

Excluding the Marginalized? Exploring the Livelihood and Inequality Implications of Herbicide Diffusion in Eastern India

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INTRODUCTION

- Perception of increase in farm wages and labor unavailability have prompted push for labor saving agricultural technologies, e.g., machinery, and herbicides.
- Growing evidence that these displace women labor, and marginalized group(s) labor.
- **In India:** Mechanization displaced women weeding labor (Afridi et al 2022).
- **In Malawi:** Herbicides displaced *ganyu* labor (Bouwman et al 2021).

Objectives:

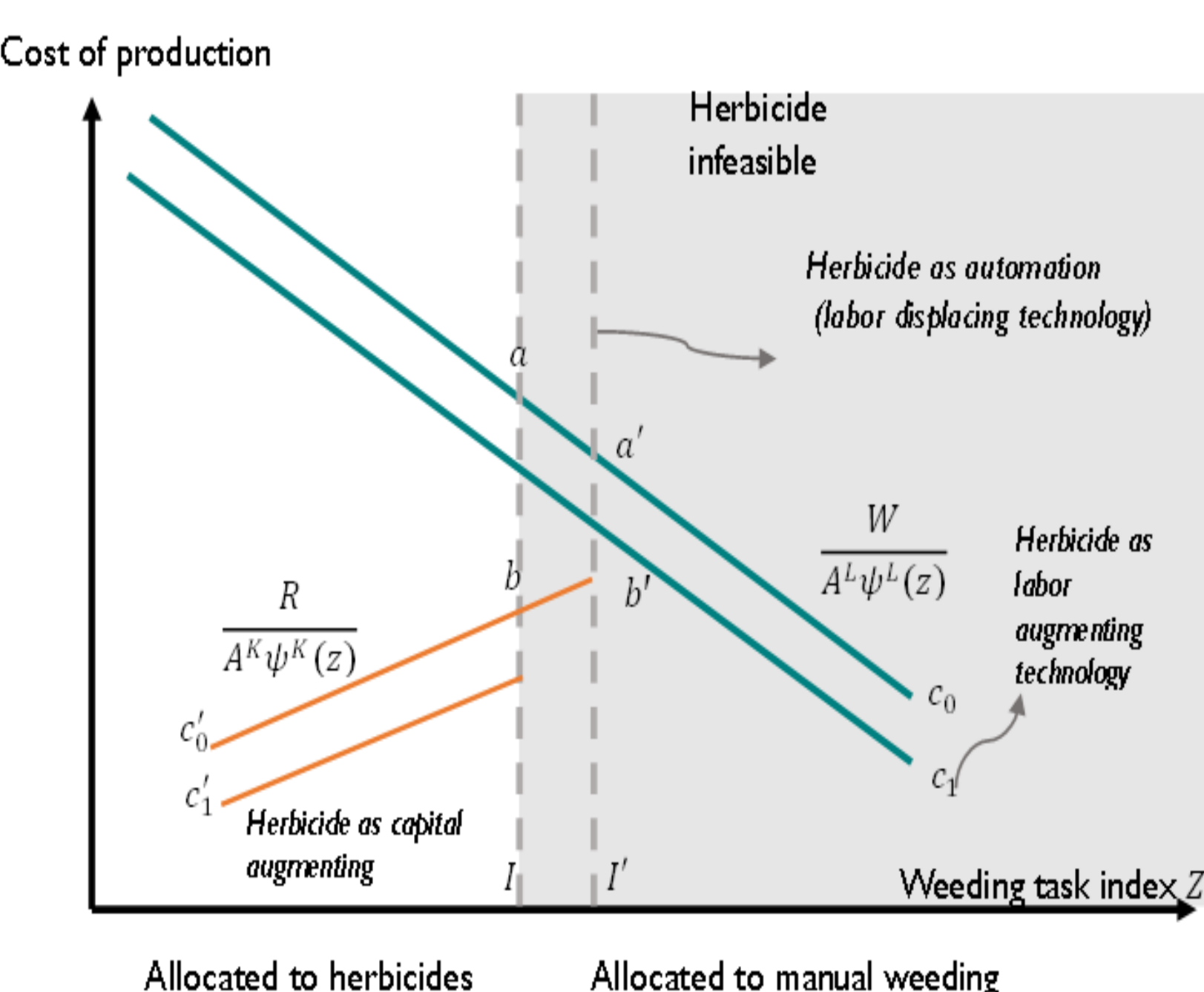
- (a) Explore if the rapid growth in herbicide use in Bihar has affected historically marginalized groups and women labor demand in weed management and other on-farm tasks.
- (b) Propose **task-based approach to inequality as appropriate framework for gender and social inclusion research** on unintended impacts of agricultural technologies.

