

*Full Length Research Paper*

# Farmers' knowledge in the cropping systems of Northern KwaZulu-Natal, South Africa: Current challenges and solution for sustainable future food production

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Accepted 2 October, 2009

**Most African farmers involved in food production in South Africa; practice peasant farming for consumption and for retail sale in the informal market, local communities and street corners in the cities. These farmers are mainly constrained by different factors which include; lack of basic farm inputs like machineries and fertilizers. They also have limited knowledge of the standard methods of production required to satisfy the genetic requirement of improved seeds that are available in agric shops; and have insufficient access to arable lands. Due to the fact that they are resource poor formers, they lack enough financial input and support from rural extension agencies, with a resultant low yield response. Although, peasant farmers in northern KwaZulu-Natal of South Africa seem to have common challenges in their farming regime, their knowledge within each cluster varies tremendously. Observed variation in farmers' activities has been reported to affect yield on farmers' fields and farmers' knowledge plays an important role in the overall production systems of the communities. This paper highlights the challenges of peasant farmers in a study conducted over a period of nine months on the maize-based farming system of Northern KwaZulu-Natal, South Africa using a well structured questionnaire. The implication of the study on the future improvement of farming activities in the region is discussed. The result of this study outlined possible ways of improving the crop production systems of the people of the studied area and also opened new research initiatives to better partner with these farmers for improved food production.**

**Key words:** Cropping systems, farmers' knowledge, food production, Northern KwaZulu Natal, production input, small scale farmers.

## INTRODUCTION

In South Africa, the supply of staple foods to the formal market is mainly controlled by skillful commercial farmers. However, most African farmers involved in food production practice peasant farming for consumption and for retail sale in the informal market, local communities and street corners in the cities. These farmers are mainly constrained by different factors which include; lack of basic farm inputs like machineries and fertilizers. They also have limited knowledge of the standard methods of

production required to satisfy the genetic requirement of improved seeds and have insufficient access to arable lands. Due to the fact that they are resource poor formers, they lack enough financial resources to acquire input and there is limited support from rural extension agencies, with a resultant low yield response (Sanchez et al., 1997; FAO, 1999).

Peasant farmers in Northern KwaZulu-Natal are grouped into clusters of farming units; supplied with common irrigation facilities. The provisions of irrigation and or chemical facilities are paid for by these groups of farmers who receive patch of lands for their farming activities. Although, these farmers seem to have common

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challenges in their farming regime, their knowledge within each cluster varies tremendously. Observed variation in farmers' activities has been reported to affect yield on farmers' fields (Lewu, 2002) and farmers' knowledge plays an important role in the overall production systems of the communities (Flavier, 1995; Gadzirayi et al., 2006).

The cropping systems of the peasant farmers in Northern KwaZulu-Natal Province can be described as a maize-based cropping system characterized by mixed cropping with vegetables and roots crops. To the best of our knowledge, there is no information on the influence of farmers' knowledge and their production systems on the agricultural productivity of the region. In this study, we present the result of a survey conducted over a nine month period in Umkhanyakude, Uthungulu, Melmoth and Ulundi communities using a well structured questionnaire and farmer to farmer interview approach. These communities are located in the Northern KwaZulu-Natal region of South Africa. The result of this study is expected to outline possible ways of improving the crop production systems of the people of the studied area and also open new research initiatives to better partner with these farmers for future improved food production especially among marginal input farmers.

## METHODOLOGY

### Study area

The research was carried out amongst the Zulu speaking people living in the northern region of KwaZulu-Natal Province, South Africa. The whole area falls within latitude 27° 26' - 28° 44' S and longitude 31° 23' - 31° 56' belong to the former KwaZulu homeland of the apartheid era in the present KwaZulu-Natal Province. Many aspects of traditional culture are still preserved in these former homeland areas and most of the inhabitants are mainly dependent on natural resources and pension payments for subsistence. A few engage on petty trade sold in informal markets and some practice farming systems characterized by limited resource inputs. The surveys were confined to Umkhanyakude, Uthungulu, Ulundi and Melmoth traditional dwellings.

