

Available on <http://www.pjbt.org>  
**Pakistan Journal of Biotechnology**  
 (PJB)  
 (P-ISSN: 1812-1837 and E-ISSN: 2312-7791)



## COST ANALYSIS OF HYBRID VEGETABLE PRODUCTION AND ITS IMPACT ON FARMER'S INCOME IN BALUCHISTAN, PAKISTAN

Juma Khan Bajkani<sup>1\*</sup>, Humera Amin<sup>2</sup>, Shah Pasand<sup>3</sup>, Iram Raza<sup>4</sup>, Sabeen Siddiqui<sup>4</sup>, Ahmed Ali<sup>5</sup> & Fateh Muhammad<sup>3</sup>

<sup>1</sup>Social Sciences Research Institute (SSRI), PARC, Tandojam, Pakistan

<sup>2</sup>Department of Agriculture Extension, College of Agriculture, University of Sargodha

<sup>3</sup>Social Sciences Research Institute (SSRI), PARC @ ARI Sariab Road Quetta

<sup>4</sup>Social Sciences Research Institute (SSRI), NARC, Islamabad

<sup>5</sup>MS-Economics Student, Department of Economics, Lasbella University of Agriculture, Water & Marine Sciences, Othal Balochistan, Pakistan

\*Corresponding author: [jumokhanbajkani@gmail.com](mailto:jumokhanbajkani@gmail.com)

Article Received 22-11-2022, Article Revised 11-01-2023, Article Accepted 12-04-2023.

### ABSTRACT

The vegetable grows in a wide range in summer and winter along with off-season vegetables in Pakistan. Vegetable production is the main source of household income and employment of many opportunities for vegetable farmers in Pakistan as well as in Balochistan. The main purpose of research work is to know the adoption rate of hybrid varieties, to estimate, and compare the profitability of selected vegetable respondents, and its impact on farmers' income. The study was conducted through primary data collection from vegetable growers who had planted hybrid, improved, and local vegetable varieties in the Balochistan. A survey methodology is used to collect primary data because it is commonly used in the field of social sciences. The research work was initiated during 2019-20 from 109 vegetable farmers, randomly selected from 25 villages of determination the study areas are Kachhi (Bolan), Killa Saifullah and Loralai districts, Balochistan. During the survey majority of vegetable growers are unknown hybrid seed varieties due to no agriculture training facilities in the vegetable growers in the study area. The research policy is long-lasting for production issues of vegetable seed varieties solving through development free diseases, high yielding, and pest-resistant seed varieties for different growing areas in the province. The researcher must think of a feature policy increasing vegetable production improve through better management practices for increasing vegetable production export for national demand. The hybrid vegetable growers received net income was Rs. 101303, 85133, 89969, and 54103 per acre of tomato, Cauliflower, Luffa/Ridge Gourd (Turia), and Onion respectively.

**Key Words:** Hybrid, Vegetable, Productivity, Net income, Balochistan, Pakistan.

### INTRODUCTION

Vegetables are a reasonable source of food and rich nutrients that provide proteins, vitamins, starch, fats, and minerals and consumption for a daily stable diet. (Adenuga et al., 2013), study findings mentioned that Lycopene can reduce cancer incidence and growth of several cancer types which is available in tomatoes. Vegetable consumption is mostly low in our country and the average consumption of the high income of people level was above. The reported (Admin, 2020) of daily 100 gms eating of per capita is low followed by the suggested consumption of about 285 grams in Pakistan. Similarly rural & urban populations used the normal levels of vegetables. In Pakistan, vegetables are

the biggest produced and consumed. It is a high inputs demanding crop and the majority of its growers belong to medium and large-size categories. The hybrid seed of growing farmers has obtained more yield and received high net income. Vegetables are not a nutrition source but the main source of household income and high protein production followed by other cereal crops. (Khushk and Lashari, 2004), reported 35 kg per capita annual consumption which is distant from the nutrition level of minimum lower. As well as vegetables demand to increases estimated earn growth for vegetable farmers. The habits of Asian food status of spite based are high on vegetables and many countries" availability per capita annually