METHODS

1. N = 2725 farm households surveyed in Bihar in 2021/22. About 400 are labourers.
2. Collected information on when they started using herbicides, labor hours by gender, historically marginalized or non-marginalized groups
3. Used task-based production function theory to match stylized facts to key moments in data.

A TASK BASED APPROACH TO INEQUALITY

(Acemoglu and Restrepo 2022)

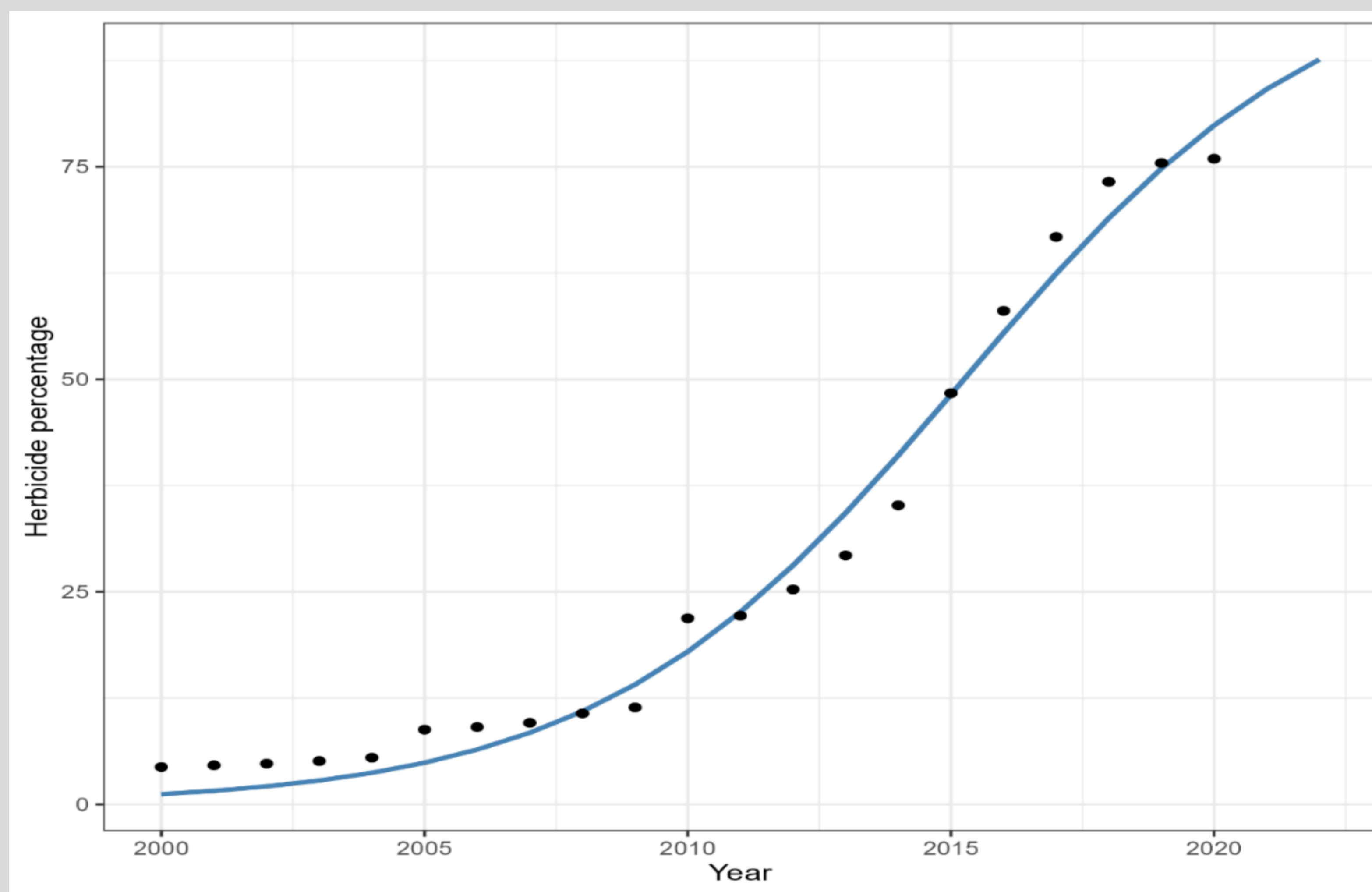


Herbicide diffusion rate has almost doubled in the past decade in Bihar which may displace marginalized groups and women's labor, affecting their livelihoods negatively.

