

Research Application Summary

**Farmer preference for improved seed potato varieties in Malawi: Case study of Ntcheu and Dedza districts**

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**Abstract**

Potato (*Solanum tuberosum*) is the main root and tuber crop produced for both food and cash. Potatoes are the world's number one non-grain food commodity. It provides fast cash because it is a short duration (3-4 months) crop. Malawi is ranked the biggest potato producing country in Africa. As one way of improving quality of potatoes in Malawi, the Government through the Ministry of Agriculture and International Potato Center released new varieties. These varieties were disseminated to the farmers in 2012-2013. A study was conducted in Ntcheu and Dedza (major potato producing districts) to determine factors that farmers base on to select potato varieties for cultivation. Results show that potato price at the market is the major factor contributing to which variety to grow. Chuma and Mwai are the major preferred varieties due to their high prices at the market.

Key words: Farmer preference, Malawi, *Solanum tuberosum*, varieties

**Résumé**

La pomme de terre (*Solanum tuberosum*) est une principale racine et tubercule produite à la fois comme culture vivrière et commerciale. Elle représente la principale denrée alimentaire non céréalière au monde. Elle permet de générer rapidement des revenus à cause de sa courte durée (3-4 mois) de culture. Le Malawi est classé premier pays producteur de pommes de terre en Afrique. Pour améliorer la qualité des pommes de terre au Malawi, le gouvernement, par l'intermédiaire du Ministère de l'agriculture et du Centre international de la pomme de terre, a sorti de nouvelles variétés. Ces variétés ont fait l'objet de vulgarisation auprès des agriculteurs en 2012-2013. Une étude a été menée à Ntcheu et Dedza (principaux districts producteurs de pommes de terre) pour déterminer les facteurs sur lesquels se basent les agriculteurs pour sélectionner des variétés de pommes de terre à cultiver. Les résultats ont montré que le prix de la pomme de terre sur le marché était le principal facteur de croissance de la variété. Les variétés Chuma et Mwai étaient les principales variétés préférées en raison de leurs prix élevés sur le marché.

Mots clés: Préférence des agriculteurs, Malawi, *Solanum tuberosum*, variétés

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## Introduction

Increase in population and income levels of Malawians, has increased the production and consumption of potato (*Solanum tuberosum*). In Africa, Sub-Saharan region contributes about 70 percent of the total potatoes produced with Malawi contributing 20 percent (FAO and CFC, 2010). Solanum potato in Malawi is ranked as the third most important food and cash crop after maize and cassava. Over the years both production and yield of solanum potato has increased such that in 2013, yield grew by 0.9 percent compared to 1.9 percent growth in 2012 (World Potato statistics). The huge growth in 2012 was because of the release of improved varieties by the Government in collaboration with the International Potato Center. The potential of Malawian potato economic growth lies in smallholder farmers as they are the biggest producers. These smallholder farmers produce potatoes from a minimum land size of 0.25 acres to a maximum of 4 acres (Maganga, 2012). Despite the small piece of land allocated to solanum potato, high production is attained from farmers producing potatoes twice a year on average. Therefore any interventions in the potato sector benefit directly the rural smallholder farmers as potato production in Malawi is mainly a source of cash.

Unfortunately only a small percent of Malawi's potato is exported. This is because despite the increase in production and yield, quality of the potatoes sold and consumed has declined over the year (Demo *et al.*, 2007). Reasons for the decline are; recycling of local seed, limited land size to practice crop rotation, lack of proper storage techniques and lack of quality seed. Lutaladio *et al.* (2009) added that many developing countries lack efficient systems for regular multiplication and distribution of quality seed tubers and the rapid deployment of new, improved varieties

As a way of improving quality of potatoes, the Government of Malawi in collaboration with the International Potato Center in 2012 released new improved varieties. These varieties are locally known as Bembeke (800946) with yield of 41 tons per ha, Njuli (CIP 396027.205) 36 tons per ha, Chuma (CIP 395015.6) 32 tons per ha, Thandizo (CIP 381381.13) 35 tons per ha, Zikomo (CIP 381381.20) 34 tons per ha and Mwai (CIP 396036.201) 41 tons per ha (Mviha *et al.*, 2011).

The new varieties were disseminated in the country in 2012-2013. Some of the districts that received the new varieties were Dedza, Ntcheu, Dowa and Mchinji. Due to limited numbers of tubers, large number of potato farmers and high cost of inputs, farmers were encouraged to form clubs so that they could multiply and share tubers amongst themselves. This process has been on-going making the 2016-2017 season the third for sharing. The focus of the paper is to understand the characteristics that smallholder farmers undertake in adopting new potato varieties and the challenges faced in seed acquisition.