below the minimum requirement of consumption of 55 kg/annum (Siemonsma, 1993; Moustafa A, 2007). Reported the vegetable growers received more income from vegetable production due to more agriculture training; they increase production and diversified levels into other major crops. Balochistan produced about four months of vegetable production and other months' imports significances of vegetables from Sindh, Punjab, and neighboring countries in Iran. Consumers also willingly pay the best prices for additional quality greenhouse foodstuffs generating further encouragement to raise production. The primary production of vegetables was 5.57 million tonnes and production increased from 1.3 to 5.57 million tons from 1971 to 2020 in Pakistan with an annual growth rate of 3.21 percent (<https://knoema.com>, 2020). The sharing of vegetable crops under 0.62 million hectares is about 3.1 percent of the total cropped area while the area reduced due to cereal and other cash crops growing pressure were increasing (Admin, 2020). The average potential of vegetable yield is very low as followed by the world standards of yield per hectare. The total area of vegetables was 463.06 thousand hectares excluding potatoes, production was 8374.0 thousand tons per hectare (GoP, 2018-19). Balochistan province was covering a vegetable plus potato area of 34.50 thousand hectares and production was 411.0 thousand tons the area contributed 7.45 percent while production is 4.91 percent of the country during the same year, which is very low as compared to the other provinces and the province is a deficit in vegetable production. The area & production was a huge decrease due to shortage of water, low germination of seed, high load shading of electricity, the high price of inputs, low price of vegetable products, and climate change not favorable for vegetable sowing in Balochistan. The quality of vegetable demand increases at the national level from time to time and the mandate of production is not rising due to less production, which did not change of production of vegetable from season to season. The vegetable is in shortage in winter and significantly reduced the market supplies due to heavy frost and cold temperatures.

**Hybrids Seeds of Vegetables:** Now most all crops of vegetables of hybrid seed varieties are available in the market. The respondents of vegetables grow all kinds of vegetables in our field because of their high yield, disease free, few use of pesticides, early fruiting, or mature and good quality products. The Asia farmers had low knowledge of hybrid vegetable seed and they used previous own kept seed. The huge seed of hybrid is potential, but then again the upgrading and continued exposure of seed production of pollinated varieties provided reasonable growing material to the poorer farmers. Keeping the view cruciferous crops are top ten Asia countries and they cover in highest percentage.

The hybrid seed of cabbage and cauliflower F1 is the main source of Japanese seed companies (Devarrewaere, 1995). In the hybrid vegetable research study conducted by (Bonina Bonina, J., Cantliffe D. J., 2004), they reported that hybrid vegetable growers as well as organic farmers want to grow open-pollinated. Hybrid seed measured of two parents need be the offspring that vary in one or more transmissible characteristics. Highlight the (Kirschenbaum, 2000) research study hybrid seeds only planted once time while thus cannot planted or saved for next year and one of the replacements for hybrids is open-pollinated cultivars. These are created by selfing or outcrossing to the similar parental kind. Further open-pollinated cultivars are mentioned as inheritance cultivars because they have been grown for several years. No length of standard period farmers grew to be measured as an heirloom cultivar, but generally, 40 years is the minimum (Kirschenbaum, 2000). It is possible to evaluate a profit margin in several ways, but the most common way to do so is by looking at the rate of return on invested capital. A company's profitability may be assessed over time by calculating the amount and value of inputs and outputs. Comparing companies and their returns on capital invested allows for comparison. The easiest way to analyze profitability is to expand a case study of a few companies in the lack of complete accounting for many of them (Scarborough and Kydd, 1992). The main purpose of research work is to know the adoption rate of hybrid varieties, to estimate, compare the profitability of selected vegetable respondents and its impact on farmers' income.