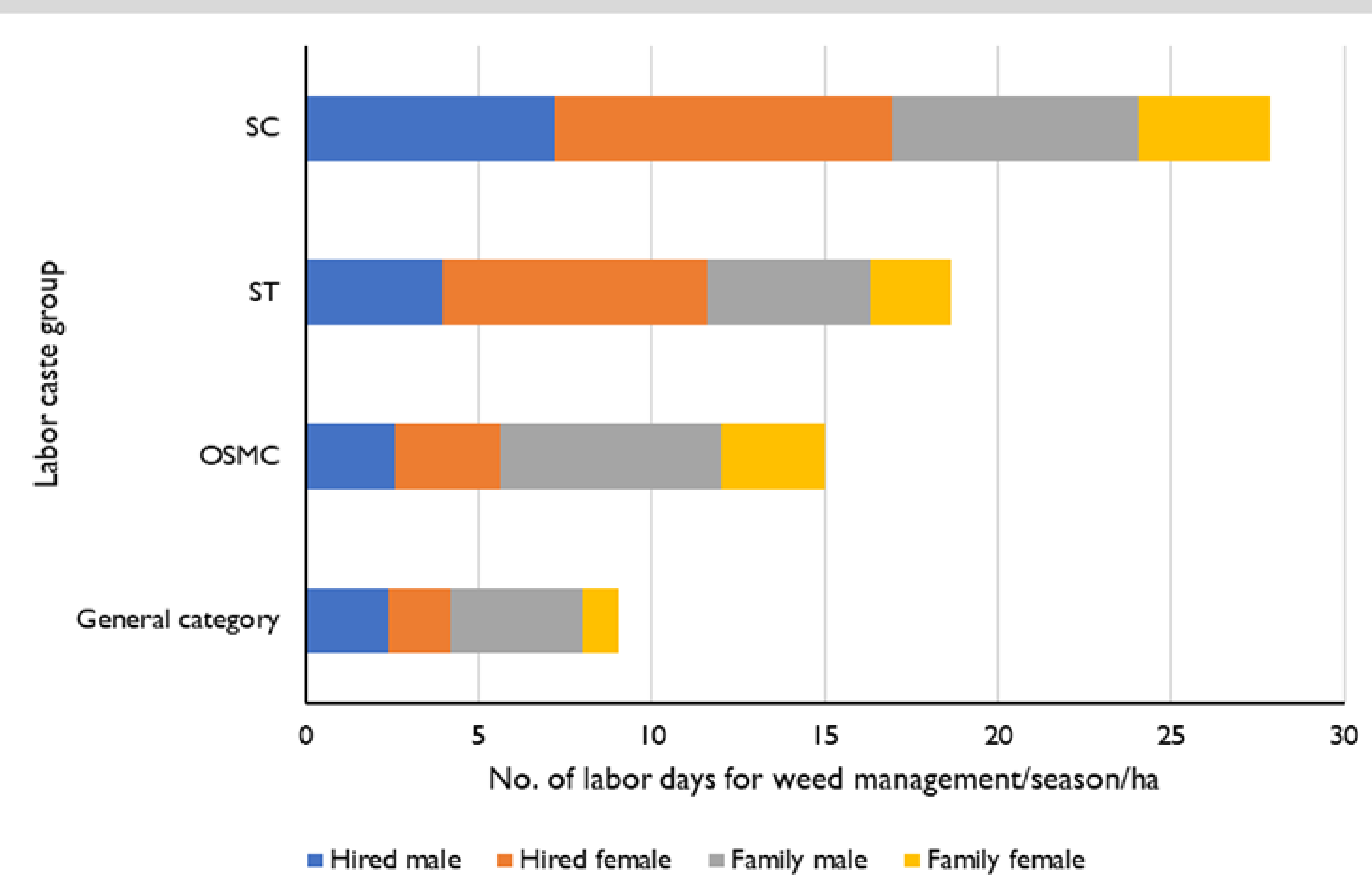
Retooling laborers with skills to support farmers on new technologies can be more transformative than training farmers.

