Adoption potential of Gliricidia Agroforestry Technologies in Dryland Areas of Dodoma region, Tanzania

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Background

Optimal crop productivity in the dryland areas of Sub Saharan Africa including Tanzania is limited by declining soil fertility and negative impacts of climate change (Fig 1). These challenges have often been linked to poor livelihoods among farmers (Sanchez, 2002; Müller et *al.,* 2011).

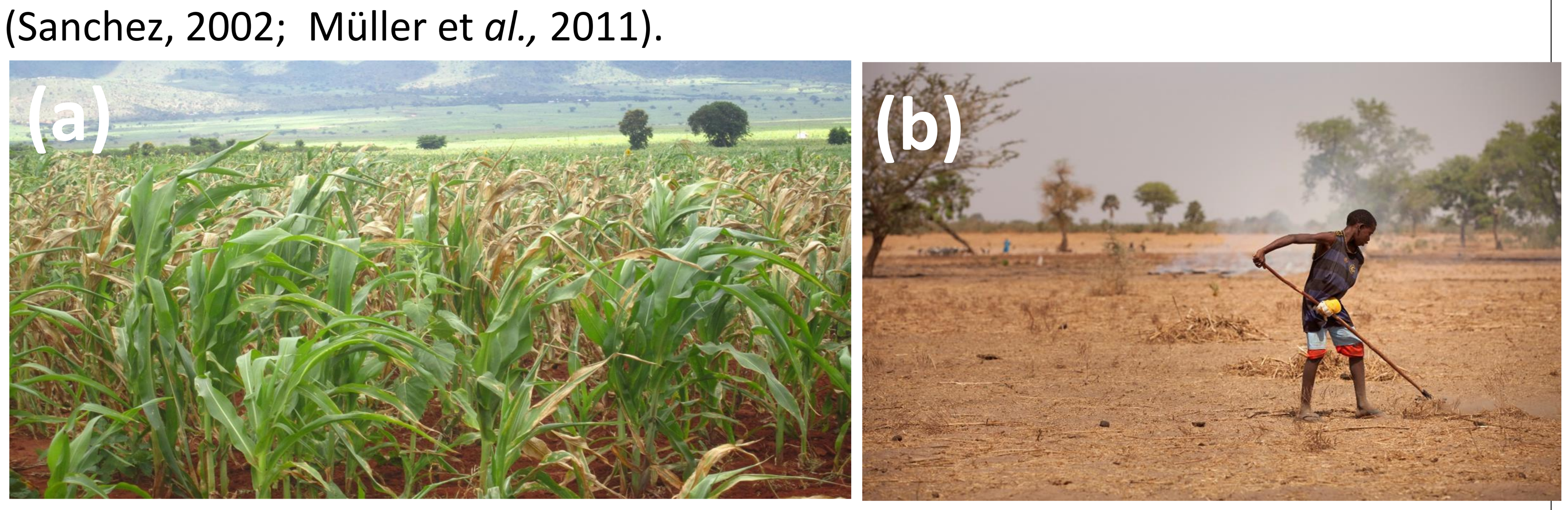


Figure 1: (a) Drought and heat stricken maize crop and (b) Infertile soil due to unsustainable farming practices in Kongwa District, Tanzania

Gliricidia agroforestry technologies were developed through extensive collaborative research conducted under the Africa RISING and Trans-SEC projects to address the mentioned productivity bottlenecks (Fig. 2). However, information on farmers potential ability and willingness to in cooperate these technologies into their farming systems is lacking