## MATERIAL AND METHODS

The order of study objectives data collected from vegetable producers and various stakeholders to examine the status of vegetable production in the Balochistan province of Pakistan. Primary data for the study was collected in the year 2019-20 from 109 vegetable farmers of Kachhi (Bloan), Laralai, and Killa Saifullah districts of Balochistan. The secondary data was collected from the different departments and organizations to substantiate findings obtained by analyzing primary data. The questionnaires used for the study covered information relating to knowing the adoption rate of hybrid varieties, to estimate and compare the profitability of selected vegetable respondents. The scientists clarified the purpose of the study before starting the interview at their farms. The farmers guaranteed the collected data will be used for research purposes and would be held in reserve confidential. A representative sample of vegetable farmers, market intermediaries, and other stakeholders was selected for the collection of primary data. Selected respondents were interviewed by using a set of detailed, pre-tested, and finalized questionnaires.

Suitable quantitative analytical techniques have been used to achieve the objectives of the study. The farmers were randomly selected during the survey time.

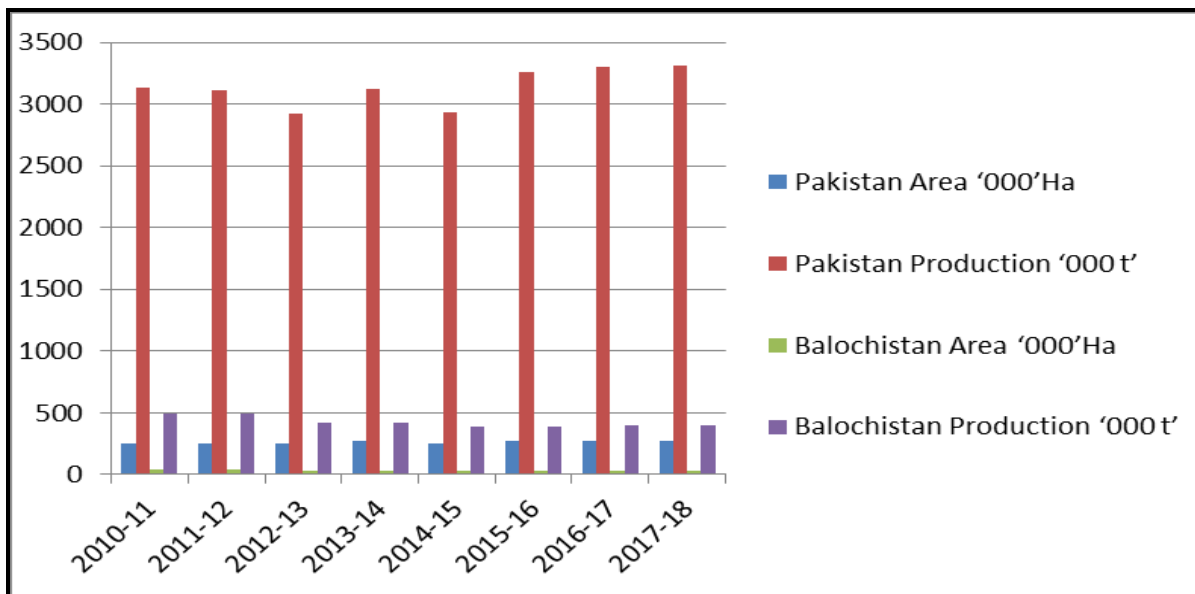


Figure 1. Area & Production of Pakistan & Balochistan

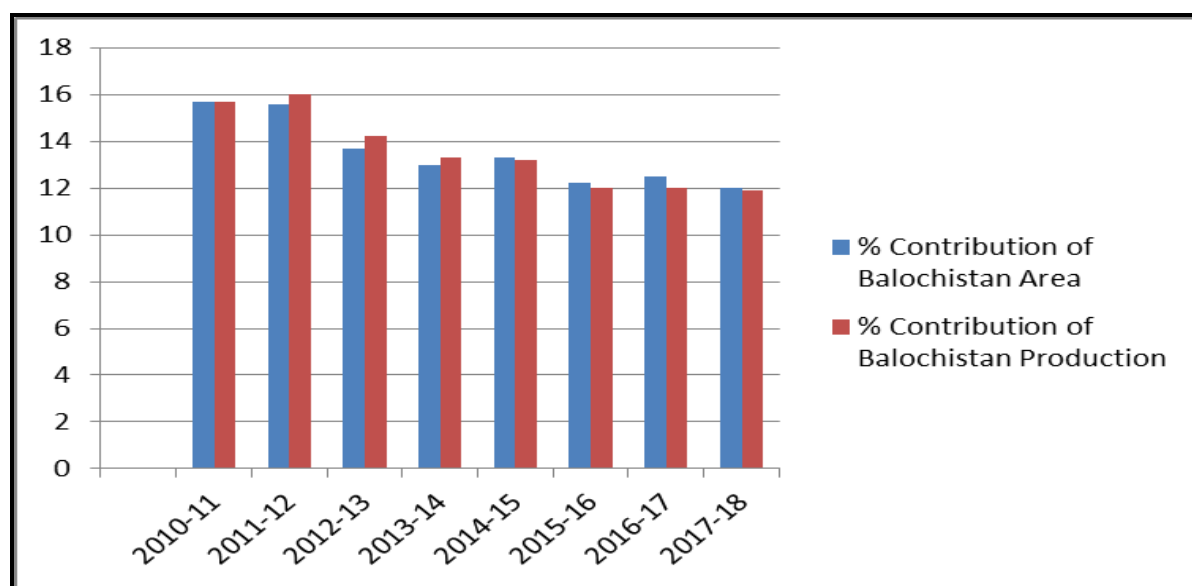


Figure 2. % Contribution of Area & Production of Balochistan

Table 1. Sample Size by Selected Districts

Districts	Sample Size (#)	Percentage
Loralai	32	29.36
Killa Saifullah	42	38.53
Kachhi (Bolan)	35	32.11
<b>All</b>	<b>109</b>	<b>100.00</b>

**Data editing, entry, and analysis:** When finalizing the field survey, the data has been edited and shifted from the questionnaire into a worksheet as a database file in

SPSS software. The mutable names within the database file mention questions in the questionnaire. Economic analysis of vegetable farming by farm size categories

