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Self-Organisation in Building Resilience to Climate Change in Smallholder African Agriculture

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Introduction

African agriculture is largely based on smallholder production. However, another common feature of agricultural production in Africa is the production deficit. In East Africa, climate variability is already a challenge that contributes to this deficit and climate change is likely to worsen the problem through temperature and evaporation increase and increased frequency and intensity of extreme weather events, although various climate projections indicate a likely increase in total rainfall for East Africa. The spatial and temporal distribution of rainfall under a changing climate in East Africa is however still uncertain (Christensen et al. 2007).
Under such uncertainty, increasing the resilience of agriculture to climate change offers a viable approach to deal with the expected negative impacts while considering other multiple pressures that form the backdrop within which the climate changes. This paper thus explores how farmers self-organise and how this contributes to their resilience to climate variability and climate change.

Self-organisation

Self-organisation refers to the ability to form flexible networks and the ability to be involved with the social, economic and institutional environment on other scales than the local (Milestad 2003). Self-organisation is based on the understanding that the degree to which actors are connected and have control over their various resources determines the degree to which they can reduce their vulnerability and build their resilience to climate change. Self-organisation includes opportunity for self-organisation, reliance on farm's own resources and farmer's own knowledge as well as cooperation and networks
Self-organisation is one of the three components of resilience that promises greater control and influence over farm activities and farm socio-economic environments than without (Ifejika Speranza 2010). Traditionally, African farmers have organised themselves into various groups and this practice has evolved to the modern, with financial institutions taking advantage of this form of cooperation to disburse credit to farmers through group liability (cf. Lee 2006). Self-organisation covers activity spheres related to farm production such as finance, labour, marketing, knowledge groups, or even multi-functional farmer organisations that offer extension services (cf. Tiffen et al. 1994, Ifejika Speranza 2006, Lee 2006). Through participation in groups and networks, farmers can improve their assess to financial services, reduce labour burden, improve natural resources governance and access to markets (Liniger et al. 2005; Neubert et al. 2007). Self-organisation thus improves access to various livelihood capitals (financial services, technical information), and can play a critical role in increasing buffer capacity (cushioning risks and shocks) and by extension enhance environmental, economic and social resilience (Ifejika

Speranza 2010). Although, self-organisation is an endogenous process, there may be some strategic roles for external involvement to support this process (Lee 2006). Thus, self-organisation can contribute to the other components of resilience (buffer capacity and capacity for learning) and thereby actively reducing vulnerability to climate change impacts. Self-organisation is thus important in a changing climate as farmers in certain areas will need to acquire new knowledge, skills and improve their livelihood assets.

Material and Methods

The study areas

The study areas lie west to north-west of Mount Kenya and comprise 16 villages in Buuri, Laikipia and Meru districts where farmers were interviewed. The villages are located in the sub-humid – semi-arid transition zones and altitudes are around 2000meters above sea level. The vegetation comprises mainly acacia bush and grasslands. Mean annual temperatures are between 16^{o} C and 20^{o}C and annual rainfall is between 400mm to 750mm. Three rainy seasons occur, the March to May rains (long rains) ranges from 115-260 mm and the October to November rains (short rains) are usually more. Continental rainfall caused by the Mount Kenya occurs in certain pockets around July-August and ranges from 112-183 mm. Rainfall is generally low in the area (Berger 1989) and droughts are common. Climate change projections conducted in the area indicate an increase in the frequency and intensity of extreme rainfall events leading to increased water availability and floods in certain months and lower rainfall in other months (Notter et al., 2007).

Data and methods

Data was collected in field work in April 2009 through interviews, focus-group discussions and literature review. 41 farmers (male 68%, female 32%) practicing various degrees of conservation agriculture conservation in 16 villages of Buuri- (1), Laikipia East- (34), Laikipia- (1) and Meru-districts (5) were interviewed. The respondents were purposefully sampled because they recently adopted conservation agriculture in the past three years (6 farm seasons). Their practices are illustrative of adaptation to climate variability and climate change in smallholder agriculture.

Both quantitative and qualitative data were collected and statistics was used to analyse the quantitative data while the qualitative data was analysed for content. Various criteria and indicators of self-organisation were identified and used for analyses. These include local resource use, cooperation and networks, farm resource use, farmer knowledge and flexibility.

Results and Discussion

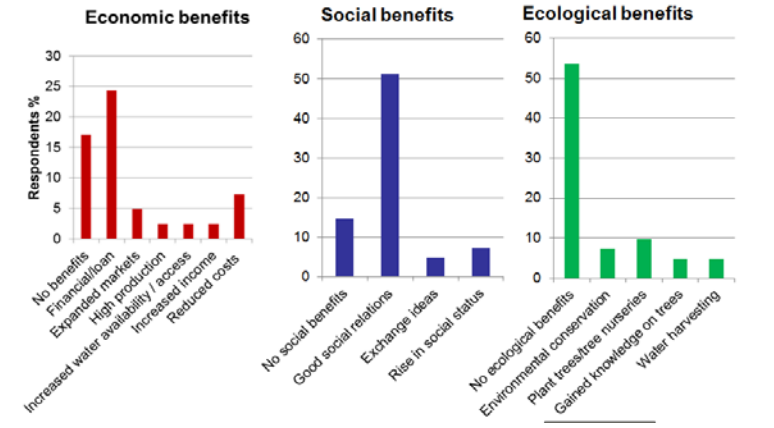
Self-initiative in practicing conservation agriculture: Over 70% of the farmers started practicing conservation agriculture through interventions by the Ministry of agriculture and other Non-governmental organisations. About 18% of the farmers started practising CA through the influences of other farmers and their neighbours, while only about 10% started practicing CA through own trial and experiments.