### The survey

The study involved the use of Rapid Rural Appraisal technique based on a well structured questionnaire (Marshall and Newton, 2003; Lewu, et al., 2007). Apart from observations made by survey personnel on the cropping activities of the communities visited, interviews were conducted in *isiZulu* with chosen farmers within each cluster of farmers. At the start of each interview, we identified ourselves as non governmental but academic group interested in the improvement of farming activities in these communities. This information was necessary in order to obtain the most objective response at every instance. The interview made use of agricultural extension agents from each of the four main communities visited. Arrangements were made with each agriculture agency which, identified farmers groups and communities that were surveyed. At every community, government agencies liaised with community leaders for approval before accesses are gained into the communities. A total of 76 respondents were interviewed individually over a period of 9 months (June 2008 – February 2009). Scheduled visits were made to selected clusters of farming units within each

community. Farmers were then chosen at random within each farming cluster. Random samples of respondents were interviewed based on the number of farmers per cluster. The interviews were conducted in the early hours of the day to evening. Most of the respondents live in Peri-urban settlements. A wide range of information on cropping systems, family structure, constraints to production and farm management activities were carefully and patiently presented to the respondents in a 17 page questionnaire. The settlements included in the survey were selected at random located around Melmoth Umkhanyakude, Uthungulu, and Ulundi districts.

Farmers' responses to questions on family structure, constraints to production, extension services and farm management activities were recorded. For each question, the percentage of farmers who gave similar responses was calculated for each district and percentages calculated based on the total number of farmers who responded to each question. Those who did not respond to certain questions were excluded from the percentages. In instances where a farmer selected more than one reason for the use of certain method, percentages were calculated for each group of similar responses.

## RESULTS

### Household and farm characteristics

The majority of the households of the interviewed farmers (65.2%) were headed by males (Table 1). The age of the heads of household ranged between 31 and 78 years. Sixty-five percent of the household heads were above 50 years old and 20% of the household heads were older than 65 years. Household family size ranged between 3 and 19 persons, with an average family size of 8.7 persons (Table 1).

The farming system in the northern KwaZulu-Natal was dominated by smallholdings with land size as small as 0.2 ha while few farmers own up to 1.9 ha. The mean land size by individual farmer in the survey area was 1.6 ha (Table 1).

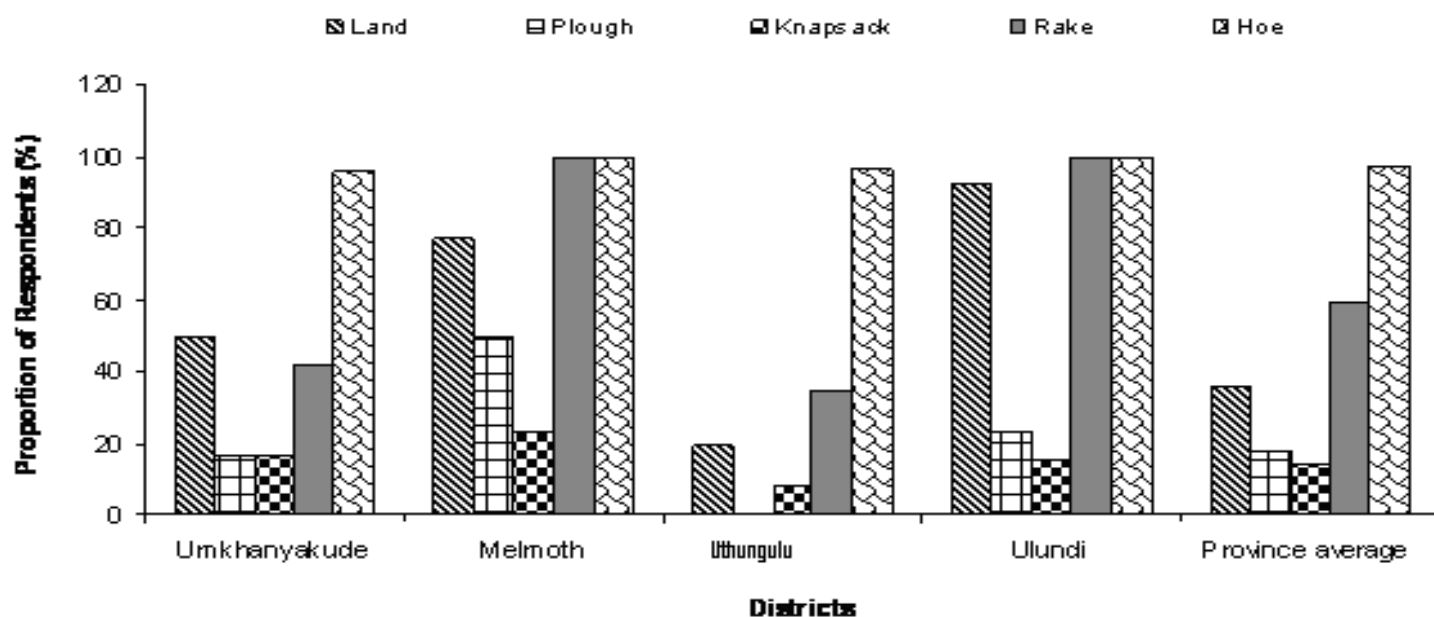
### Farmers' access to production inputs