has been done, as it helps investigate a wide range of issues (Gall, M. D., W. R Borg and J. P. Gall. 1996) Thus, sample farmers were categorized into three types based of farm size farmers to capture differences in resource endowment, cost of production and profitability per unit area.

**Farm costs and returns analysis:** The study results deliver a comparison of the total cost and return of different vegetables. To examine the performance of vegetable farmers adopted the following procedure:

**Total costs:** Total cost is the entire amount of money that must be spent on something to produce, maintain or own it and related costs commonly used like:

**Total fixed costs:** The sum of all costs that never change, while waiting for new money costs are required with the level of production increase or decrease. For example, somebody who pays rent will pay a similar amount of rent each month; this is a fixed cost.

**Total variable costs:** The components of variable costs are the costs that the differences concerning sales volume and are called the cost of goods sold.

**Opportunity costs:** The term economics opportunity cost is that mentions the value of what you have to give up in order to consume something else. For example the farming land & labor his own he could receive by renting it to someone else (Hofstrand, 2005).

**Total revenue:** The producer received an amount from the sale of any quantity of production. (Biz, 2002), indicated the total income is calculated by taking the price of the sale times the quantity sold.

**Economic profits:** Economic profit or loss is the difference between the revenue received from the sale of an output and the costs of all inputs used except opportunity costs that have been deducted from gross income.

**Gross margin:** Gross margin equates to net sales minus the cost of goods sold. Gross margin can also be called gross profit margin, which is gross profit divided by net sales.