Empirical stylized facts

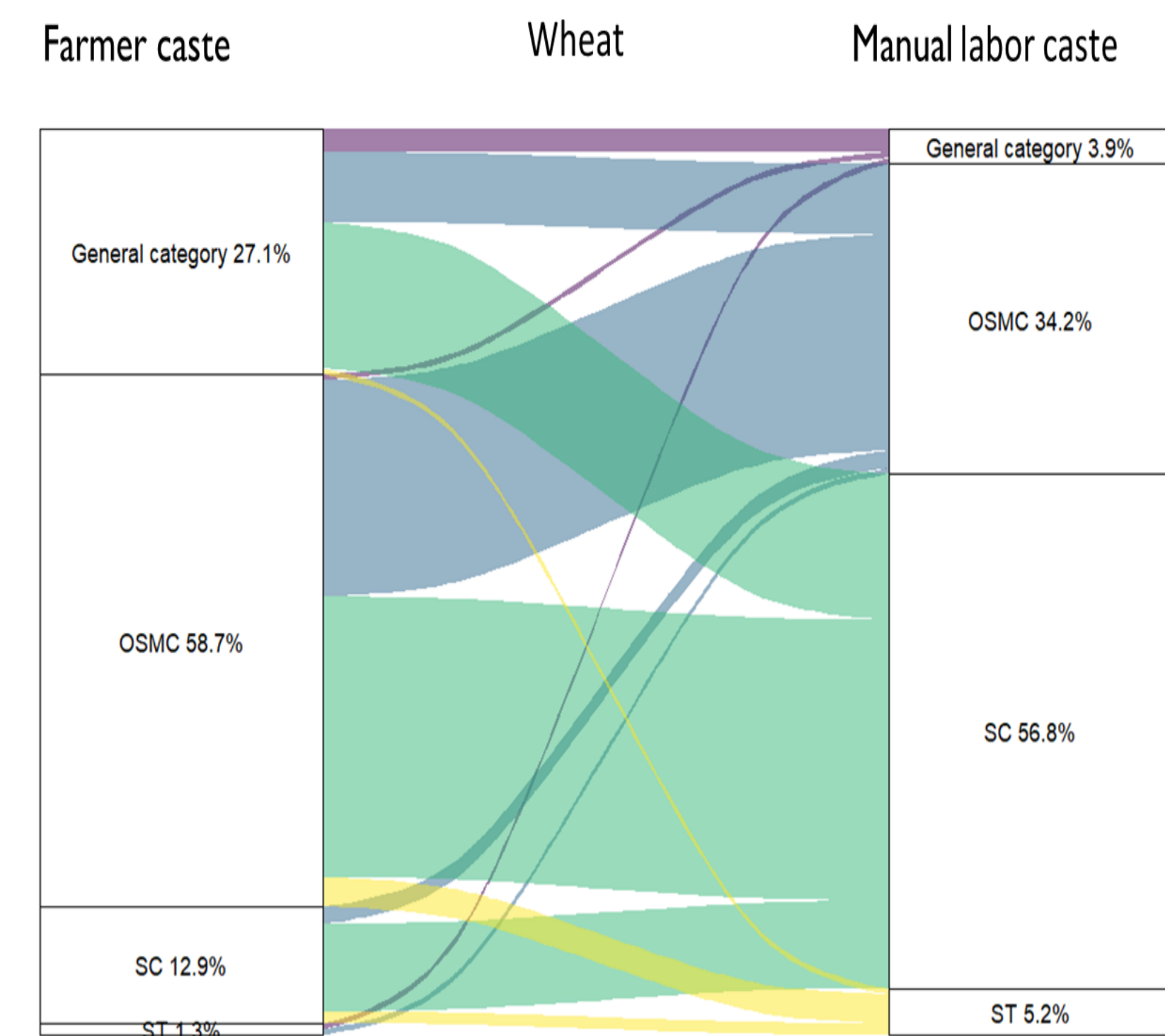
Fact 1: Herbicide use has rapidly increased in Bihar



