Research article

Effect of Management and Constraints on Grape Farming: A Case Study in Mirbachakot, Kalakan and Shakardara Districts of Kabul, Afghanistan

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Abstract The skillful management is one of the foremost important success factors for today's farms. When a farm is well managed, it can generate funds for its sustainability. Grape is one of the most diffuse fruits in the world and Afghanistan. Grape is covering an estimated 82,450 hectare which is equivalent 48% of the total fruit growing area with estimated 874.500 tons production and the average yield per year is 8.5 ton/h. Although fresh grape is one of the cash crops however, the quality and quantity are not satisfactory for producers and external markets. The situation has not changed with the years. Therefore, a survey was conducted in 2017 with 60 grape growers, supported by questionnaires in Mirbachakot, Kalakan and Shakardara Districts of Kabul province. The purpose was to get an understanding of 1) current socio-demographic characteristics of farmers, 2) management methods, 3) constraints factors, 4) and contribution of grape farming to household income. Findings indicate that grape farming was predominant 83.3% male activity and main source of annual income. Further, 60% of small-scale grape producers had less than one hectare of land under grape production. Likewise, 50% had more than 10 years and 33.3% between 1-5 years' experience in grape farming. Improper vine training, poor canopy management and weak postharvest vineyard management were the core factors for incidence of pest and disease which put negative effect on grape production. Moreover, high level of farmer's illiteracy and diseases had significant digit effect on growth, yield and quality of grapes. Hence the low quality and quantity of grape are influenced by poor management methods, such as non-availability experts, lack of technical guidance and high initial investment was the severest constraint's factor for development of grape farming in the study site. Thereby the study recommended and suggested that improved managerial skills of farmers and providing initial investment material for grape producers could contribute to address the problems.

Keywords effect, management, constraints, grape farming, Kabul

INTRODUCTION

Most production economist refers to the production factors as land, labour, and capital. While the decisions on how to use the production inputs and resources, and implementation of the plans are the responsibility of this fourth factor management. The quality of the decisions gives rise to the success of the operation and management skill is clearly critical to efficiency and profit (Peter L. Nuthal, 2010). Farms like other small businesses require sound management to survive and prosper. Land, labor, and capital do not automatically produce fruit or any other products, these resources must be organized into a proper combination, the proper amount and at the proper time for the desired production to occur.

The continual development of new agriculture technologies means that farm managers must stay informed of the latest advances (Ibrahim et al., 2008). Farmers are requiring upgrading of skills and capabilities in farm management and marketing to more efficiently run their farm business (FAO, 2007). Good management is a crucial factor for success of any business especially farms. When a farm is well managed it can generate funds to be sustainable. To be successful, farm managers need to spend more time make management decisions and developing management skills (Ronald et al., 1999). A manager, regardless of position, must use the ideas of scientific management carefully generated by Frederick Taylor during early 20th century. The best management is a real science, which shows that the basic principles of scientific management is applicable for all types of human activities from the simplest of our individual actions to the work of our large companies (Alistair McKinnon, 2003). This is due to production agriculture in Afghanistan and other countries is changing as following; more mechanization, increasing farm size, continued adoption of new production technologies, new marketing alternatives and price fluctuation, and increased business risk (Atul Patil, 2008). These factors create new management problems, but also present new opportunities for managers with the right skills.

Moreover, farm managers and economists have always been interested in the reasons why some farms have higher net incomes than others and the reasons of differences is identified in 1900 century that is managerial skills (USAID, 2005). Historically, farm management researchers and writers have commented the importance of managerial skill (Ronald et al., 1999; Yamuna S. Devarajan, 2009). This aspect of production efficiency and constraints associated with production are seldom highlighted and level of research funds devoted to the areas is quite minimal. This situation is needed to change as any manager is clearly the key to combining resources appropriately to achieve the farm goals. So, it would be worthwhile to study the problems associated with pre and postharvest operations by grape growers in Shakardara, Mirbachakot and Kalakan Districts of Kabul Province.