## RESULT AND DISCUSSION

**Socioeconomic Characteristics of the Sample Respondents Farm Size:** It is important to examine how resources are managed, and the resulting impact on productivity and sustainability. The empirical literature indicated that small farmers have an advantage in labor supervision over large farmers. Therefore, the quantity of labor inputs is likely to be higher on small farms. Second, small farmers can have restricted access to modern input, and this can hold back their productivity, third, small and large farmers may differ in their attitude to risk and uncertainty. The large farmers may be more willing and able to carry greater risks. Results showed that 50.46 percent of respondents had more than 25 acres, followed by 32.10

percent have more than 12.5 – 25 acres, and 17.44 percent falling less than 12.5 acres and high large, medium, and small farm size was found in Killa Saifullah and Bolan districts 64.29, 16.0 and 28.0 percent respectively.

**Socio-economic profile:**The information regarding the socio-economic characteristics of the sample vegetable farmers is presented in the average age of the sample farmers was about 44 years, implying that relatively senior members of farm families were operating the farming business. The sample farmers of the study area on average had 4.0, 22.39, and 16.52 years of formal education in schooling, farming, and vegetable experience, respectively. The average involvement in farming of the respondents was 83.34 and 16.66 percent full-time and part-time, respectively. The average family size was 25.37. Further, results showed that 91.0 and 9.0 percent of respondents living pattern joint and single, respectively.

**Source of income:** As depicted in the overall average source of income of sample farmers 78.50 percent dependent on agriculture and the second source was 8.14 percent of livelihood depending on livestock found in the study area.

**Land Tenure System:** Vegetable cultivation is a resource requiring business, so the status of the farmers has a significant role in crop production. Agribusiness management describes the importance of the decision-making process in the efficient and potential use of inputs in production and returns as well. The land tenancy also has an important production aspect. The length of time horizon for owners and tenants is bound to differ, giving rise to different attitudes towards long-term investment (especially natural resources management investment) in crops with long gestation periods. Growers can be classified into various categories, especially about land tenure. In the vegetable growing system, it was observed that more than the tenant's growers shared the land on a production basis. There is an important distinction between landowner, tenant, and owner-cum-tenant. An owner is a functionary who owns the land but does not cultivate the land by himself. His land is cultivated by landless tenants and shareholders. The tenant is a functionary, who cultivates his land by himself. The result indicates that owners dominant with 37.35 percent, OCT was 31.60 percent and 31.05 percent of growers of vegetables belonged to group tenants respectively. Information regarding the high percentage of large farm sizes was found owner group in the study area.

**Knowledge of hybrid seed varieties of vegetables:** Agriculture knowledge is the main portion for vegetable growers. During the survey majority of vegetable growers are unknown of hybrid seed varieties of vegetables due to no agriculture training

facilities in the vegetable growers followed by some area. farmers who know of hybrid seed varieties in the study