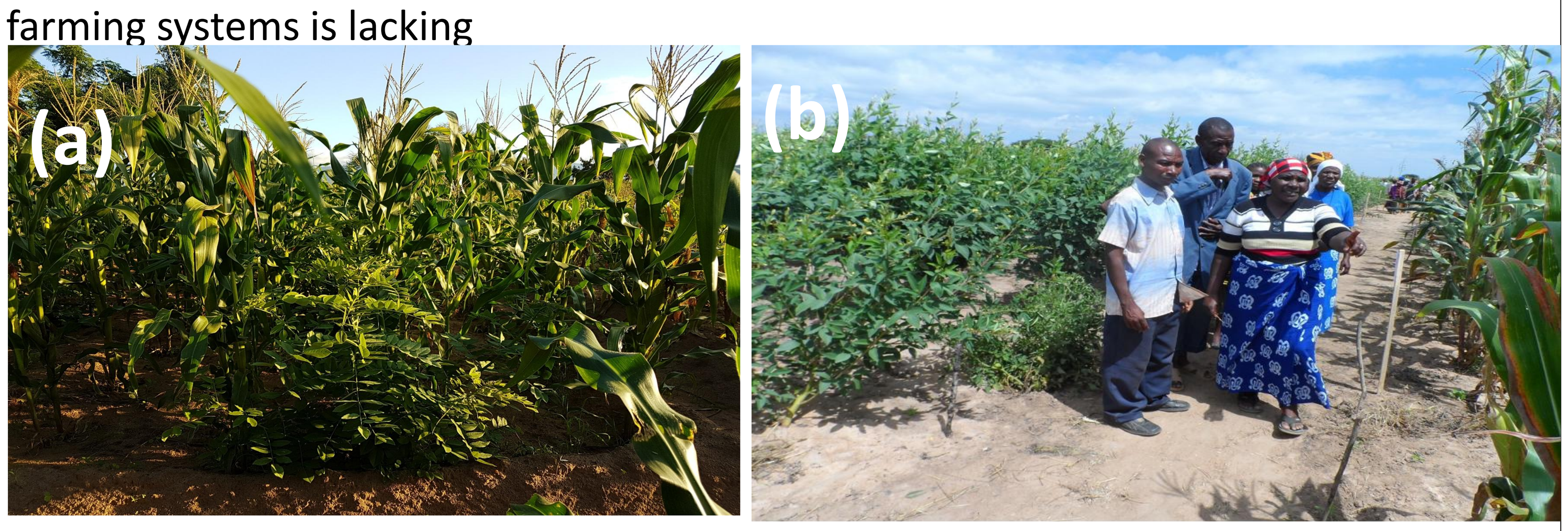


Figure 2: (a) Maize-gliricidia intercropping and (b) participatory assessment of technologies during the farmer field day

Objectives

1. To simulate and compare adoption potential peak level of gliricidia agroforestry and fertilizer technologies

2. To asses the effect of population and technology factors on adoption potential peak level

Methodology

A survey of villages with agroforestry projects in dryland areas of Kongwa and Chamwino districts was conducted between December and March 2018 under the CSA project on Capacity Building for Resilient Food Security in Tanzania (CBfRFSP). Focus Group Discussions were arranged with experienced farmers, village leaders and farmers hosting demonstration plot to collect opinions about population and technology adoption driving factors as specified in the Adoption and Diffusion Outcome Prediction Tool (ADOPT) (Kuehne et *al.,* 2011)

