

Reaping the benefits: Assessing impacts and facilitating diffusion of improved common bean technologies in Ethiopia

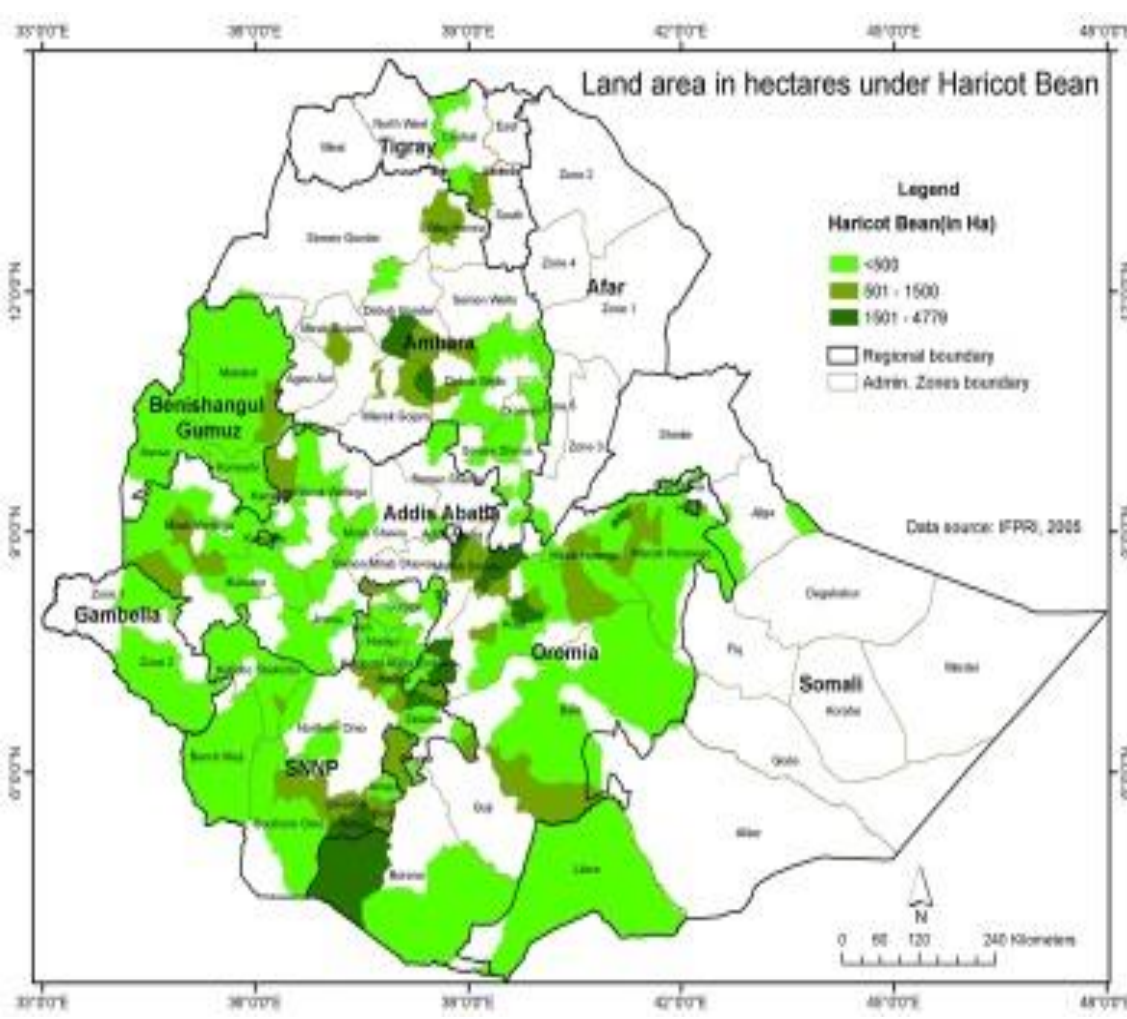
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Introduction

Common bean is an important cash and food crop for small holders in Ethiopia. It is widely grown in the central, southern, and north western parts of Ethiopia (Fig.1) by nearly four million households. In a time when national average productivity was less than 1ton per hectare, EIAR and CIAT obtained financial support from Bill and Melinda gates foundation under the Tropical Legumes project (led by ICRISAT), which has been used to develop and promote a number of improved varieties and related management practices.



