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Forage innovations for resilient livestock systems in northwest Vietnam

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Abstract

Livestock production plays a critical role in the mixed farming systems of Vietnam's Northwest Highlands, where smallholder livelihoods depend heavily on cattle, pigs, and buffalo. However, persistent feed shortages, low-quality forage resources, and socio-economic and institutional constraints limit productivity and resilience, particularly among ethnic minority communities. This study synthesizes evidence from two participatory research-for-development initiatives implemented in Mai Son district, Son La province – Li-chăn (2017–2021) and Chăn-henh (2022–2024) – to assess the performance, adoption, and scaling potential of improved forage technologies in upland systems. Using a mixed-evidence synthesis approach, the study integrates quantitative data from forage trials and adoption studies with qualitative insights from gender-sensitive diagnostics, farmer interviews, and stakeholder consultations. Results demonstrate that high-yielding tropical grasses such as Green Elephant, Mombasa, and Mun River significantly improved biomass production and enhanced year-round feed availability, particularly during critical dry-season periods. Participatory on-farm trials confirmed strong farmer preference for these species due to their productivity, adaptability, and palatability. Adoption analysis revealed that 155 households integrated improved forages, with cultivated areas increasing by up to 66% across farm types. Gender-responsive approaches, including inclusive training and labor-saving feed technologies, enhanced women's participation and reduced workload burdens. Capacity-building initiatives, particularly Training-of-Trainers and farmer-led extension models, proved effective in promoting knowledge diffusion and sustaining adoption. Despite these gains, several barriers continue to constrain broader uptake. Limited access to quality seed, financial resources, and extension services, especially in remote upland communities, restricts equitable adoption. Institutional challenges, including weak seed systems and fragmented market linkages, further hinder scaling efforts. The study highlights the importance of integrated, participatory, and gender-sensitive approaches in accelerating forage innovation uptake. Strong co-investment with local institutions and farmer-led dissemination models emerged as critical enablers of sustainable scaling. To achieve long-term

impact, coordinated efforts are needed to strengthen seed systems, improve access to finance, institutionalize extension services, and embed forage development within policy frameworks. These findings provide valuable insights for designing inclusive and scalable livestock development strategies in upland regions, with broader relevance for similar small-holder systems globally.

Keywords: Adoption and scaling, gender-responsive approaches, improved forages, livestock productivity, participatory research, seed systems