they often lack the necessary resources to fully benefit from intensification and they are often more vulnerable to the effects of ensuing environmental degradation.
- These key findings were largely corroborated by expert experience, with similar distribution of cases on a win-win, losewin, lose-lose axis (Figure 2).

Our findings also show that while agricultural intensification interventions may achieve win-

win outcomes, particularly through interventions with increased inputs such as fertilizer and pesticides, this tends to occur mainly when a narrow range of impacts are studied, typically food production and income-generation. In many win-lose or lose-lose cases, a wider range of impacts are considered. Further, only a few of the reviewed cases provide evidence that they are contributing holistically to meeting SDG2 and SDG15. By beginning to identify the conditions associated with negative and positive outcomes, we can point to research and policy agendas that can support more sustainable agricultural intensification. Importantly, in cases where intensification leads to ecosystem service benefits beyond short-term food production or to wellbeing benefits beyond income, a combination of landscape scale intensification with reforestation and diversification of agronomic practices is typically achieved.

Recommendations

It is clear from this synthesis that the global sustainability agenda urgently requires broader research and policy approaches that address the diverse outcomes of agricultural intensification for people and nature in a more coherent and systematic manner. Failing to do so would run the risk of intensifying land use without meeting the full range of sustainability objectives. Scientifically, we need to better understand:

- Which types of intensification efforts and forms of innovation in design and implementation can best reconcile complex social and ecological trade-offs, hence realising more positive outcomes for both people and nature;
- How trade-offs between the wellbeing of various societal groups and ecosystems can be identified;
- How some of the commonly-experienced unsustainable outcomes can be avoided, particularly for the poorest social groups who often suffer the most from loss of environmental services.

At local, national and global level, policy-makers and funding agencies should:

 Be aware that agricultural intensification efforts are not always beneficial. What leads to the fulfilment of one sustainable development goal may lead to negative impacts on another;



RESULTS FROM LITERATURE REVIEW

RESULTS FROM EXPERT INTERVIEWS

Figure 2. shows how the cases of agricultural intensification produce win-win, win-lose, or lose-lose outcomes for wellbeing and ecosystem services. The dots indicate how each case was interpreted. Left figures are modified from Rasmussen et al. (2018) and the four panels in the middle show the trade-offs between different types of ecosystem services and wellbeing

- Base policy and funding decisions on agricultural intensification strategies that have demonstrated (not just hypothesized) social and ecological win-win outcomes;
- 3. Increase monitoring of agricultural intensification interventions to fully understand

whether well-intended programmes also have the desired outcomes. Such data needs to be made publicly available for general learning on the outcomes of agricultural interventions.

References

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More information

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