METHODOLOGY

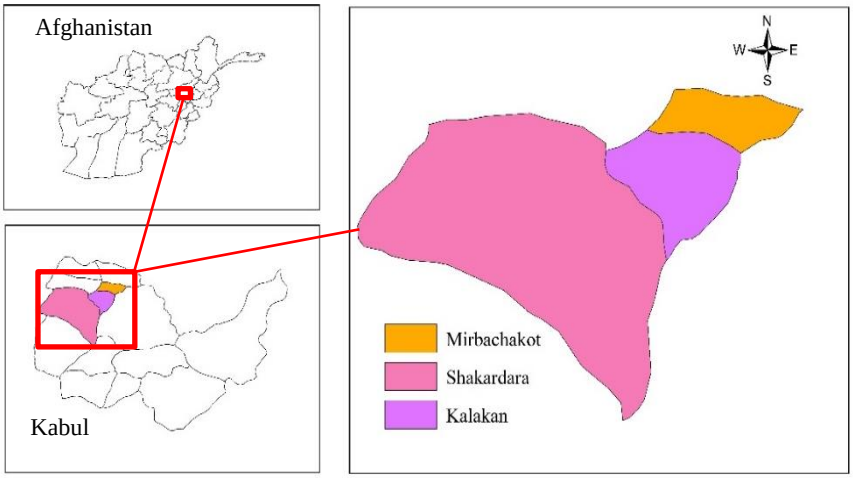

Fig. 1 Map of study sites in Kabul, Afghanistan

A survey of 60 grape growers was randomly selected and conducted in Shakardara, Mirbachakot and Kalakan Districts of Kabul Province, Afghanistan Fig. 1. A face-to-face interview was used supported by structured and semi-structured questionnaire. The questionnaire covered several areas to obtain the objectives of the research. The main aspects covered in the questionnaire were; questions on socio-demographic characteristics of farmers, management methods, farm size under grape and yield, identify main problems, constraints and the last part of the questionnaire covered contribution of grapevine farming to household income, as experienced by grapevine farming. The data analyzed using average rank formula and descriptive tools such as the frequency and percentage in excel.

RESULTS AND DISCUSSION

According to Table 1, the majority of grape growers 66.0% were aged 35-64 and 33.3% were less than 35 in trellised grape farmers. While 58.3% of Bush grape farmers were less than 35 years and 41.6% were 35-64 years. Grape farming was a predominantly male activity (83.3% male, 16.6% female), followed by married individuals constituted 66.6%, large family size 5 members and above was characteristics observed from 66.6% of trellised system Fig. 2 compared to 33.3% of bush system Fig.3. The majority of the respondents 66.0% were illiterate, while 21.6% primary and 16.6% had secondary education background.

Table 1 Socio-demographic characteristics of grape farmers

Variable	Trellised grape farmers n=30	Bush grape farmers n=30	All n= 60
Age			
<35	10(33.3)	20(58.3)	30(50)
35-64	20(66.0)	10(41.6)	30(50)
Sex			
Male	25(83.3)	23(76.0)	48(80)
Female	5(16.6)	7(24.0)	12(20)
Marital status			
Married	20(66.6)	20(66.6)	40(66.6)
Single	10(33.3)	10(33.3)	20(33.3)
Education			
None	18(60.0)	19(63.3)	37(61.6)
Primary	6(20.0)	7(23.3)	13(21.6)
Secondary	6(20.0)	4(13.3)	10(16.6)
Household size			
Less than 5	10(33.3)	20(66.6)	30(50)
5 and above	20(66.6)	10(33.3)	30(50)

Note Parentheses indicate the percentages

Fig. 2 Trellised system

Fig. 3 Bush system

In Australia, grape growers are highly skilled, constantly updating their knowledge of the cultivating, and are interested on adopting new technologies and practices. There is a comprehensive education program at all levels. Several universities are active in the field of practical skills of grape cultivators, and government agricultural agencies properly introduce education in new ways and technology arising from research centers (Rajeev Bhat, 2017). It evidenced that communicating laboratory research or knowledge generated from research centers to local farming communities is an important part of dealing with the sustainability challenges faced by the agriculture sector.