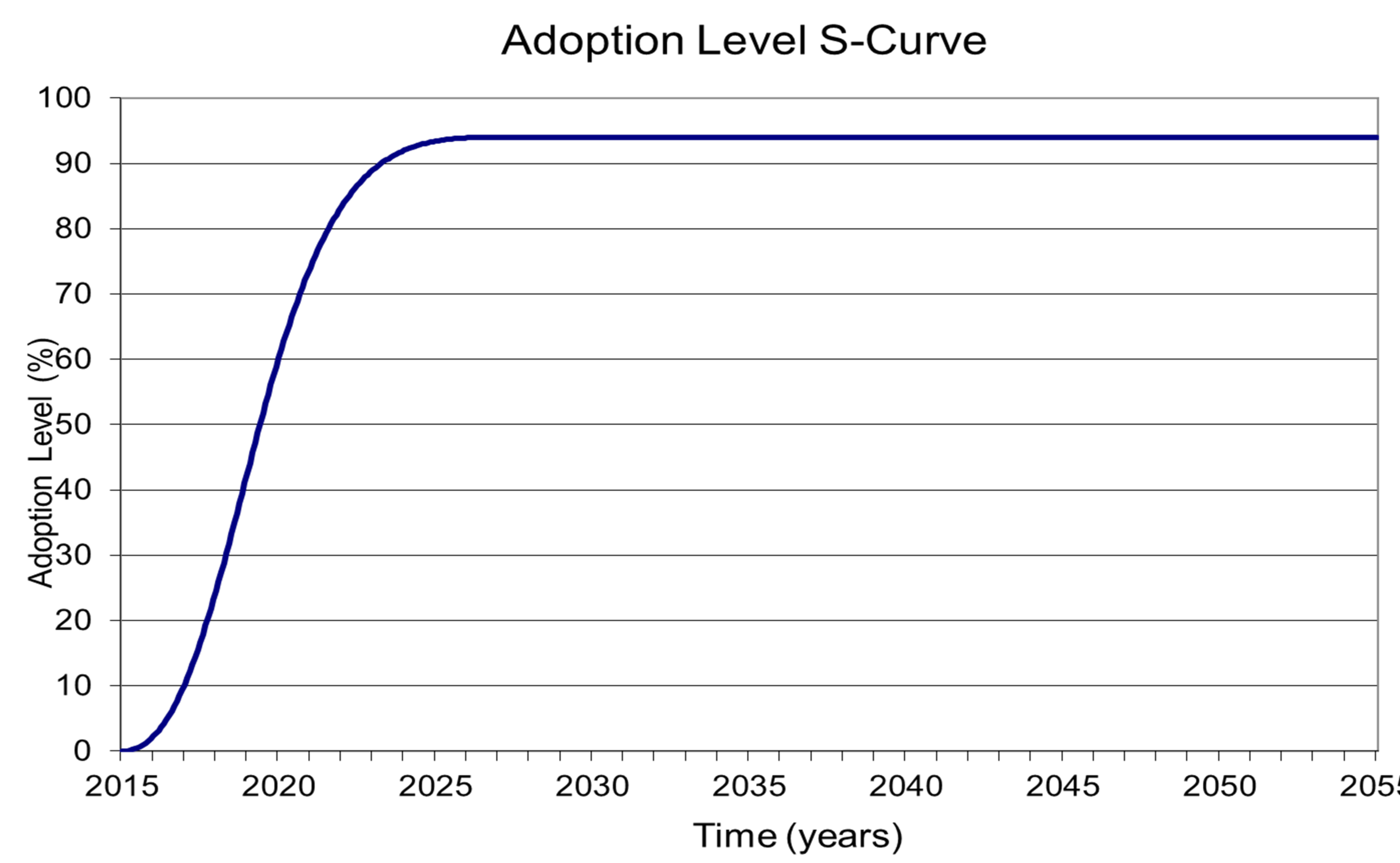
These variables include farmers' perception on financial and environmental cost, benefits and risks of technologies, existence of social networks, advisory support, technologies complexity, observability, easiness, trialing, time it takes for benefits to be realized