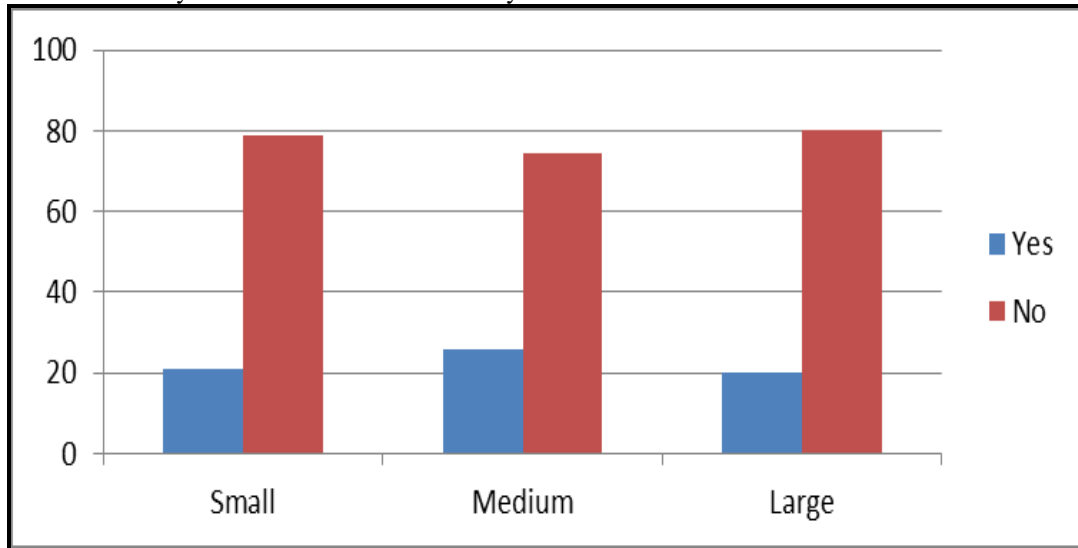


Figure 3. Knowledge of hybrid seed varieties of vegetable

**Characteristics and Non-characteristics:** Perception of vegetable growers and analysis of characteristics and non-characteristics of hybrid seed varieties of vegetable shows that farmers compare with other local

varieties that the majority of growers asked about characteristics of hybrid varieties are high yielding and non-characteristics of the high price of hybrid seed varieties.

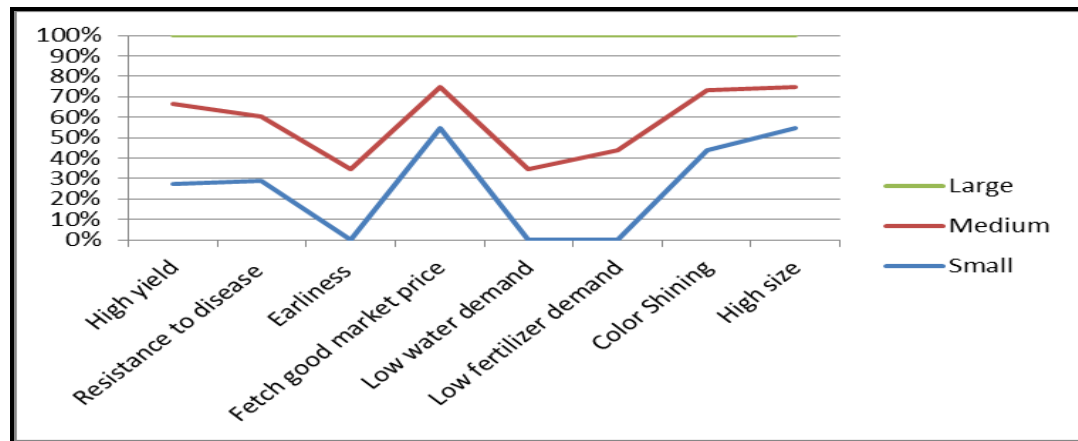


Figure 4. Characteristics of hybrid seed varieties

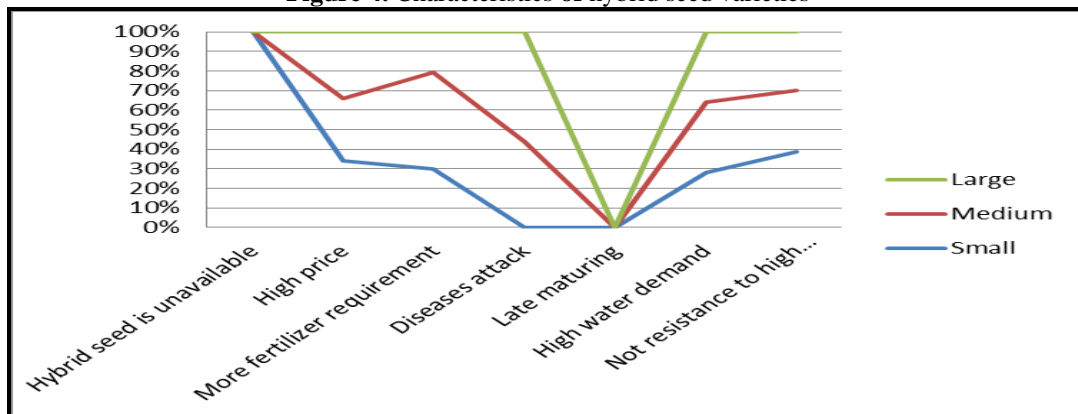


Figure 5. Non-Characteristics hybrid seed varieties

**Seed Rate:** Generally growers' high or low recommended seed rates are used on our farm and some growers used recommended seed rates used on the farm. Results showed that overall, the seed rate for hybrid tomato, cauliflower, Luffa/Ridged Gourd (Turia), and onion was 184 gm, 313gm, 2.5kg, and 6.33kg/acre respectively.