Comparing Traditional and Trellised Grape Farming

To attain your quality goals, you should learn both traditional and modern practices. According to Fig. 4 in traditional vineyard system, improper vine training, poor canopy management and weak

postharvest vineyard management were the core factors for incidence of pest and disease 45% which put negative effect on grape production. Conversely trellised system not only support the weight or the fruit, but it spreads the grape ensuring sunlight penetrates all parts of the vine. In addition to promoting good air circulation which is essential for keeping down the incidence of disease (reduced 20%) and produce disease-free grapevines can have an impact on survival, growth yield, susceptibility to pests and diseases, and the quality of fruit. All of which affect profitability and insure the long-term sustainability and success of the vineyard. Proper planting and training of young grapevines are essential for the establishment of a productive vineyard. The objective is to achieve a uniform planting of strong, healthy, well-shaped vines.

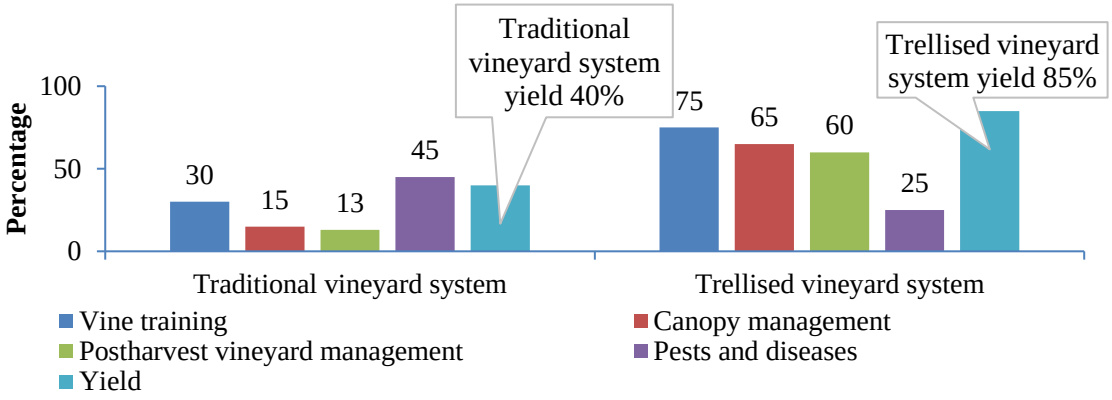

Fig. 4 Comparing traditional and trellised vineyard management system

Table 2 Engage years, farm size and grape yield

Variable	Frequency	Percent
Number of years engaged in grape farming		
<5	10	16.6
5-10	20	33.3
>10	30	50.0
Farm size under grape production (hectare)		
<1	35	58.3
1-5	15	25.0
>5	10	16.6
Total yield last year ton / ha		
<10	30	50.0
10-15	20	33.3
>15	10	16.6

According to Table 2 the qualified majority of respondents 50.0% were engaged in grape farming more than 10 years, 33.3% between 5-10 years, while only 16.6% engaged less than < 5 years in grape farming. On the other hand, 58.3% grape farmers had less than < 1 hectare, 25% between 1-5 hectare and 16.6% more than > 5 hectare of land under grape production. The average yield per hectare 12.5 tons which is lower comparing with neighboring countries such as India produce 30-50 tons per hectare, due to use of improved varieties, technologies, and moreover very good grapevine management practices.

Average Rank Formula

Descriptive statistics particularly tabulation was used to summarize the data. To determine the constraints and factors that influenced decline in agricultural production, average ranking for each of the ranked causes was used to determine the most influential factors using the formula;

Average rank $P_a = \frac{X_1P_1+X_2P_2+X_3P_3+\cdots+X_nP_n}{Total\ response\ count}$ (1)

Where X_i is the response count for each choice and P_i is the ranked position.