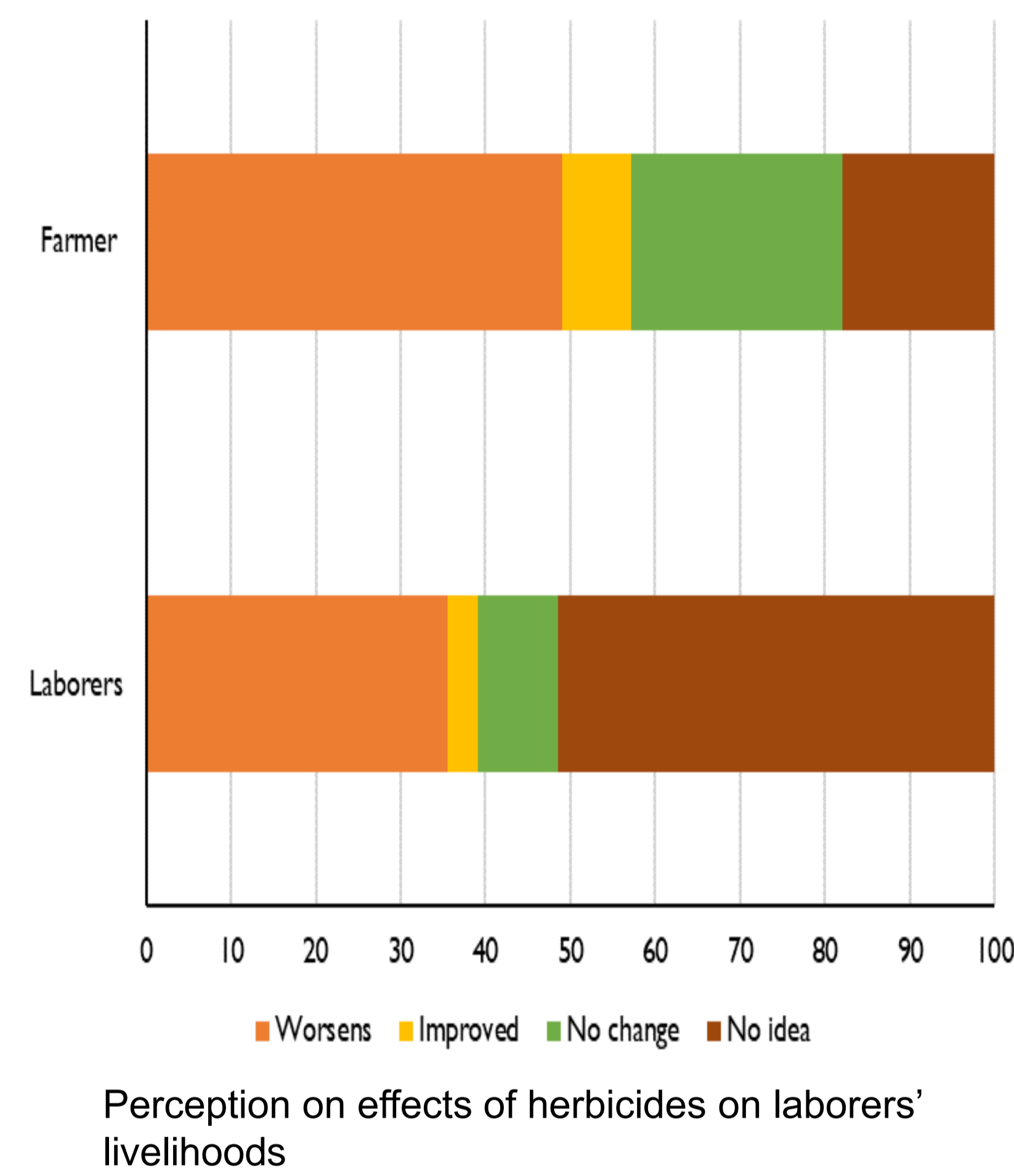
Fact 2: Manual weeding mostly done by marginalized group women while herbicides applied by men



Fact 3: Farmers mostly hire those from same group or more marginalized groups



Fact 4: Herbicide use may lead to labor displacement and loss of livelihood.



DISCUSSION

- Evidence of marginalized women labor displacement.
- Lack evidence on labor reinstatement.
- Agricultural technologies like herbicides can unintentionally impose a "social group" premium or cost.

ACKNOWLEDGMENTS

Funding: BMGF through CSISA and MAIZE CRP.

REFERENCES

Acemoglu, D., and Restrepo, P. 2022. "A task-based approach to inequality". IFS Deaton Review of Inequalities.

Afridi, F., Bishnu, M., and Mahajan, K. 2022. "Gender and Mechanization: Evidence from Indian Agriculture." *American Journal of Agricultural Economics*. Doi: <https://doi.org/10.1111/ajae.12315>.

Bouwman, T.I., Andersson, J.A., and Giller, K.E. 2021. "Herbicide induced hunger? Conservation agriculture, Ganyu labour and rural poverty in Central Malawi." *The Journal of Development Studies* 57(2): 244-263. Doi: <https://doi.org/10.1080/00220388.2020.1786062>.