- The goal is to increase bean productivity, which will lead to higher welfare for the people in bean value chains.
- The purpose of this study was to assess project progress in terms of achieving its goal and developmental outcomes

Methodology

- The study was conducted in four regional states of Ethiopia which consist over 98% of the total common bean production area (CSA, 2015), and are used as sampling strata (Fig. 2)
- Structured household and community questionnaires were used to elicit information from a nationally representative sample of 1122 households and 102 kebeles that were selected based on stratified probability proportional to size (where production area was used as size) method in the four strata (Table 1)

Table 1. Sampling distribution by strata and sampling units

Region (Geog. area)	District	Kebele	Farm HH
Oromia	22	56	616
SNNP	8	24	264
Amhara	8	19	209
BNSG	1	3	33
4 strata	39	102	1122

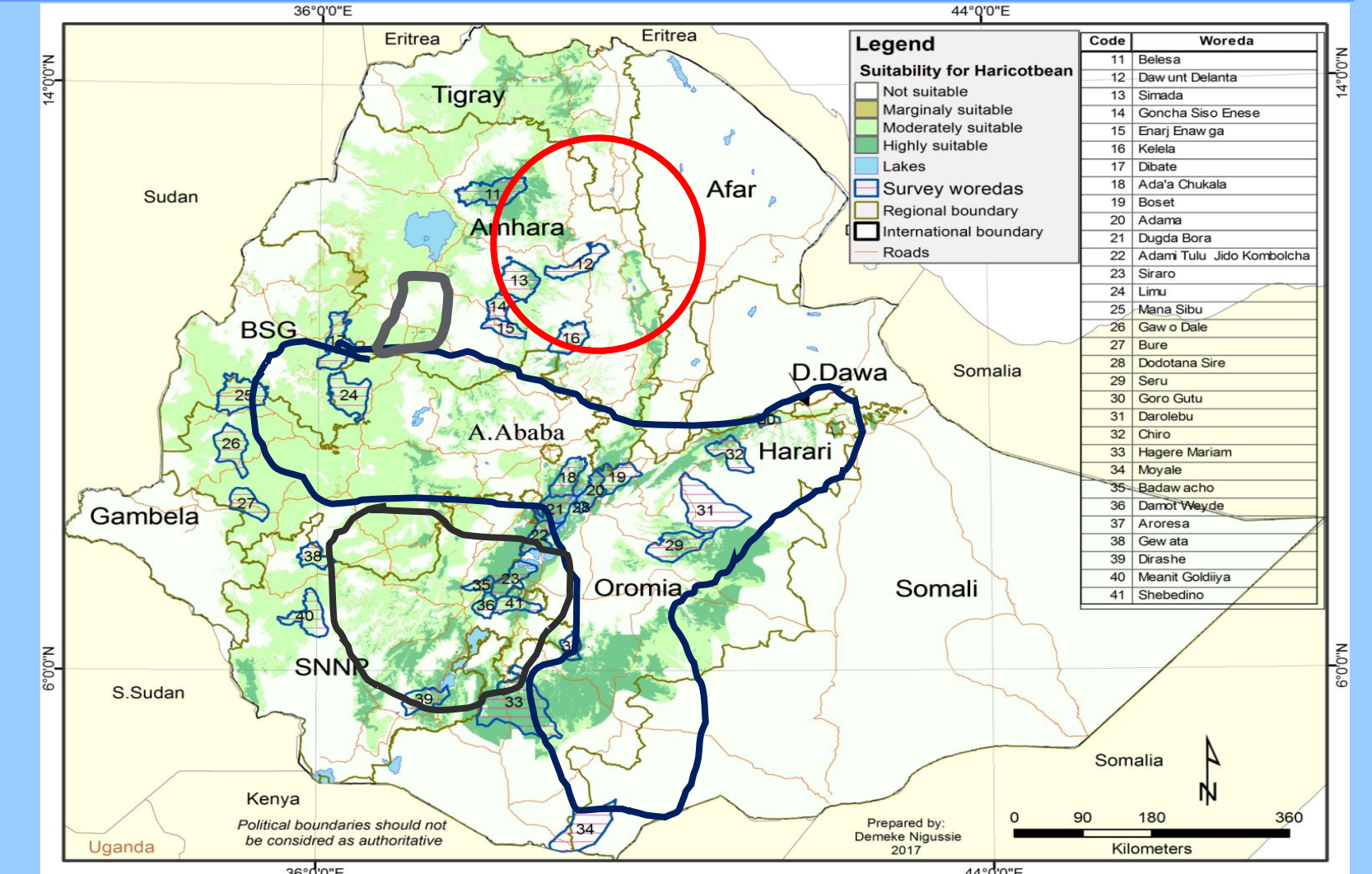
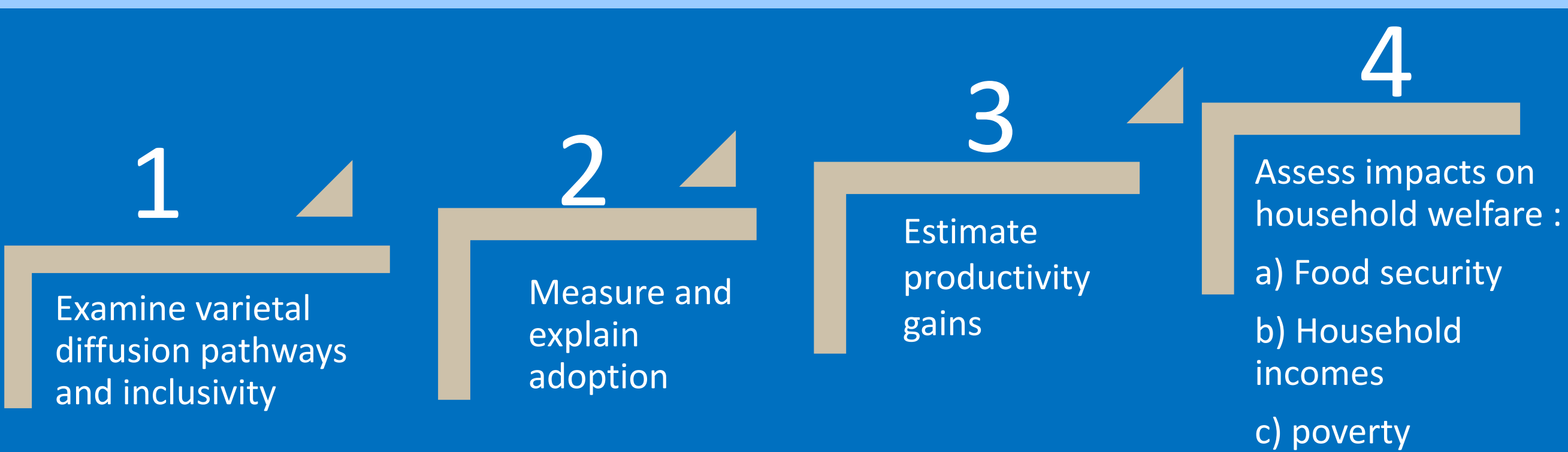