**Vegetable Varieties:** Pakistan is one of the countries where the varietal replacement has been generally very slow although farmers quickly adopted varieties at the time of the Green Revolution in the late 1960s (Byerlee D, 1993). Almost vegetable growers grow quality seed varieties of hybrid vegetables in Pakistan as well as Balochistan. As discussed during the field survey farmers of vegetables were unknown hybrid vegetable varieties and they minimum of one and a maximum of three varieties planted.

**Cost of Production of Hybrid Vegetables :** Vegetables are a main cash crop in this connection growers use high inputs for obtaining more yield and comparatively per acre cost production of higher followed by few inputs used by farmers. The transportation, packing, and marketing charges veahigher share (28.61) in production cost as a comparison to other vegetables in table 2. In the cost of tomato production comparison between commercial and locally grown, the investigator collected averages for each type of report and budget based on industry. Researchers reported the average cost of Industrialized tomatoes was \$4085 and 19,000 to 25,000 pounds/acre

produce of every harvest of tomato farming methods of industrialized (Diver, Kuepper & Born, 1999; Agricultural Research Service, 2000; McCraw, Motes & Schatzer 2007). A similar study reported the used rarely local farming practices produce cost \$3912/acre (New Jersey Agricultural Experiment Station, 1996; Estes, Kleese & Lauffer, 2003). The farmers can receive potential yield when they used new technology in crop farming (Khushk, et al, 2001). The tomato productions locally grown are resulting in 5/100/acre production from general farms (Hood, 2005). Globally tomato is the main cash and commercial vegetable crop in many parts of the world (Babalola et al., 2010).

There is a wide distinction in vegetable prices and many reasons were bearing another vegetable, supply & demand in the market. The higher sale price was the early and low price in mid vegetable season. The results of the cost of production of major hybrid vegetables are presented in table 2. The overall tomato hybrid cost of production was high per acre (Rs.142884.56), followed by other hybrid vegetables and while the Luffa/Ridged Gourd (Turia) growers received high income from other hybrid vegetable growers. A similar study (Qasim M. et al, 2018), determine the production cost of tomatoes was Rs. 140383.85, Rs. 117224.93 & Rs. 117224.93 per acre in Sindh, Punjab, and Balochistan respectively. Further, those reported the highest per acre net returns were Rs.145375 per acre received from Balochistan farmers followed by other study provinces.

**Table 2. Cost of Production of Hybrid Vegetables**

Practices	Hybrid Vegetables			
	Tomato	Cauliflower	Ridged Gourd /Luffa (Turia)	Onion
Deep Ploughing #	1	1	1	1
Hrs/ac	2.5	2.5	2	2
Rs/hrs	1200	1200	1200	1200
<b>Total amount (Rs/ac)</b>	<b>3000</b>	<b>3000</b>	<b>2400</b>	<b>2400</b>
Cultivator #	2	2	2	2
Hrs/ac	3	3.5	3	3
Rs/hrs	850	850	850	850
<b>Total amount (Rs/ac)</b>	<b>2550</b>	<b>2975</b>	<b>2550</b>	<b>2550</b>
Leveling #	1	1	1	1
Hrs/ac	1.5	1.5	1.5	1.5
Rs/hrs	850	850	850	850
<b>Total amount (Rs/ac)</b>	<b>1275</b>	<b>1275</b>	<b>1275</b>	<b>1275</b>
Tractor ridge making Cost/acre (Rs)	1400	1400	1400	1400
Manual ridge-making Costs Rs/acre	1600	1600	1600	1600
<b>Total Land Preparation Cost</b>	<b>9825</b>	<b>10250</b>	<b>9225</b>	<b>9225</b>
Share in Total cost (%)	6.88	10.45	12.40	9.47
Seed rate/ac	184 gm	313 gm	2.5kg	6.33kg
Rs/ unit	10.47	20	450	2738 / kg
<b>Total amount (Rs/ac)</b>	<b>1926</b>	<b>6260</b>	<b>1125</b>	<b>17333</b>
Sowing cost/acre	3000	3000	2400	5000
<b>Total Seed rate &amp; sowing cost</b>	<b>4926</b>	<b>9260</b>	<b>3525</b>	<b>22333</b>

