Targeting bean research in the face of drought and climate change

Enid Katungi - Improved Beans for the Developing World
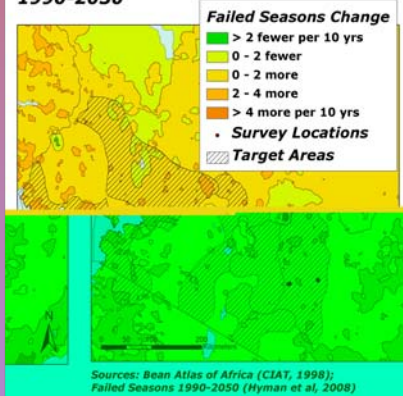**Andrew Farrow** - Decision and Policy Analysis Program

Introduction

Climate change will cause shifts in the areas suitable for cultivation of a wide range of crops including beans (Jarvis and Lane, 2007). Sub-Saharan Africa will be the region most affected.

While annual rainfall is likely to increase in East Africa due to climate change there is less consensus on variability of rainfall between and within seasons (van de Steeg et al, 2008). Nevertheless climate change is predicted to have serious adverse effects on the agriculture of Kenya (Kabubo-Mariara and Karanja, 2006). Drought and floods will increase, particularly in arid and semi-arid areas.

Change in number of 'failed seasons' in target bean-producing areas in Kenya 1990-2050

Failed Seasons Change
- > 2 fewer per 10 yrs
- 0 - 2 fewer
- 0 - 2 more
- 2 - 4 more
- > 4 more per 10 yrs
- • Survey Locations
- Target Areas

Sources: Bean Atlas of Africa (CIAT, 1998);
Failed Seasons 1990-2050 (Hyman et al, 2008)

Materials and Methods

A combination of methods has been developed or applied by CIAT to assess changes and their impact on specific crops and livelihoods in general so as to inform policy for better targeting of interventions and consequent impact.

Drought maps based on expert knowledge (CIAT, 1998; Jones et al, 2005) and on simulations of agricultural growing seasons (Hyman et al, 2008) have been used to select action and counterfactual sites for socio-economic impact assessment of bean improvement and seed delivery in drought-prone districts of Mwala and Kitui in Eastern Kenya.

A baseline study involving a survey of 120 households, transect walks and focus group discussions has been carried out to assess farmers' perceptions of natural hazards, their coping strategies, vulnerability, and determine the technological needs to mitigate drought risks in the face of climate change..

Results and Conclusions

Drought is ranked the most important constraint to livelihood improvement, causing substantial yield loss in agriculture. The problem of drought intensification in Kenya is further exacerbated by long-standing decline in soil fertility and other agro-ecological conditions. Access to drought-tolerant bean varieties and soil fertility improving technologies needs to be facilitated.

Drought is already causing excessive food insecurity with an average household experiencing 5 months of inadequate food supply per year. Further increases in the number of failed seasons could lead to humanitarian disasters.

Bean variety	Drought: Yield (Kg/Ha) Mean	Std. Dev	No drought:Yield (Kg/Ha) Mean	Std. Dev.	Yield loss due to drought (Kg)	Loss as % of yield
GLPX92	316.8	377.6	1061.4	1253.8	744.6	70.15
GLP2 large red mottled	161.2	322.6	726.6	1082.3	565.4	77.82
KATB1	288.7	256.8	1218.9	1483.2	930.2	76.31

A woman grazing her cattle on a piece of land she rented at Ksh. 500 per month to complement her small land during drought

An analysis of household food insecurity suggests that diversifying sources of income by investing in off-farm employment and social capital reduces household vulnerability. However, lack of credit and poverty restrict off-farm income to a few households. Accumulation of livestock as a buffer stock has also become less affordable due to population pressure.

Mixed cropping appears a feasible strategy with one additional crop in the plot reducing the number of food-scarce months by 0.6. Farmers mix about four crops, with common bean and Maize the most important intercrops, occupying about 0.2 Ha each per year. Common bean have been replacing cow peas and Doliches due to population pressure.

Gender differences also emerge from the analysis. Households where women are relatively more available for farm work are less vulnerable to food insecurity but the same is not true for men. Therefore women should be targeted for agricultural related adaptive measures.

References

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