Fig.2 Spatial distribution of sample districts

- The impacts of new variety adoption on development outcomes are analyzed within the treatment effects framework using a combination of econometric approaches: Propensity score matching (PSM) and instrumental variable methods.
- In order to investigate patterns of access to improved common bean seeds across farmers of different socioeconomic status, the sampled households are categorized into quartiles using poverty scorecard (Schreiner and Cheu, 2009) (with cut off points at 25%, 50%, and 75%), the first quartile being most poor and the fourth quartile the most well-off.

Study objectives



Results

Farmers access to seed by geographic location (Fig. 3) and socioeconomic status (Fig. 4) is through diverse sources. Other farmers trained as seed producers are important as source of seed in SNNP and Amhara regions, and for the poorer farmers.

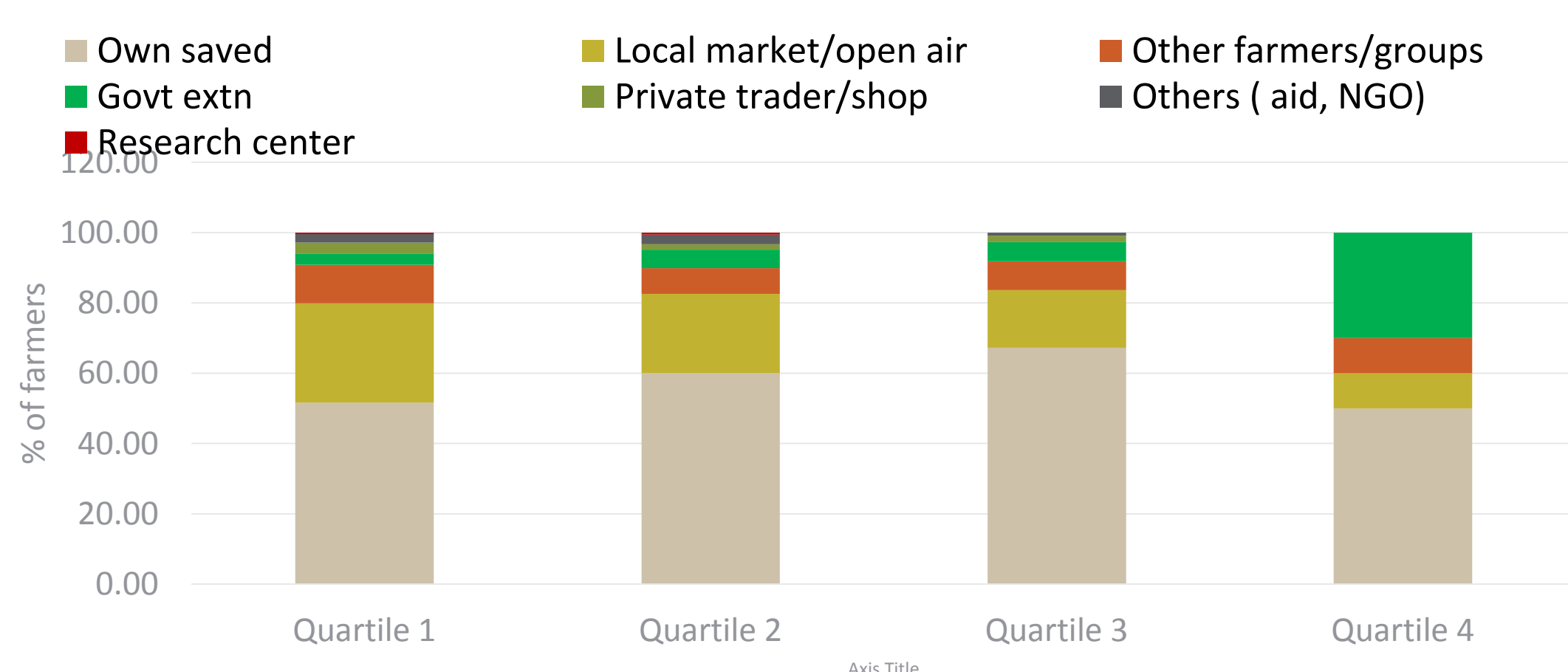


Fig.4 Sources of seed (by socioeconomic status: quartiles of poverty scorecard) of sample farmers(%)

Results

Government extension as a source of seed is evenly spread across regions than it is across socioeconomic groups.

- It is more available to well-off farmers while poorer farmers get their seed from local market (Fig.4).
- This means that poorer farmers have to wait for early adopters to supply improved varieties to local market.

