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Livelihood diversification through Farmer Field School: Exploring the way to advance climate resilience in arid and semi-arid lands of East Africa

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SUMMARY

- Arid and semi-arid lands (ASALs) in East Africa are vulnerable to recurrent climate-related shocks, including droughts and floods.
- Livelihood diversification is recognized as an effective strategy for reducing the impact of various shocks and mitigating associated risks.
- A case study from Kenya shows a higher degree of livelihood diversification among households that participated in a Farmer Field School (FFS)—an agricultural extension approach emphasizing farmers' empowerment—compared to similar households that did not participate.
- Furthermore, households with more diversified livelihoods experienced lower levels of loss from recent droughts and crop losses from pests and diseases compared to those with similar characteristics, apart from fewer livelihood options.
- The case study demonstrates the importance of empowering rural households to make adaptive decisions, thereby enhancing resilience against climate-related shocks.
- The study also highlights the need for more studies on the effects of FFS on livelihood diversification, as well as comparative analyses of alternative livelihood strategies across various contexts and scenarios.

The views expressed in this paper are those of the author(s) and do not necessarily represent the official positions of either JICA or the JICA Ogata Sadako Research Institute for Peace and Development.

1. Livelihood vulnerability contexts in arid and semi-arid lands in East Africa

East Africa has historically experienced recurrent severe droughts (Nicholson 2017). In particular, recent studies have shown that droughts in the Horn of Africa have become longer and more severe over the last few decades, although scientific evidence remains inconclusive regarding whether such trends can be attributed to human influence (IPCC 2021, 1087–1089). While the future impacts of climate change on East Africa are uncertain (IPCC 2022), some projections suggest increasingly severe drought impacts in the region (e.g., Nguvava, Abiodun, and Otieno 2019).

Over 55% of lands are classified as arid and semi-arid lands (ASALs) in East Africa (UNDP/UNSO 1997).¹ ASALs are characterized by intense solar radiation and potential evapotranspiration, unreliable rainfalls, and strong winds in most parts of the year, making agricultural production challenging (Begizew 2021). Many communities in the ASAL regions have traditionally depended on pastoralism as a means of adapting to the local natural conditions (Lind et al. 2020). While pastoralism is a well-suited production system in ASALs, severe droughts have led to significant livelihood disruptions in the region, primarily through substantial livestock losses and crop failures.

Livelihood diversification, which involves expanding income sources through both on-farm and off-farm activities, is considered an effective strategy for coping with climate-related shocks (Few et al. 2015).

2. Analyzing the effects of Farmer Field School on livelihood diversification in Kenya

Supporting rural households in ASALs to diversify their livelihoods can involve various approaches, one of which is Farmer Field School (FFS). FFS is an agricultural extension approach characterized by an emphasis on the empowerment of participants in rural households (Davis et al. 2012). This enables them to make adaptive livelihood decisions under changing natural and socio-economic conditions through participatory group learning processes (Friis-Hansen and Duveskog 2012). It is typically delivered over the span of one whole production cycle (e.g., a year or a cropping season for crop-based FFS) to ensure a comprehensive learning experience through comparative field experiments and discovery-based activities. This process fosters knowledge and skills in observation, critical analysis, knowledge sharing, debate, decision-making, and implementation (FAO 2016). According to local contexts and needs, FFS programs typically offer various opportunities for learning about and experimenting with new crops, breeds, inputs, methods and practices related to agricultural and livestock farming (Davis et al. 2012), which may facilitate participants to diversify their livelihoods. Despite its potential, empirical studies on the effects of FFS on livelihood diversification remain limited.

Against this background, JICA Ogata Research Institute implemented a case study to analyze the effects of a farm forestry FFS in Kenya on livelihood diversification and its relevance with the mitigation of vulnerability to climate-related shocks. The subject of the case study was the Capacity

¹ East Africa here includes Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Tanzania, and Uganda.

Development Project for Sustainable Forest Management (CADEP-SFM) in Kenya, which was implemented from 2016 to 2021 by the Ministry of Environment and Natural Resources, Kenya Forest Service (KFS), and Kenya Forestry Research Institute (KEFRI) in collaboration with JICA (JICA 2021). The farm forestry FFS provided in the CADEP-SFM was novel in that it included, but was not limited to, forestry programs. The case study undertook surveys in 344 households with and without FFS graduates in two counties where the FFS programs were implemented. The study also conducted key informant interviews (KIIs) and focus group discussions (FGDs) for more contextualized information in these counties. Using the household survey data, the case study undertook statistical analyses to estimate the potential impacts of FFS on household livelihood diversification and its association with losses from recent climate-related shocks. Interested readers are referred to a related publication (Sato et al. 2024) for detailed descriptions of the study, including its methodology.

The analysis of the case study revealed that households with an FFS graduate tend to have more diversified livelihoods, both in terms of the types of income sources and the range of agricultural, forestry or livestock products sold. This was in contrast to households where no one had participated in FFS, which showed less diversification.² The analysis also indicated that a high level of diversity in household sales of agricultural, forestry, or livestock products was associated with a low level of losses from recent droughts and crop losses due to pests and diseases.

3. Recommendations

Based on the case study presented in the previous section, this policy note makes the following recommendations.

3.1 Governments and development partners should consider adding FFS to a toolbox for enhancing the climate resilience of rural households in ASALs in East Africa

Although the evidence remains limited, the case study presented in this policy note shows the potential benefits of FFS for livelihood diversification and enhancing household resilience to climate-related shocks. It is recommended that governments and development partners consider experimenting with FFS to enhance the climate resilience of rural households in ASALs in East Africa and assessing its effectiveness. Given its proven track record of improving the production capacities of participating rural households, FFS can be considered a low-regret climate action.