Only 35.5% of the interviewed farmers have their own land. The remaining farmers currently have access to either communal land or hired land from few rich land owners. There was a significant variation in land ownership between districts. The lowest being in Uthungulu (19.2%) and the highest proportion of the interviewed farmers (92.3%) owning their own land in Ulundi (Figure 1). Few of the interviewed farmers possess the common farm implements such as plough (17.7%) and Knapsack (14.5%) sprayers, whereas ownership of Rake (59.2%) and Hoe (97.4%) were common in all the districts (Figure 1).

The type of fertilizer and the proportion of farmers that apply fertilizer varied between districts (Figure 2). Most of the farmers interviewed (74.3%) applied manure to their fields (Figure 2); commonly acquired from their animal dung around households. Fields situated far from the homestead received no manure mainly because of labor shortages and lack of enough finances to transport bulky

**Table 1.** Household and farm characteristics of farmers in the four Districts of the northern KwaZulu-Natal province of South Africa

	Umkhanyakude	Melmoth	Uthungulu	Ulundi	Average for the studied area
<b>Gender of household head (%)</b>					
Male	62.5	84.5	30.8	92.2	65.2
Female	37.5	15.4	69.2	7.8	34.8
<b>Household heads' age</b>					
Average	55.1	52.5	59	54.3	55.8
Range	31 - 70	32 - 70	34 - 78	39-66	31 - 78
<b>Family size</b>					
Average	10.1	7.8	8.2	7.9	8.7
Range	4 - 27	5 - 10	3 - 19	4 - 12	3 - 19
<b>Land size in hectares</b>					
Average	1.1	1.2	1.8	0.7	1.6
Range	0.2 - 1.3	0.5 - 1.7	0.5 - 4	0.3 - 1.9	0.2 - 1.9

**Figure 1.** Production equipment owned by farmers in the four districts of the Northern KwaZulu-Natal province of South Africa

manure to far distance. The use of inorganic fertilizer was also common in all the districts visited with approximately 84.2% of the interviewed farmers using fertilizers. A large proportion (75%) of farmers has access to irrigation water (Figure 2).