Table 3 Constraints of grape farming as experienced by farmers

Constraints	Rank				
	1st	2nd	3rd	4th	Average rank
Low price of grape	30 (50.0)	20	7	3	1.7
High cost of input	23 (38.3)	20	12	5	1.9
Limited access to market	35 (58.3)	15	7	3	1.6
Unavailability of cold storage facilities	40 (66.6)	10	5	5	1.5
Pests and diseases	35 (58.3)	10	6	9	1.7
Water shortage	38 (63.3)	12	5	5	1.6
Limited access to quality seedlings	30 (50.0)	10	8	12	2.0
Limited access to financial services	20 (33.3)	11	18	11	2.1
High initial investment	45 (75.0)	6	4	5	1.4
Less response of dealers and distributors in repay the amount in time	28 (46.6)	9	12	11	2.1

Note: Parentheses indicate the percentages

Based on Table 3 the results reveal that high initial investment average rank was 1.4 and the severest problem which was expressed by (75%) of grape producers followed by lack of storage facilities, limited access to market, and pest and disease average ranked were 1.5, 1.6, 1.7 respectively. This is linked to due to market is mainly domestic and grapes are sold as fresh as no value –adding activities. The market linkages for grapes are therefore weak and undermine the overall growth grape-subsector in the area. Important pests were (leafhopper and spider mites) while major diseases were powdery mildew and downy mildew. These diseases had significant digit effects on growth, yield and quality of grapes. Although data for grape losses due to pests and diseases are not available, discussion with farmers and based on my previous research paper clearly revealed that pests and diseases cause considerable damage to grapevine (Yusufi, 2017).

Table 4 Farmer's preference on grape characteristics for improvement

Characteristic of grape varieties	Score of farmers' preference			Average rank
	1st	2nd	3rd	
High yielding	70	35	15	1.2
Demand for domestic and foreign markets	86	22	12	1.3
Good quality of grape	80	25	15	1.4
Resistance to pests and diseases	85	15	20	1.4
High price	87	14	19	1.4
Need less fertilizer	80	17	23	1.5
Early maturity	75	30	15	1.5
Resistance to drought	60	35	25	1.7

According to Table 4, the average rank reveal that varieties with the high yielding at 1.2 and the more demand for domestic and foreign market characteristics at 1.3 were the most preferred by grape growers for they assure an abundant harvest for family consumption, and extra income to support household expenditure. Followed by good quality, resistance pest and diseases, high price, early maturity, less fertilizer and resistance to drought. In the study site some farmers grew more than one grape variety in their grape farm, but lack of manual labor at peak of harvesting season

was one of the problems of the farmers. So, planting a number of early maturing varieties would facilitate better scheduling of labor during harvesting season. Farmers could harvest first the short duration (early maturity) varieties, then medium and late duration varieties. Due to, grape growers usually do not have access refrigeration to stock in the storages at the peak of harvesting season. Therefore, the short duration varieties were very important for them. Uniformity color, taste, shape and medium size were also preferred as farmer's perception that these were indicators of good grape quality as a third preference.

Table 5 Contribution of grape farming to household income

Year	Labor cost*	Initial investment cost AFN**	General expenses	Total cost
2014	75,000 (65.2)	25,000 (21.7)	15,000 (13)	115,000
2015	85,000 (66.9)	27,000 (21.2)	13,000 (10.2)	125,000
2016	87,500 (70.0)	30,000 (24.0)	11,000 (8.8)	128,500
		Value of Grape Production		
	Yield	Price / kg	Production value	
2014	14,000	20.0	280,000	
2015	10,000	23.0	230,000	
2016	13,500	25.0	337,500	
Average	12,500	22.6	282,333	
		Economics of Grape Production		
	Production value	Production cost	Coefficient	Net income
2014	280,000	115,000	2.4	165,000
2015	230,000	125,000	1.8	105,000
2016	337,000	128,500	2.6	209,000
Average	282,333	122,333	2.2	159,666

**Family labor is accounted, ** Afghani currency*

Based on Table 5, the net income from farm produce was derived by production value minus production cost. The average annual net income per household from grape farming was 159.666 AFN, which is equivalent to 70% of the total income. While livestock and livestock products and other agricultural activities contributed only 30% to household income. Moreover, the average coefficient for the analyzed period from 2014 to 2016 was 2.2; similarly, the coefficient in 2016 was slightly higher 2.6, which was the result of high-value production and high selling price of grape 25 AFN/kg. This reveals there is high potential of household welfare and reducing poverty levels through grape farming, especially when grape productivity is improved.