² It should be noted that the result of this statistical analysis cannot be interpreted as proof of causality between FFS participation and livelihood diversification.

3.2 Rural household support programs aiming at livelihood diversification should emphasize the empowerment of rural households and communities to make adaptive decisions.

The study in Kenya found cases where FFS groups—after completing the FFS programs—approached and acquired additional support from other development partners and governments for new activities. The study also found a case where FFS graduates created networks of revolving funds and loans, which allowed them to participate in off-farm activities outside the FFS programs.

Natural (including climatic) and socio-economic conditions transition over time, technologies evolve, and the future is uncertain. Under such a process of relentless changes and future uncertainty, one-off training on particular crops, breeds, practices, inputs or technologies may not continuously serve rural households in ASALs the best. Empowering individual households and their communities to explore, experiment with, and make decisions on something new and useful is a key to effective livelihood diversification in the context of promoting sustainable livelihoods. FFS is a potent approach to inducing such empowerment.

3.3 Research institutions should collaborate to undertake additional case studies and build a stronger evidence base for assessing the effects of FFS and livelihood diversification on household resilience to climate-related shocks.

Despite the potential usefulness of FFS—as illustrated in this policy note—the evidence base for its effects on household climate resilience remains limited. Further case studies on FFS (or similar extension approaches) should be conducted in various regions and contexts, inviting engagement with a range of research institutions that have an interest in this area. To facilitate such case studies, governments and development partners should put data collection systems in place to acquire data for impact evaluation, before, during and after FFS programs.

Furthermore, there is a need to strengthen the evidence base on the effectiveness of livelihood diversification as a livelihood strategy to enhance resilience to climate shocks by undertaking comparative analyses. These analyses should compare the effectiveness of livelihood diversification and alternative livelihood strategies, such as specialization in the most profitable economic activities to accumulate savings for hard times. The desirability of one livelihood strategy over another likely depends on a combination of the current and historical contexts of the community as well as possible future scenarios. Therefore, accumulating such comparative studies under different contexts and scenarios should help governments and development partners navigate the deployment of livelihood strategies for enhancing climate resilience.

References

- Begizew, Golla. 2021. "Agricultural Production System in Arid and Semi-arid Regions." *International Journal of Agricultural Science and Food Technology*, 7 (2): 234–244. <https://doi.org/10.17352/2455-815x.000113>.
- Davis, K., E. Nkonya, E. Kato, D. A. Mekonnen, M. Odendo, R. Miiro, and J. Nkuba. 2012. "Impact of Farmer Field Schools on Agricultural Productivity and Poverty in East Africa." *World Development*, 40 (2): 402–413. <https://doi.org/10.1016/j.worlddev.2011.05.019>
- FAO. 2016. "Farmer Field School Guidance Document: Planning for Quality Programmes." Food and Agriculture Organization (FAO) (Rome, Italy).
- Few, R., P. Satyal, D. McGahey, J. Leavy, J. Budds, M. Assen, L. Camfield, D. Loubser, M. Adnew, and W. Bewket. 2015. "Vulnerability and Adaptation to Climate Change in the Semi-Arid Regions of East Africa." ASSAR PMU (South Africa).
- Friis-Hansen, Esbern, and Deborah Duveskog. 2012. "The Empowerment Route to Well-being: An Analysis of Farmer Field Schools in East Africa." *World Development*, 40 (2): 414–427. <https://doi.org/10.1016/j.worlddev.2011.05.005>.
- IPCC. 2021. "The Physical Science Basis." Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
- . 2022. "Climate Change 2022: Impacts, Adaptation and Vulnerability." Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change." Cambridge, UK and New York, NY, USA: Cambridge University Press.
- JICA. 2021. "Capacity Development Project for Sustainable Forest Management in the Republic of Kenya : Project Completion Report." Japan International Cooperation Agency (JICA). <https://libopac.jica.go.jp/images/report/12363461.pdf>.
- Lind, Jeremy, Rachel Sabates-Wheeler, Matteo Caravani, Luka Biong Deng Kuol, and Deborah Manzollilo Nightingale. 2020. "Newly Evolving Pastoral and Post-Pastoral Rangelands of Eastern Africa." *Pastoralism*, 10 (1). <https://doi.org/10.1186/s13570-020-00179-w>.
- Nguvava, Mariam, Babatunde J. Abiodun, and Francis Otieno. 2019. "Projecting Drought Characteristics over East African Basins at Specific Global Warming Levels." *Atmospheric Research*, 228: 41–54. <https://doi.org/10.1016/j.atmosres.2019.05.008>.
- Nicholson, Sharon E. 2017. "Climate and Climatic Variability of Rainfall over Eastern Africa." *Reviews of Geophysics* 55 (3): 590–635. <https://doi.org/10.1002/2016rg000544>.
- Sato, I., H. Kubo, J. M. Ateka, R. Mbeche, and A. Mochizuki. 2024. "Promoting Livelihood Diversification among Rural Farming Households in Kenya: What Role Does Farm Forestry Farmer Field School Play?" JICA Ogata Research Institute for Peace and Development (Tokyo).
- UNDP/UNSO. 1997. "Aridity Zones and Dryland Populations: An Assessment of Population Levels in the World's Drylands." Office to Combat Desertification and Drought (UNSO) and United Nations Development Programme (UNDP) (New York).

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