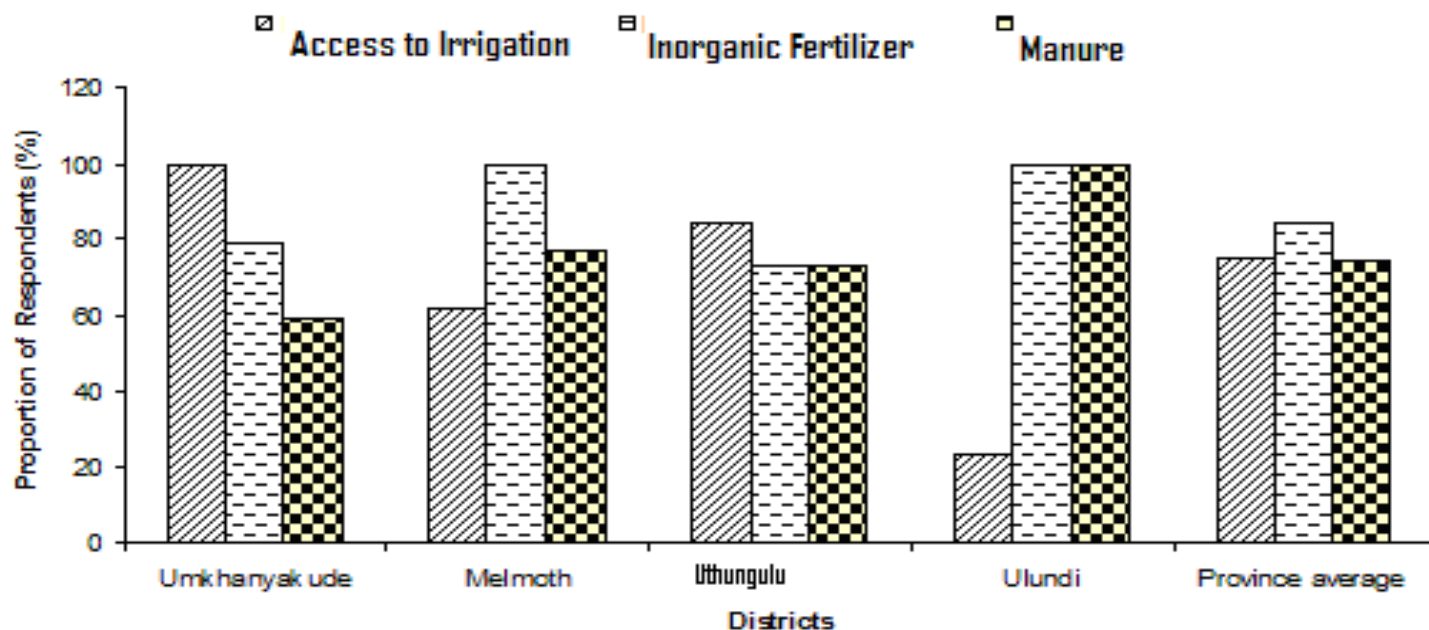
#### Farmers' perceptions of production constraints

Farmers listed a total of 13 constraints to crop production. Pests were mentioned by more than 58% of the farmers as the major constraint followed by water stress (40%) and inaccessibility of production inputs (36%) (Figure 3). Soil fertility, lack of money to hire tractors, labour and bad weather were also among the problems mentioned by

some of the farmers (Figure 3).

#### Farmers' access to agricultural extension services

Apart from Uthungulu district where only 65.4% of the respondents acknowledged the existence of extension services, all the interviewed farmers in the surveyed districts have an access to the services (Table 2). Only one farmer out of 24 respondents in the Umkhanyakude district received an advice from None Governmental Organization (NGO) (Table 2). None of the respondents in the other three districts in the survey received advice from NGOs. Advices given by extension agents from the Department of Agriculture were mostly technical (72.4%),



**Figure 2.** Farmers' access to production inputs in the four districts of the northern KwaZulu-Natal province of South Africa

**Table 2.** Type of extension services received by farmers in the four Districts of the Northern KwaZulu-Natal province of South Africa.

Extension service	Umkhanyakude	Melmoth	Uthungulu	Ulundi	Average for the province
<b>Type</b>					
Technical advice (%)	87.5	61.5	57.7	84.6	72.4
Marketing and Business (%)	66.7	38.5	23.1	46.2	43.4
Management (%)	91.7	15.4	30.8	30.8	47.4
<b>Service provider</b>					
Department of Agriculture (%)	100	100	61.5	100	86.8
NGO (%)	4.2	0	0	0	1.3