Farm resources used and their sources: Access to farm inputs such as capital, machines, seeds, labour and manure will enable farmers to be flexible in responding to changes in seasonal rainfall patterns, for example. However, most farmers hire their farm machines from outside their farms from other farmers and purchase seeds mainly from the agro-vet shops in the urban centres. In most cases less than 15 per cent sourced the above-mentioned inputs are from their own farms. Although 68% of the respondents rated themselves overall to rely 51-100% on their own resources, 32% of the farmers relied up to 50% on resources not belonging to them.

Groups and networks of the farmers: At least 42% of the farmers belong to a group. The farmers belong to 14 different groups ranging from financial self-help groups, water groups, and agricultural groups to marketing groups. An examination of the roles in the groups shows that about 45% of the farmers hold group management positions. While the farmers derive various benefits from being members in a group or network of groups, the main benefits mentioned include financial support (49%), knowledge and ideas (27%), water availability (17%) and socialisation (12%).

Figure 1 illustrates how farmers rated the benefits which they derive from using their own resources, and participating in groups and networks.

Figure 1: Benefits of memberships in groups and organisations



Source: Own data analysis

Reliance on own (farm) resources: The preliminary data analysis shows that self-initiative for adopting innovations is still low. Reliance on own farm machines is low, but for other resources (cash, labour, seeds through purchase), self-reliance is high. Considering farmers' own assessments, farmers are aware of the benefits of self-reliance and strive to increase this feature.

Farmer groups and networks: At least 40% of the farmers are organised in groups. Almost 25% of the farmers are in decision-making positions in the groups - this could have positive effects on their resilience to production risks as reflected by the benefits they mention. However, the use of own-farm resources needs to be improved.

The benefits listed in figure 1 indicate that the self-organisation of the farmers increases their resilience to production shocks including climate change impacts. Interventions by governments and other external actors should thus promote farmer self-organisation.

Conclusions and Outlook

As analysis is still on-going, it is planned to explore for inter-linkages and trade-offs between the variables that capture self-organisation. Self-organisation can also be related to the other dimensions of resilience - buffer capacity and capacity for learning. Further analyses will also explore whether farmers who belong to a group/network suffer fewer climate-triggered

production losses, and how much an adaptation is likely to still contribute to self-organisation in the future.

References

Berger, P. (1989): Rainfall and Agroclimatology of the Laikipia Plateau, Kenya. AFRICAN STUDIES SERIES, A5, Geographica Bernensia, Institute of Geography, university of Bern.

Christensen, J. H. et al. (2007): Regional climate projections, in: S. Solomon et al. (eds.): Climate change 2007: the physical science basis, Contribution of working group I to the fourth assessment report of the Intergovernmental Panel on Climate Change, Cambridge: Cambridge University Press; online: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter11.pdf (accessed 9 June 2009)

Ifejika Speranza, C. (2006b): Drought vulnerability and risk in agro-pastoral areas: an integrative approach and its application in Kenya, Bern: Centre for Development and Environment (CDE), Institute of Geography, University of Bern (PhD Thesis)

Ifejika Speranza, C. (2010): Resilient adaptation to climate change in African agriculture. Bonn: Deutsches Institut für Entwicklungspolitik / German Development Institute (Studies 54)

Lee, N. (2006): Rural remote microfinance and selfish genes; online: http://www.microcreditsummit.org/papers/Workshops/2_Lee.pdf (accessed 24 June 2009)

Liniger, H. et al. (2005): Assessing and managing scarce tropical mountain water resources. The case of Mount Kenya and the semiarid upper Ewaso Ng´iro Basin, in: Mountain Research and Development 25 (2), 163-173

Milestad, R. (2003): Building farm resilience: challenges and prospects for organic farming, Uppsala: Swedish University of Agricultural Sciences (doctoral thesis); online: http://diss-epsilon.slu.se/archive/00000170/01/91-576-6410-2.fulltext.pdf (accessed 10 July 2008). online: http://www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/%28ynDK_contentByKey%29/ANES-84NGFJ?Open (accessed 23 October 2010)

Neubert, S. et al. (2007): Poverty oriented irrigation policy in Kenya: empirical results and suggestions for reform, Bonn: DIE (Discussion Paper 12/2007); online: www.die-gdi.de/CMS-Homepage/openwebcms3.nsf/(ynDK_contentByKey)/ADMR-7BRHCE/$FILE/12-2007.pdf (accessed 9 June 2009)

Notter, B. et al. (2007): Impacts of environmental change on water resources in the Mt. Kenya region, in: Journal of Hydrology 343 (3-4), 266-278; doi: 10.1016/j.jhydrol.2007.06.022 (accessed 9 June 2009)

Tiffen, M., M. Mortimore and F. Gichuki (1994): More people, less erosion. Environmental recovery in Kenya, Chichester: John Wiley