Research Article

Horticultural interventions for sustainable agriculture in Balochistan

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Abstract

In the globally changing scenario, the importance of agriculture is becoming more and more important to feed the over increasing population of the world. Pakistan is also facing the same problem particularly in the province of Balochistan. The PACCD (Pakistan Agriculture Cold Chain Development) project is working on innovative and updated horticulture interventions to boost the agriculture sector in the province of Balochistan. The finding of PACCD suggested that cultivation of high density, early bearing, innovative and dwarf apple and grapes varieties along with efficient irrigation system could increase profitability and productivity on sustainable basis in the Balochistan province of Pakistan.

Keywords: PACCD; apple; grape; efficient irrigation system; sustainable agriculture

Introduction

Balochistan is known as the 'fruit basket' of Pakistan but having water scarcity problem for successful fruit production. Baluchistan is the largest province of Pakistan with a total land area of 347,000 square kilometers. Agriculture has been the main source of income for majority of the population in Baluchistan. Agriculture is the bread and butter for small landholder; however, the farmers face numerous problems. It is a dire need to shift towards sustainable agriculture approach, changing the priority from farms to farmers' development [1]. Despite the critical importance of the agriculture sector, the overall growth of agriculture sector has fallen from the last three decades and the yield gaps is rising in our country particularly in Balochistan. Critical

investments in new planting materials (plants and seeds), farming technology and water use efficient systems are not introduced in the province to boost and uplift the agriculture sector of Balochistan [2]. In the country and Balochistan, both public and private sectors are involved in the production, multiplication and distribution of improved planting materials particularly high yielding and hybrid seeds. Parallel with such need of the farming communities of the province new planting materials in horticulture sector has always been a serious demand of the farmers. Water is the most essential and very critical input for the sustainable agriculture in the province. Efficient use of water for irrigation system has always been considered as an essential intervention generally in the country and

particularly in Balochistan. High efficient irrigation systems are highly necessitated by the farmers' communities of the province for more saving of water and more cultivation of land in Balochistan. The traditional planting methods have seriously damaged the horticulture sector of Balochistan due to harsh weather particularly the irregular precipitation. The PACCD project is working hard to fulfill the demand of the farmers by providing some benefits and trainings for the sustainability of Agriculture in the Balochistan.

Materials and Methods

The PACCD (Pakistan Agriculture Cold Chain Development) project is working on horticultural interventions for the sustainable agriculture in the Balochistan province of Pakistan. PACCD is mainly focusing on establishment of cold storages in the province. However, the PACCS also focused on three more interventions e.g. (1) introduction of innovative, high density, early bearing and low delta planting materials of apples (Jeromine, Granny Smith, Fuji, Golden Delicious and Gala) and grapes (Vitro-Black, Victoria and Autumn Royal), (2) efficient irrigation system (drip irrigation) and (3) innovative planting methods for cultivation of grapes and apples (Trellises). The project implemented and executed by Winrock-international and financed or funded by United States Department of Agriculture (USDA).

Both apples and grapes were grown on straight and T-Trellises system with 7 x 7 feet plant to plant distance and 11 x 11 feet row to row distance. All the plants were irrigated through drip irrigation system having two emitters for each plant with 40 liters discharge of water per hour. The total number of plants per acre calculated on the formula ($\text{Plants per acre} = \frac{\text{row to row distance} \times \text{plant to plant distance}}{\text{area of one plant}}$) were 565. Data were collected on the following parameters using the scientific analytical

approach. All the data are presented in tabulated forms and explained in the results and discussion section.

- 1: Water requirements of traditional and high density apples.
- 2: Water requirements of traditional and low delta innovative grapes.
- 3: Total number of plants per acre of traditional and high density apples.
- 4: Total number of years for bearing fruits of traditional and high density apples.
- 5: Total price per kg of traditional and innovative apples.
- 6: Trellises and trenches system comparison in grapes.

Results and Discussion

Maximum water requirements of all the selected dwarf and high density apples varieties in peak season (June and July) was 40 liters per irrigation and the minimum water requirements was 20 liters per irrigation. However, the maximum water requirements of traditional apples varieties in peak season was more (140 liters) per irrigation and the minimum water requirements in normal months was 125 liters per irrigation (Table 1). Similar results were also noted in the innovative and high yielding grape varieties. The reason for this great saving and conservation of water in the province is highly and crucially essential for the sustainability of horticulture sector in Balochistan and it has been proved that the proper selection of efficient water using irrigation systems, methods and techniques along with low water consumption apples and grapes varieties could save water for more area to be brought under cultivation and would be resulted on strengthen rural livelihood in the province [3]. The farmers of the province are not familiar with the innovative varieties of grapes/apples and water conservation techniques, whereas the concerned varieties and techniques could be a diversification towards sustainable agriculture in Balochistan.

Table-1. High density dwarf and traditional apples varieties, their water requirements, number of plants per acre and fruit bearing intervals grown by PACCD in Balochistan.

Varieties	Water Requirements. (1 st June -30 th July/24 Hour-peak days)	Number of Plants/acre.	Fruit Bearing Interval
Jeromine	Min 20 liters. Max 40 liters	Min 565. Max 750	1 st Year
Red Delicious	Min 120 liters. Max 140 liters	Min 70. Max 76	After 10 Years
Fuji	Min 20 liters. Max 40 liters	Min 565. Max 750	1 st Year
Katja	Min 120 liters. Max 140 liters	Min 70. Max 76	After 5 years
Granny Smith	Min 20 liters. Max 40 liters	Min 565. Max 750	1 st year
Golden Delicious	Min 120 liters. Max 140 liters	Min 70. Max 76	After 10 Years
Gala	Min 20 liters. Max 40 liters	Min 565. Max 750	1 st year
Amri	Min 120 liters. Max 140 liters	Min 70. Max 76	After 10 Years
Golden Delicious	Min 20 liters. Max 40 liters	Min 565. Max 750	1 st year
(Dwarf) Mashadi	Min 120 liters. Max 140 liters	Min 70. Max 76	After 10 Years

Table-2. Price per kilogram, trellises vs. trenches, drip irrigation vs. flood irrigation for innovative grapes crop grown by PACCD in Balochistan.

