Forage seed system, Indigenous knowledge and constraints of forage production in Afghanistan

Srinivas Tavva[1]*, Roberto Tellaria[2], Zewdie Bishaw[3], Niane Abdul Aziz[4], Serkan Ates[5], Yashpal Singh Saharawat[1] and Hytullah Esmati[1]

[1]ICARDA, Kabul, Afghanistan
[2]ICARDA, Amman
[3]ICARDA, Ethiopia
[4]ICARDA, Lebanon
[5]ICARDA, Jordan
Corresponding author e-mail: srinictcri@yahoo.com

Introduction

The Afghanistan seed sector is in transition after the postwar reconstruction and rebuilding (Kugbei *et al*., 2011). Though the national seed policy and law was enacted in 2009 (Gazette, Govt. of Afghanistan, 2009), its implementation is yet to take off. Availability and access to quality seed is one of the major limiting factors for the crop-livestock production system in Afghanistan. Informal seed sector is dominant where the vast majority of farmers are saving their own seed of both local and improved varieties of forage crops. The purpose of this study is to understand the status of the forage seed system, indigenous knowledge of farmers and constraints in seed production of forage crops and the possible options to improve it.

Materials and Methods

A sample of 210 farmers from Baghlan and Nangarhar provinces of Afghanistan were interviewed. Primary data was collected in 2014 on seed sources and criteria used for selecting different seed sources, indigenous knowledge and constraints associated with forage seed production, driving forces of forage production, knowledge on the essential attributes of fodder varieties, *etc*. Analytical tools used included descriptive statistics of variables considered in the study and Cobb-Douglas production function (equ. 1) estimation using ordinary least square analysis to examine the main driving forces of fodder production (Y) in the target provinces (Srinivas *et al*., 2001). Variables included in the production function were total livestock (number) maintained by ith farmer (Li), area under forage crops (Ai) in ha, price of fodder (FPi), meat (MtPi) and milk (MPi) in Afghani, annual milk produced (Mi) in litres, labor days used in the cultivation of fodder (LDi) and socio-economic variables like age of the farmer (FAi) in years, education dummy (FEDi) (FED = 1, if the farmer is literate, 0 otherwise), social networking dummy (SNDi) (SND=1 if farmer is member of any social network, 0 otherwise) and number of sources of information about forages (SIi). Ui is random disturbance term.

$$LnY_i = \beta_1 + \beta_2\,LnL_i + \beta_3\,LnA_i + \beta_4\,LnFP_i + \beta_5\,LnMtP_i + \beta_6\,LnMP_i + \beta_7\,LnM_i + \beta_8\,LnLD_i + \beta_9\,LnFA_i + \beta_{10}\,LnFED_i + \beta_{11}\,LnSND_i + \beta_{12}\,LnSI_i + U_i \quad equ\ldots\ldots\ (1)$$

Results and Discussion

Households in the target provinces depend on crop residues and planted fodder mostly during winter while in spring, grazing on natural pastures, on marginal lands and use of planted fodder are common to feed their livestock. Among the planted fodder crops, wheat (straw), maize (stover), mung bean (residue), fodder sorghum and to a certain extent clover and alfalfa are important in the target provinces. More than 90% of farmers have been cultivating local varieties of these crops (less than 10% of farmers) cultivate improved varieties only in case of wheat). The study indicated that own saved seed (85%; n=210) is the major seed source for fodder crops and similar result was reported in the studies conducted by Bishaw and van Gastel in 2008 and Srinivas *et al*., 2010 in Afghanistan. Local markets (9%), NGOs (3%) and neighbors (1.7%) are also important seed sources. It was found that less than one per cent farmer's sourced seed from village based seed enterprises (VBSE). Availability of seed on time, lack of credit facilities, high price, and non-availability of sufficient certified seed are the reasons for farmers' preference to save their own seed. Extension services, radio messages, research institutes, other farmers are the important sources in the order of the percentage of farmers received information about forage seed availability. Less than 30% of farmers have good knowledge of different protocols to be followed during seed production. Plant height, straw yield, suitability for repeated cutting, palatability are the important characteristics that farmers rated high while selecting a forage crop variety for production. Social constraints like lack of

knowledge/awareness on forages and lack of education are more relevant while non-availability of improved varieties of forage crops and their certified seed in sufficient quantities are rated as important technological constraints in forage production. The estimated model indicated that livestock maintained, fodder price, meat price, labor days in forage production, and the extent of participation in social network, are the factors influencing fodder production in the target provinces (Table 1). R^2 value of (0.46 for pooled data; 0.42 for Nangarhar and 0.32 in case of Baghlan) indicates that the fitted econometric model explained the variation to the extent of 46% in the forage produced in target provinces together. The analysis through estimated model indicated that forage production exhibits decreasing returns to scale (sum of all coefficients=0.89). The logged coefficients for livestock maintained by farmers (0.096) indicated that forage production increases by 10% with one percent increase in the livestock maintained. Fodder price is positively associated with forage production as per the theoretical expectation while price of meat is inversely associated with forage production. Marginal product for labor is positive in both provinces indicating the scope to increase use of labor to enhance forage production. Though farmers are members of different social networks, farmers are not getting the potential benefit either due to non-participation in their activities or these associations are non-functional. This might be the reason for the significant negative coefficient for social network dummy in target provinces.

Table 1: Coefficients and their standard error of the variables in Cobb-Douglas production function on forage produced in target provinces						
Variables	Baghlan (n=140)		Nangarhar (n=70)		All (n=210)	
	Coefficient (β)	Std. Error	Coefficient (β)	Std. Error	Coefficient (β)	Std. Error
Constant	11.029*	5.938	5.068*	2.826	11.578***	2.117
Livestock maintained	0.052	0.059	0.177	0.180	0.096*	0.057
Area under forage crops in each farm	0.012	0.113	0.017	0.173	0.095	0.095
Average fodder price per kg	0.487***	0.159	0.316	0.446	0.321**	0.140
Average meat price per kg	-0.333	1.016	-0.323	0.287	-0.643**	0.276
Average milk price per kg	-0.015	0.656	0.374	0.553	-0.539	0.332
Annual milk production per farm	-0.254**	0.119	0.199	0.144	-0.027	0.081
Labor days in forage production	0.281	0.184	0.589**	0.231	0.581***	0.142
Age of farmer	-0.093	0.295	-0.061	0.325	-0.060	0.215
No. of information sources on fodder crop technologies	-0.256*	0.153	-0.071	0.225	-0.170	0.131
Social network dummy	-0.175	0.138	-0.739**	0.395	-0.562***	0.120
Education dummy	0.119	0.129	0.190	0.170	0.018	0.104
R^2	0.323	0.594	0.418	0.576	0.465	0.624
F statistic	4.852***		3.723***		14.329***	
Returns to scale (RTS)	Decreasing		Decreasing		Decreasing	

*** Significant at 1%; ** Significant at 5%; * Significant at 10%;

Conclusion

Seed production for forage crops by formal sector is rather negligible in Afghanistan. Farmers own saved seed meets more than 80% of seed requirements for forage crops. It is therefore essential to improve availability and access to quality seed through formal and informal sectors. It is critical to increase the awareness and knowledge about the importance of forages, making available improved varieties with sufficient certified seed and capacity building of farmers on the agronomic and management practices of forage crops in order to reduce the feed demand supply gap in Afghanistan. Then it would be possible to reduce the forage demand and supply gap and to improve the livestock productivity in the country.

References

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