

# Productivity & Profitability Evaluation

## of Agronomic Interventions in Smallholder Wheat Production in Arsi, Ethiopia

Pierre Ellssel<sup>1</sup>  
Gerold Rahmann<sup>2</sup>  
Bernhard Freyer<sup>1</sup>

<sup>1</sup> University of Natural Resources and Life Sciences (BOKU), Dept. of Sustainable Agricultural Systems, Austria  
<sup>2</sup> Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Germany

Contact: pierre.ellssel@students.boku.ac.at

### background

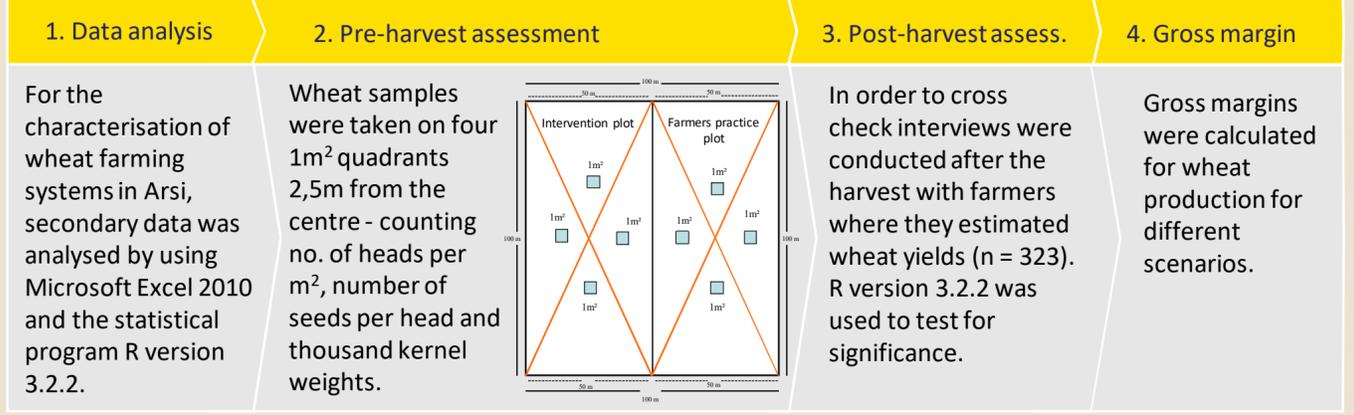
In Ethiopia average agricultural productivity can be considered low. Poverty and food insecurity are especially severe among the rural population. The production methods are basic, labour intensive and with low capital and external inputs. To improve efficiency in terms of productivity and profitability different agronomic interventions are tested on 593 randomly sampled smallholder farms (SHF) with wheat production. The types of interventions comprise tractor ploughing, harrowing (tractor mounted), row seeding (tractor mounted), improved seeds/varieties, recommended dosage and timing of fertiliser, herbicide and fungicide application.

### research goal

The research goal was to enhance the understanding of wheat farming systems in Arsi-zone and to evaluate applied agronomic interventions regarding its impact on productivity and profitability in wheat production.

### methodology

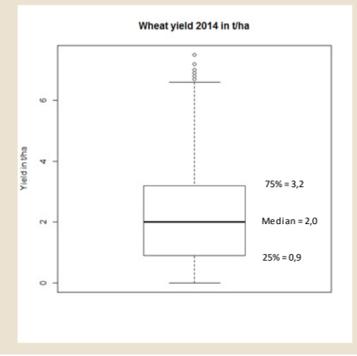
The research approach is mono-factorial. On each sampled wheat producing farm one farm section is "treated" with one intervention whereas the other part is still managed as before (control = oxen plough, broadcasting, inappropriate dosage/timing) in order to allow comparison ("with" and "without"). The harvest data was collected on 300 SHF in a pre- and from 323 SHF in a post-harvest assessment.