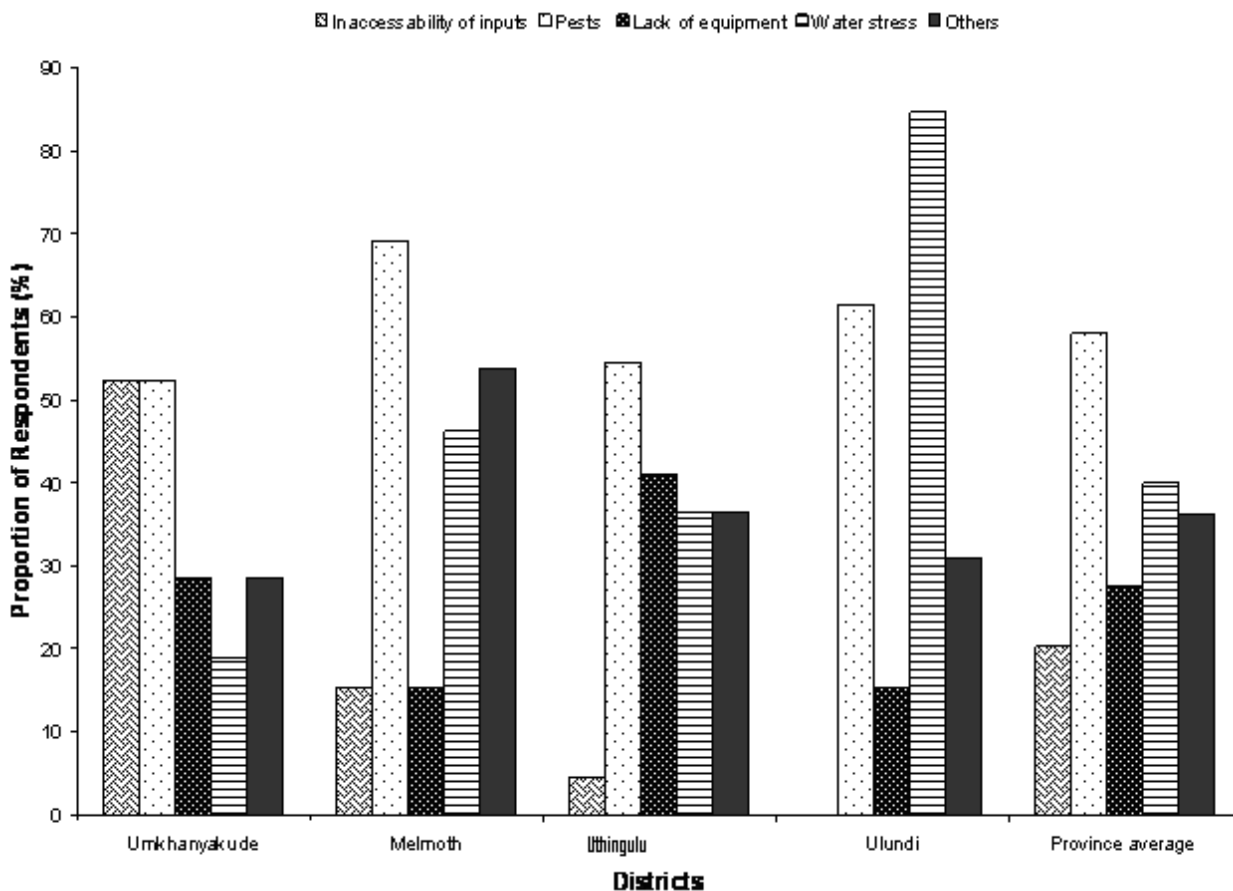
with advices on marketing, business and management reaching less than half of the interviewed farmers (Table 2).

## DISCUSSION

The demographic characteristics of the farmers involved in marginal input farming in the survey indicated that the majority of the farmers are of the male gender with a reasonably large family size of 9 individuals. This is an indication that farming in this region is gender sensitive to the male gender (Sabo and Dia, 2009). This is contrary to Agboola (2001), who observed that rural women form more than 70% of farmers enlisted in dry season vegetable production in Southern Nigeria. The same trend was also recorded by early workers in Cameroon and Tanzania (Gochkwoski and Ndoumbe, 1999; Wienberger and Msuya, 2003). The result of this survey is particularly

worrisome in a country where large percentage of homes is controlled by single female parents. It would have been encouraging if the reverse is the case; which could preclude future food security and alleviation of poverty for the large population of marginal input bracket residing in rural communities.

