Land Use Policy 46 (2015) 304–313

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Does raising maize yields lead to poverty reduction? A case study of the Massive Food Production Programme in South Africa

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ARTICLE INFO

Article history:
Received 22 May 2014
Received in revised form 16 February 2015
Accepted 23 March 2015

Keywords:
Agriculture
Maize
Development
Poverty
Smallholder
South Africa

ABSTRACT

Despite much policy attention to agricultural development in South Africa, efforts since democratisation have failed to raise smallholder engagement in agriculture and to break the trend of persistent rural poverty. This paper presents results from a study of the Massive Food Production Programme (MFPP) in three villages in Eastern Cape Province, South Africa. The MFPP aimed to reduce poverty by raising maize yields. Following a trend of introducing maize varieties developed for large scale farming, the MFPP introduced hybrid and genetically modified maize varieties suited to high-input farming environments. These varieties did not perform well under smallholder conditions. In particular, they were highly sensitive to local storage conditions. Furthermore the restrictions on saving and sharing seed associated with new genetically modified varieties were resented locally. The results show how farming was most important for the poorest households who depended on it for their food security. While these households were in most need of agricultural support, they were also the least supported by the programme. Support with fencing, cattle traction, and locally attuned agricultural advice, which was not prioritised in the MFPP, would have been beneficial across wealth groups. Such support could, in contrast to the MFPP, lead to sustained and positive impact on smallholder livelihoods. In contrast, the strong emphasis on raising yields in the programme did not prove to have the desired effects on poverty.

Introduction

Improvement of smallholder farming is a high priority in South Africa's fight against rural poverty (Aliber and Hall, 2012; Kepe and Tessaro, 2014). Substantial efforts and large sums of money have been devoted to poverty reduction through agriculture, but research shows that these efforts have failed to raise smallholder engagement in agriculture and to break the trend of persistent rural poverty (Aliber and Hall, 2012; O'Laughlin et al., 2013). This paper seeks some explanations for this by analysing the reasons behind the failure of the Massive Food Production Programme (MFPP) to reduce rural poverty through raising maize yields in three villages in Eastern Cape Province, South Africa.

The MFPP, which was run by the Eastern Cape Department of Agriculture (ECDA[2]) in close cooperation with the agro-industry, was organised into 424 different projects and planted over 15,000 ha in the province between 2003 and 2009 (Mtero, 2012). It aimed to raise maize yields through subsidisation of hybrid and genetically modified (GM) seed, fertiliser and mechanisation. The idea behind MFPP was that stimulating agricultural growth through raising smallholders' maize yields would lead to poverty reduction. This idea is strongly rooted in agricultural development policy in Africa today (Collier and Dercon, 2013).

In this paper, we analyse how the focus of the MFPP on maximising maize yields affected the possibility of the programme to make agriculture more important for rural livelihoods and to meet the needs of the poorest in particular.

Maize is the staple crop for many smallholders in Africa and promotion of new maize hybrids and GM varieties is viewed by many as the solution to low yields in smallholder farming (Brooks et al., 2009). South Africa in particular has promoted the introduction of GM maize (James, 2013). An analysis of smallholder experiences in South Africa might therefore provide insights that can be used in other smallholder contexts across Africa where GM crops are considered.

The present study, conducted in three villages in Eastern Cape Province, was based on two important facts about South African smallholder farming. Firstly, farming is commonly just one of many activities that smallholders employ to make a living. There is a

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[2] Since 6 May 2009, the former Eastern Cape Department of Agriculture (ECDA) has changed its name to Department of Agriculture and Rural Development.

http://dx.doi.org/10.1016/j.landusepol.2015.03.015
0264-8377/

strong historical interdependency between smallholder farming and urban wage work in South Africa, making it particularly relevant to draw on the wider livelihoods situation to understand farming in a South African context (Aliber and Hart, 2009; Carr and McCusker, 2009; Hebinck and Lent, 2007; Slater, 2002).

Secondly, research in South Africa shows high levels of social differentiation even within areas of widespread poverty (Carter and May, 1999; Neves and du Toit, 2013). The heterogeneity of rural poverty results in farming playing different roles within rural communities, which means that the MFPP is unlikely to have been of equal benefit to all. Therefore the analysis specifically examines how the capacity to engage in agriculture and to benefit from the MFPP differs between households of different wealth status, defined here through a local wealth ranking exercise.