Varieties	Price per K.G (In PKR)	Trellises.vs.Trenches	Drip Irrigation.vs. Flood irrigation
Vitro-Black	Min 280. Max 360	Maximum Production, less infestation, protection from rain in case of trellises /low production, Disease infestation, high risk of fungus attack due to rain in case of Trenches.	37 % water saving. Uniform irrigation. Uniform fertigation. In time irrigation in case of drip irrigation / great wastage of water. High laborious fertigation application. High infestation of weeds.
Kishmishi	Min 60. Max 80		
Victoria	Min 280. Max 360		
Shunderkhani	Min 60. Max 80		
Autumn Royal	Min 280. Max 360		
Haita	Min 60. Max 80

Fig. 1. The Graphic illustration of the water requirements for high-density and Traditional apple Varieties

Fig. 2. The graphic illustration of plants per acre of high-density and traditional apple varieties

Fig. 3. The graphic illustration of price per kg (PKR) of local and innovative grapes Varieties

Traditional apples varieties like Katja, Red Delicious, Golden Delicious, Amri and Mashadi were ranges from 70 (minimum) to 76 (maximum) plants per acre, whereas, the high density dwarf apples ranges from 565 to 750 plants per acre (Table 1). The possible reason for this could be the selection of suitable varieties of apples that needs less water because the province is facing a great shortage of water which created the drought situation in the province. The importance of high density apple varieties could perform very well because of less water requirement and minimum efforts for its production can boost the rural economy and could strengthen the horticulture sector by such intervention in the province [4]. All the traditional varieties of apples like Red Delicious, Golden Delicious, Amri and Mashadi have the capability to give production (Fruits) after 10 years, whereas Katja has the capability to give production very early in 5 years (Table 1). Interestingly, the high density dwarf apple varieties Jeromine, Granny smith, Fuji, Golden Delicious and gala have the capability to give production in first year (Just after plantation of the plant). However, the farmers' community of the province is not familiar with these innovative agriculture interventions. Dissemination of

these new information among the farmers in the drought areas of Balochistan could maximize the fruit production on sustainable basis. This sort of intervention could encourage the farmers to spread their horticultural activities because due to early bearing without wasting time, the farmers can get good production from their innovative commodities in shortest period of time [5].

Innovative grapes varieties were with the maximum price per kg as compare to traditional grapes varieties (Table 2). The minimum price per kg of Vitro- black was PKR 280 and the maximum price per kg of Vitro-black was PKR 360. On the other hand, the price of traditional variety Kishmishi ranged between PKR 60 to 80 per kg. Same results were noted for Victoria the price ranged from 280 to 360 per kg. The price of traditional varieties ranged from 60 to 80 per kg. The innovative variety Autumn Royal price per kg ranged from 280 to 360 PKR. These results are in agreement with [6] and [7]. The concerned results are argued on the selection of best innovative low delta grapes varieties. The best selection of certain varieties may strengthen the horticulture sector of the province. The innovative varieties could be resulted a great diversification towards dissemination of the

best selection of grapes which would be again resulted on a sustainable agriculture in the province. The latest and best growing techniques and Ideal efficient water using irrigation system could strengthen and boost the rural economy of Balochistan. The Province is still facing water scarcer situation in the form of a slight drought and as the rainfall in the province is highly variable with depleting water resources, resulting from elevation difference, the average annual precipitation varies from less than 50 mm in the southwest to about 400 mm in the northeast. The evaporation rates, on the other hand, are very high ranging from 2000 mm to over 3500 mm, thus requiring irrigation necessary for practicing agriculture. In the uplands, however, under favorable topographic condition, rainfall is just sufficient to support the growth of natural vegetation which could be highly imperative that these resources could be used most judiciously to ensure agriculture development and productivity. While the innovative and modern growing techniques like trellises and efficient and judicious use of water resources could develop and strengthen the sustainable agriculture in the province.

Conclusion

Cultivation of high density, early bearing, innovative and dwarf apple and grapes varieties along with efficient irrigation system could save water, increase fruit

production and growers income on sustainable basis in the Balochistan province of Pakistan.

References

- 1 FBS (Federal Bureau of Statistics) (2012). Government of Pakistan, Islamabad.
- 2 Agriculture Statistics of Balochistan (2011). Directorate of Statistics, Rani Bagh, Seriab Road Quetta. Government of Balochistan.
- 3 Naseem M, Khan W, & Akram M (2010) The water use efficiency techniques and strategy in horticulture sector of Balochistan I: 34-37
- 4 Tareen ZA (2010) Horticulture Improvement through modern Technology in Balochistan. *J Bio Tech* 2: 21-24.
- 5 Gokturk B, Sagdic O, & Ozkan G. (2008). Determination of Drought Resistant Apples in Micro Climatic conditions of Ezmeer. *Int J Food Sci Tech* 41: 799-804.
- 6 Musakhail N, & Sangeen M (2007) The performance and economic importance of low Delta crops in micro climatic conditions of Balochistan. Agriculture Research Institute, Seriab Road Quetta- Balochistan (ARI) 2: 43-46.
- 7 Majeed K (2010) Balochistan Conservation Strategy. IUCN, Quetta- Balochistan.