### findings

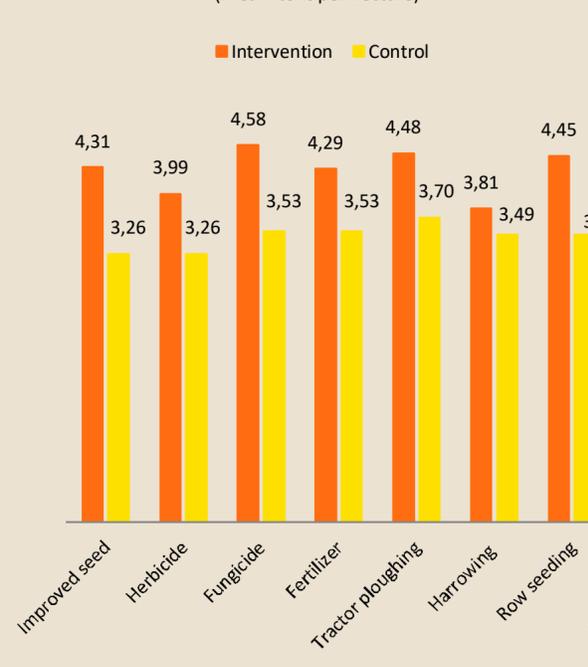
#### Key facts - Farming Systems Analysis - Arsi (2014)

- Land size: 1,7 ha
- Wheat yield: 2,27 t/ha
- Household size: 6,3
- Farmers age: 46
- Main cash crop: wheat
- Wheat price: 362 US\$/t



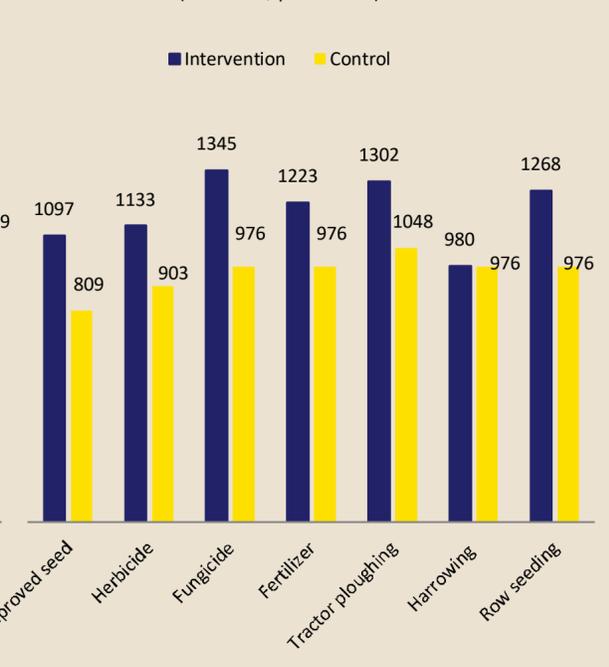
#### Productivity Comparison (2016)

(Mean: tons per hectare)



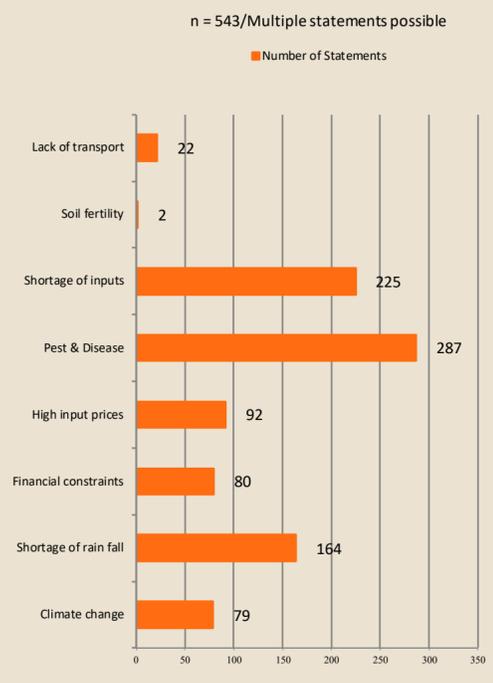
#### Gross Margin in US\$ (2016)

(Mean: US\$ per hectare)



#### Farmers' Challenges

n = 543/Multiple statements possible



### conclusions

Most applied agronomic interventions show significant increases in productivity and profitability – thus may contribute to poverty and food insecurity reduction. However, other factors such as volatile precipitation might have unexpected adverse impacts on the production. Furthermore, financial and insurance services might be crucial for successful implementation along with education in application of inputs as well as appropriate quality, timely and quantitative availability. Increasing monoculture of wheat due to various reasons leads to surging pest and disease pressure, thus increasing the need for pesticides. An appropriate crop rotation management might reduce the use of agro-chemicals while increasing productivity. More versatile crop rotations, integrated pest management and/or agro-ecological methods – among other measures - might be crucial for sustainable perspectives with regards to climate change as well as productivity.

Acknowledgements: Many thanks to the participating farmers and to GIZ GmbH for the overall support. Data and rights belong to GIZ.