## Methodology

The study was conducted in the Central part of Malawi in Ntcheu and Dedza districts. These districts were purposively selected because they contribute 70 percent of the potatoes

produced in the country. Data were collected in May 2016 from 170 smallholder potato farmers producing the new varieties. Purposive sampling was done to select the Extension Planning Area and later a random sampling technique was used to select the farmers. Extension Planning Areas (EPAs) were purposively sampled because not all EPAs have the new varieties and selection of the farmers was based on who is currently growing the new varieties. The study used a structured questionnaire to collect data. Data were collected on socio-economic parameters of farmers, potato production (input use) and challenges in seed acquisition.

## Results

Table 1 gives a summary of household socio-economic characteristics of the smallholder potato farmers growing the new varieties. The average number of household members was five with a maximum of 12 and a minimum of one while average education is primary education and average age is 44.

**Table 1. Description of variables**

Variable	Observation	Mean	Std. deviation	Min.	Max.
Land cultivated in 2014-2015	169	3.113	1.98	0	11
Land allocated to potatoes	169	1.096	0.84	0.05	3.75
Household size	169	5.686	1.80	1	12
Age of household head	169	44.355	10.91	23	74
Years of schooling of household head	168	6.446	3.16	0	12
Years of producing potatoes	164	12.835	9.61	1	48

New potato varieties are categorized into white and red fleshed potatoes. Thandizo and Zikomo are whitefleshed. These are preferred for home consumption as boiled tubers. On the other hand, Chuma and Mwai are red fleshed and are preferred for sale because they fetch good prices. Chuma and Mwai varieties are mostly preferred by local chips vendors because they consume less cooking oil. Table 2 shows the most preferred varieties in Dedza and Ntcheu and the reasons.

Some of the major challenges in seed acquisition are the lack of seed tubers for the new potato varieties. Since the improved varieties were supplied in limited quantities, it will take a long time for the farmers to produce enough seed. One's membership to a potato club is a crucial in seed acquisition as the only source of seed is from a fellow farmer. Due to scarcity of seed, most farmers sell their seed expensively which makes seed potato unaffordable to many farmers. This is why land size allocated to potatoes is very small compared to total land size cultivated.

The other challenge faced is the lack of proper storage often resulting into rotting of potatoes. Most of the farmers store their seed in sacks or bags to initiate sprouting. Unfortunately,

heat from the sacks encourage tuber rots. Theft is also one of the biggest problems facing potato farmers to the extent that some of the farmers lose entire gardens to thieves.

Factors affecting adoption of the new varieties were analyzed using a probit model. The model was used because of the binary nature of dependent variable which is whether the farmer grew the improved variety. Table 3 shows the marginal effects. The overall model is significant at a 5 percent confidence level with years of producing potatoes (p-value of 0.009), land allocated to potatoes (p-value of 0.008) and access to credit (p-value of 0,09) being significant. Years of producing potatoes is taken as experience in potato farming which makes it easy for the farmers to adopt the varieties.

**Table 2. Farmers preference for new potato varieties**

Potato variety preferred	Dedza	Ntcheu	Average market price in Malawi Kwacha per kg	Reason
Chuma	15	63	150	Easy to market High yield
Mwai	13	38	132	Fetch high prices High yield
Thandizo	11	24	125	Big tubers
Zikomo	1	4	122	High yield Less cooking time

**Table 3. Marginal effects after Probit**

Variable	dy/dx	Std. Error	z-value	P-value
District	-.174	.107	-1.62	0.105
Years of producing potatoes	.014	0.006	2.63	0.009*
Household size	.016	0.267	0.61	0.544
Years of birth of HH head	-.003	0.004	-0.74	0.459
Years of schooling of HH head	.004	0.014	0.34	0.734
Land allocated to potatoes	.159	0.060	2.65	0.008*
Did you receive potato information	-.099	0.121	-0.82	0.412
Are you a member of potato club	-.073	0.124	-0.59	0.555
Did you have access to credit	.161	0.095	1.68	0.09**

Number of observation LR Chi2(4)Prob>Chi2Y-value16119.470.0006.545

\*Significant at 1%, \*\*Significant at 10%

Access to credit is explained by the ability of the farmers to have income to purchase inputs. For high yield, potato production requires a lot of inputs (fertilizer and pesticides) which the smallholder farmers are resource constrained. Due to small quantities of new potato varieties, land allocated to potatoes is small compared to the total land cultivated.

### **Conclusion**

The potato seed system in Malawi is still informal as there is no proper quality control along the chain. Despite the release of the new varieties, seed tuber quantities are still small. Farmers therefore are forced to grow both new and old varieties, despite the low yields for the latter. Solanum potato being the most important source of cash, its seed system in Malawi needs to be improved.

### **Acknowledgement**

This paper is a contribution to the 2016 Fifth African Higher Education Week and RUFORUM Biennial Conference.

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