CONCLUSION

This study indicates that management is a critical factor for success of any business especially agriculture. Land, labor and capital cannot automatically produce fruits. Resources must be organized in the right combination for the desired production. Findings revealed that grape farming is predominantly 83% male activity and the main source of annual income (70%) for small scale farmers in Afghanistan. In trellised vineyard system the incidents of diseases drastically reduced 20% and grape production considerably increased 40%, due to vineyards are properly managed in the light of advice of agriculture experts. Despite this advantage, adoption of trellised system remains low in the research site. In this connection it also found that high initial investment in grape farming 75%, unavailability of cold storage facilities 66.6%, limited access to market that fully derive benefit of grape production 58.3%, scarcity of water 63.3%, pest and diseases 58.3% were the core constraints factors identified for adoption of trellised system. The poor quality and quantity of grape is affected by weak management practices such as non-availability of experts, lack of access to technical guidance. If these issues are not considered, the long-term viability of grape production will be at risk. Despite the challenges, the result indicated that grape farming not only bring maximum profit to household income but also maintaining sustainability. Thereby, the

study recommended that a concrete action should be taken for providing initial investment material and effective extension programme to improve viticulture knowledge of grape producers.

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REFERENCES

Abdullah, Y. 2016. Horticulture in Afghanistan, Challenges and opportunities. University of Tsukuba, Journal of Developments in Sustainable Agriculture, 11, 36-42.

Alistair, M. 2003. The impact of scientific management on contemporary New Zealand business. New Zealand.

Atul Basweshwar, P. 2008. A study on constraints analysis of grape exporting farmers of Maharashtra state. University of Agricultural Sciences.

FAO. 2007. Farm management extension services, A review of global experience, Food and Agriculture Organization of the United Nations, Italy.

FAO. http://www.fao.org/docrep/003/x6897e/x6897e04.htm, Food and Agriculture Organization of the United Nations, Italy.

Ibrahim UZUN, A. and Bayir. 2008. Viticulture in Turkey. Bulletin UASVM, Horticulture, 65 (1).

Kazim, 2003. A review of the horticultural marketing and post-harvest conditions in Afghanistan.

Kemal-ur-Rahim, K. 2003. A review of the horticultural marketing and post, Harvest conditions in Afghanistan. Food and agriculture organization (FAO), Italy

Nuthall, P. 2010. Farm business management. Lincoln University, New Zealand, https://www. bookdepository.com/Farm-Business-Management-Peter-Nuthall/9781845938390

Peter, L. 2010. Farm business management. USA.

Rajeev, B. 2017 Sustainability challenges in the agrofood sector, India. https://www.wiley.com/en-us/ Sustainability+Challenges+in+the+Agrofood+Sector-p-9781119072768

Ronald, D., William, M. and Patricia, A. 2015. Farm management, Australia. https://trove.nla.gov.au/ work/2167435

USAID, 2005. Global horticulture assessment. University of Davis, California, Global Horticulture Assessment Team (led by UC Davis and AVRDC), The World Vegetable Center, USA.

Uzun, Ibrahim and Bayir Yegin, Arzu. 2008. Viticulture in Turkey. Bull UASVM, Hort. eISSN. 1843-5394.

World Bank, 2014. Agricultural sector review, Revitalizing agriculture for economic growth, job creation and food security, World Bank.

Yamuna, S. 2009. Discriminating the effects of vineyard management practices on grape and wine volatiles. Faculty of the Virginia Polytechnic Institute and State University in partial, USA.

Yusufi, M. 2017. Pre and postharvest losses and marketing of grapes in Afghanistan, A case study in Mirbachkot, Shakardara and Kalakan Districts Kabul, Afghanistan. International Journal of Environmental and Rural Development, 8 (1), 153-159.