It is acknowledged here that an important reason for the failure of the MFPP to stimulate agricultural growth through raising yields was that the programme did not support smallholders in reaching markets. Access to markets is a key factor determining whether smallholders in can in fact benefit from raised yields (Andersson Djurfeldt, 2013; Poulton et al., 2010). Due to the particularly comprehensive suppression of commercial smallholder farming in South Africa historically (Bundy, 1988), supporting smallholders to reach and compete on agricultural markets might be even more important here than elsewhere in the region. The importance of facilitating market access is also acknowledged in the new agricultural policy for the province (Jacobson, 2013). We argue in this paper, however, that even if smallholders were supported in reaching markets, the narrow focus on raising yields is problematic in itself as it is not attuned to the local role of farming in the wider livelihoods situation of Eastern Cape smallholders. As the focus on maximising yields through hybrid and GM maize remains also in more recent interventions in the region (Iversen et al., 2014), a critical analysis of the role of maize yields in poverty reduction is still needed, and is the focus of the present paper.

The Massive Food Production Programme

The MFPP was introduced in the study villages in 2003. Like in the pre-democratic mechanisation schemes, land was ploughed collectively to benefit from economies of scale. Tractors ploughed across all fields in the field areas, including the fields belonging to smallholders who did not participate in the programme. At the same time, fields located outside main field areas, in mechanically inaccessible terrain, were excluded. Furthermore, to avoid the heavy weed problems resulting from fallowed fields, only smallholders currently actively engaged in farming could participate.

Subsidies for input purchases were conditional upon compliance with programme terms. In the first year all inputs were free to participants, while the subsidies were reduced stepwise in following years. It was anticipated that when the programme finished after 5 years, participants would be able to pay the full cost for inputs, as their income would rise with increased yields.

Programme terms included applying specified minimum levels of fertiliser and selecting high-yielding (in essence hybrid or GM) maize varieties through dialogue with the seed industry. Otherwise, no government advice on seed was provided, as MFPP policy was explicitly to leave choice of varieties to the market. Seed companies were encouraged to promote their products at fairs to which participants were invited. Other extension services and agricultural advice were not prioritised in the programme.

During the first 3 years, the study villages planted genetically modified Bt maize (CRN 4549B and DKC 7815B) from the agrochemical company Monsanto. Due to misunderstandings during the seed order, a conventional hybrid (SNK2551) was planted during the fourth season. The village chief explained the choice of Bt maize by the fact that Monsanto was the only company that had demonstrated its seed in a local trial.

Villagers objected to the MFPP excluding households with unplanted or mechanically inaccessible fields, so the chief distributed seed and fertiliser from the MFPP to households formally excluded from the programme. People also continued to recycle seed from the programme, although advised against this. These adaptations of the programme to local circumstances were interpreted by programme leadership as disobedience and are also one reason why yields and incomes did not rise as much as expected. Moreover, there was clear disagreement between MFPP managers and smallholder participants in many villages about the contribution to input costs that smallholders were willing and able to make and the two parties appeared to have fundamentally different views about the role of agriculture for livelihoods.

The study villages and many other villages in the region dropped out of the MFPP after four of the five intended years due to disagreement with the management about the terms and conditions of the programme.

Maize and South African smallholders

The comprehensive political suppression of rural livelihoods in pre-democratic South Africa led to a reorientation of agriculture towards subsistence, with significant reliance on migrant labour (Bundy, 1988; Hendricks, 1990). Commercial smallholder agriculture was made virtually extinct in the region and the shortage of labour in agriculture that resulted from the enforced labour migration led many households to focus on gardening over farming in the more distant fields (Aliber and Hart, 2009; Andrew and Fox, 2004; Fraser et al., 2003). The switch to maize from sorghum as a staple crop in the region has also been described as a reaction to labour constraints, as maize is less labour intensive (Beinart, 1982).

To address the severe poverty resulting from the political suppression of the majority population, smallholders in the region have been subjected to repeated agricultural development interventions (De Wet, 1990). It has been described how this pre-democracy focus on raising yields in effect was an efficient strategy for avoiding dealing with the root of the problem, that smallholders were, due to political suppression, short of land, labour and market access (Jacobson, 2013).

Despite repeated introduction, hybrid maize has so far been adopted to a very limited extent by South African smallholders. A key reason for this is that the majority of hybrids, including all of the more recently introduced GM maize varieties,[3] sold in South Africa are adapted to the agricultural practices and environments of large-scale, capital-intensive and commercially-orientated farmers. Hybrids are generally high-yielding under optimal agricultural conditions and high fertilisation. Furthermore hybrid seed need to be purchased new every year to retain yields. Estimates by the South African seed industry in 2003 suggested that 90% of smallholders planted open-pollinated varieties (OPVs) of maize or recycled seed from OPVs or hybrids, and that only 10% purchased hybrid seed in any given year (Gouse et al., 2005). While (non-hybrid) OPV maize, the type of maize mainly used by South African smallholders, commonly produces lower yields than hybrids, they are generally better adapted to less optimal agricultural conditions. OPV seed can also be recycled without major effects on yields (Chimonyo et al., 2014).

The genetically modified Bt maize was introduced in South Africa in 1998 and was first introduced to South African smallholders through field trials in smallholder communities conducted by

[3] All genetic modifications in maize have so far been incorporated into hybrid varieties.