Contrary to the encouraging trend in age distribution recorded among cotton farmers in Northern Nigeria (Sabo et al., 2009), 65% of the respondents are over 50 years old and another 20% are more than 65 years old. This implies that 85% of the farmers are no more in their active age (Atsan et al., 2009). Similar results were recorded in Limpopo province of South Africa, where the average age of farmers was found to be between 53 and 61 years (Kamara et al., 2001). Therefore, farming population in the region could drop dismally within the next decade; with a resultant negative implication on future food security in the districts. There is need to encourage the younger members of the population to be



**Figure 3.** Farmers' perceptions of different production constraints in the four districts of the Northern KwaZulu-Natal province of South Africa

involved in farming.

Land ownership is still a largely debated issue in South Africa. The low percentage of land ownership among most farmers in the study area is not unfamiliar; as the process of land distribution is still currently being debated by all stake-holders. However, the over 92% land ownership recorded in Ulundi is not surprising either; due to the fact that most lands in this region were owned by the black population previously under the former KwaZulu homeland government. The majority of the farmers in other communities still have to hire land for production and this could only increase production cost and make it difficult for farmers to compete for low market prices that large volume producers can offer. Even for farmers who could produce surplus at comparative low prices, studies have shown that these farmers still remain trapped within poverty bracket due to lack of access to profitable market (Heinemann, 2002; IITA, 2001).

Most fields visited during the survey had proportion of their fields planted to cabbage without ready market. Although, intervention by the local authority to sell this produce to public hospitals was welcomed by the farmers, but it appeared the promise was not matched by

action; therefore, most of the farmers experienced great financial losses during this planting season. However, the competition for market is keen with commercial farmers currently forming mutually beneficial active groups which agree on common prices for their produce (Senyolo et al., 2009); making it more difficult for emerging farmers to enter the mainstream commodity market. The development of technologies creates opportunities for a more efficient, competitive and profitable means of production in agricultural sector; and those who adopt these technologies faster are able to control the market than late adopters (Gurel, 1998).

The large percentage of the farmers using crude implements like hoe and rake is characteristics of marginal input farmers in Africa. Although, nearly all the farmers interviewed hire tractors to cultivate their fields, planting and weeding were done by hand using crude implements. The high incidence of mechanical cultivation by small scale farmers is encouraging and may be unique to South Africa, this is not common in many small scale farming systems in the rest of Africa. The use of crude implements for other farming activities apart from cultivation is a production constraint that ultimately increase

production cost among African farmers. These farmers eventually find it difficult to compete in the formal commodity markets (Machethe, 2004).

Although, over 84% of the respondents applied one form of fertilizer to their field; it was discovered that not enough or appropriate fertilizer were used. Overall production output could be affected; and the limitation to market access can only make matter worse for an already struggling farming population. Local authorities ranked most interested farming communities into farmers' groups with a provision of basic inputs like communal lands, common irrigation facilities and shared extension services. The effort of the Department of Agriculture is still fraught with lack of financial inputs to run their irrigation pumps, high cost of purchasing pesticides and erratic supply of basic extension services. To circumvent these numerous challenges, there is need for support in the form of financial (loan) inputs; where the government could serve as guarantors for such loans and more intensive and purposeful supply of extension services to update emerging farmers on the most appropriate production techniques to improve production. Public sectors also need to provide support to open market for emerging farmers that will transcend the current informal market outlet presently experienced by this farming population (Atsan et al., 2009).

Understanding the complexity of the problems in the small scale farms and the interactions between system components is essential for proper planning interventions such as introduction of novel crop management strategies. Such types of crop management strategies require high levels of expertise from farmers and extensionists in order to be implemented effectively. The NGOs' involvement in the study areas is worrying especially in the light of a report that only a few of the extensionists working on small-scale farming systems in South Africa received the required training in specific fields of crop production (Stevens and Van Heerden, 2005). The road ahead is tortuous; but with the combined effort of private and public stakeholders, the solution is achievable.

## ACKNOWLEDGEMENTS

The authors thank the research committee of the University of Zululand for financial support; the farmers and local authorities of the Department of Agriculture for access to the survey communities.

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