Data Analysis: ADOPT model simulation and sensitivity analyses were conducted

Main findings

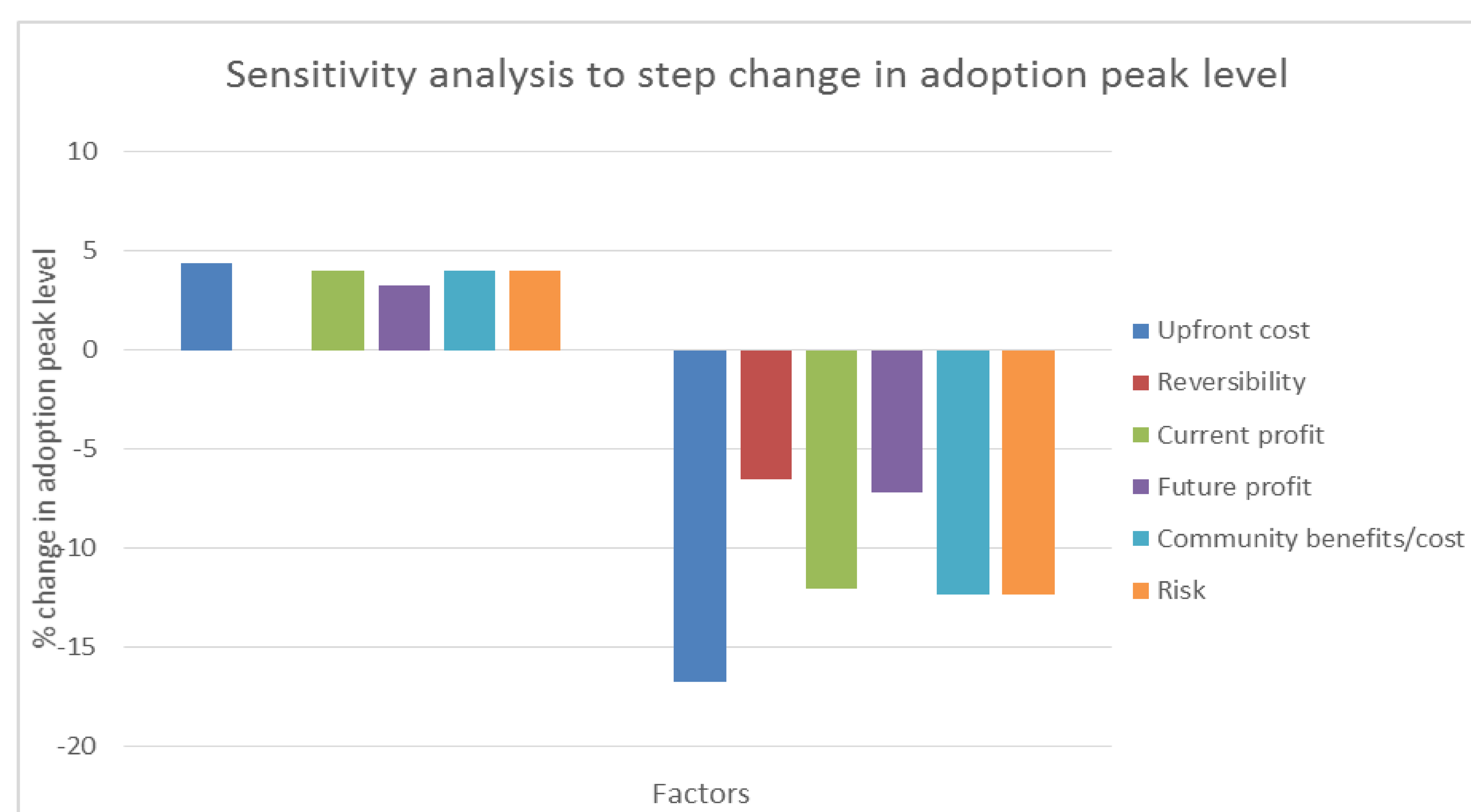
A. ADOPT MODEL RESULTS

1. The results revealed variations in peak level with gliricidia agroforestry intercropping technology exhibiting the highest adoption peak level of 94%



B. Sensitivity Analysis results

1. Sensitivity analysis results depict the high sensitiveness of cost and benefits factors in step change response of adoption peak level. It shows that a unit increase in upfront cost steps down adoption peak level by 16.7%



Conclusions and recommendations

Gliricidia agroforestry based technologies show relatively greater potential in addressing multifaceted constraints to farmers including soil fertility, moisture and detrimental effects of climate change than fertilizer technologies

Changes in initial cost required to start up the agroforestry project and benefits/profit accrued in the first 2 to 3 years have the greater effect on adoption peak level

We recommend enhancing farmers' access to input including tree seedlings at affordable stable prices and raising farmers awareness of non-cash gliricidia agroforestry technologies benefits to raise the level of adoption and diffusion

Key reference

Kuehne, G., Llewellyn, R., Pannell, D., Wilkinson, R., Dolling, P. & Ewing, M. (2011). ADOPT : a tool for predicting adoption of agricultural innovations. Paper presented at the 55th Annual National Conference of the Australia Agricultural & Resources Economics Society, Melbourne, Victoria, February 8-11, 2011.

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