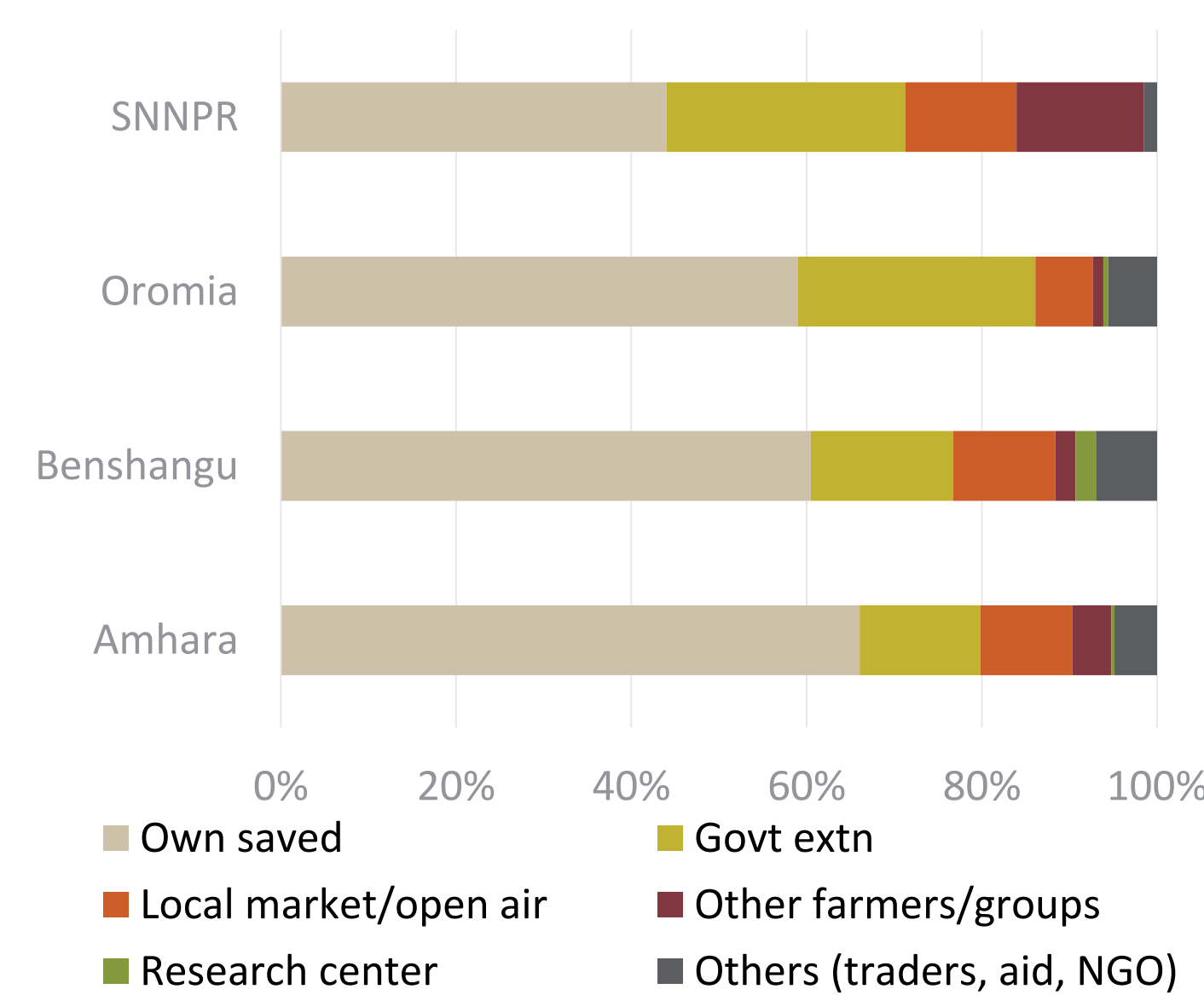


Fig. 3 Sources of seed (by geographic location of sample farmers (%))

Results

The impact of adopting improved varieties of common beans is estimated for full sample including non-intervention areas and sub-sample consisting of intervention areas (Table 2). The estimate for the full sample suggest yield gain of about 336 kg/ha (based on radius matching. The corresponding yield gain for adopters in the intervention area was 564-628kg/ha- nearly double the gain in the full sample (Table 2). The results generally suggest that the investment on common bean research and development has achieved its goal of increasing productivity which can translate into household welfare..

Conclusions and next steps

- Farmers are reaping the benefits of improved varieties . This corroborates the national statistics of yield gain from 1 ton to 1.7 tons/ha between 2008 and 2016 (project period).
- Most farmers rely mainly on informal sources of seed. Formal ones are accessible mainly to well-off farmers. These two seed channels can be complementarity, one for the rich; the other for the poor
- Government extension can increase its impacts among poorer farmers by targeting farmer groups for the poor
- More work on robustness check for unobserved heterogeneity in the analysis In addition, accurate analysis on the impact and seed diffusion is expected as seed samples collected from respondents are precisely identified using DNA finger printing analysis
- Estimate impacts of adoption on household welfare: food security, incomes and poverty on-going

Table 2. Impact of improved varieties on yield (kg/ha), PSM (sub-sample: intervention areas)

Matching algorithm	# Bean plots (improved variety)	# Bean plots (local variety)	ATT	Std. Err.	t
Full sample					
Nearest neighbor	482	314	-54.1	269.8	-0.201
Radius	482	827	336.6	184.7	1.823
Kernel	482	827	218.4	199.7	1.094
Stratification	482	827	207.3	174.6	1.187
Intervention areas					
Nearest neighbor	253	135	258.3	290.8	0.888
Radius	253	260	628.7	217.2	2.895
Kernel	253	260	575.3	181.8	3.164
Stratification	253	260	565.8	174.7	3.238