Share in Total cost (%)	3.45	9.44	4.74	22.93
# Irrigation	12	11	9	11
Irrigation charges (Rs/acre)	6216	5698	4662	5698
Irrigation application cost/ac(Rs)	4800	3300	1953	3900
<b>Total irrigation cost</b>	<b>11016</b>	<b>8998</b>	<b>6615</b>	<b>9598</b>
Share in Total cost	7.71	9.17	8.89	9.85
Fertilizer application	6	6	3	4
DAP (bags/ac)	1	1	0	1.25
Rs/bag	4000	4000	0	3800
<b>Total amount (Rs/ac)</b>	<b>4000</b>	<b>4000</b>	<b>0</b>	<b>4750</b>
Urea (bags/ac)	4	4	3	4
Rs/bag	1800	1800	<b>1900</b>	<b>2000</b>
<b>Total amount (Rs/ac)</b>	<b>7200</b>	<b>7200</b>	<b>5700</b>	<b>8000</b>
NP/Others (bags/ac)	0.5	0.25	1.25	0
Rs/bag	2800	<b>2800</b>	<b>2800</b>	<b>0</b>
<b>Total amount (Rs/ac)</b>	<b>1400</b>	<b>700</b>	<b>3500</b>	<b>0</b>
Fertilizers Application cost (Rs/ac)	1800	1800	900	1600
FYM (Hand trolley/ac)	50	25	0	30
Sale price/hand trolley with transport charges (Rs)	80	<b>80</b>	<b>0</b>	<b>80</b>
<b>Total amount (Rs/ac)</b>	<b>4000</b>	<b>2000</b>	<b>0</b>	<b>2400</b>
<b>FYM Application cost (Rs/ac)</b>	800	800	0	800
<b>Total fertilizer cost</b>	<b>19200</b>	<b>16500</b>	<b>10100</b>	<b>17550</b>
Share in Total cost (%)	13.44	16.82	13.58	18.02
<b>Total Thinning /hoeing/earthing cost (Rs/ac)</b>	<b>6400</b>	<b>4000</b>	<b>3000</b>	<b>3000</b>
Share in Total cost (%)	4.48	4.08	4.03	3.08
Plant Protection #	5	6	3	2
Rs/spray	3125	2150	1500	1000
<b>Total cost (Rs/ac)</b>	<b>15625</b>	<b>12900</b>	<b>4500</b>	<b>2000</b>
Share in Total cost (%)	10.94	13.15	6.05	2.05
Manual Weeding Cost (Rs/ac)	1600	1600	1200	1000
Weedicide cost /(Rs/ac)	2000	1500	1500	2000
<b>Total manual &amp; weedicide cost (Rs/ac)</b>	<b>3600</b>	<b>3100</b>	<b>2700</b>	<b>3000</b>
Share in Total cost (%)	2.52	3.16	3.63	3.08
<b>Harvesting charges (Rs/ac)</b>	<b>12000</b>	<b>4200</b>	<b>3600</b>	<b>4500</b>
Share in Total cost (%)	8.40	4.28	4.84	4.62
Transportation, packing and marketing charges (kgs/ac)	6814	6467	5138	7033
Rs/kg	6	2.15	3.4	1.6
<b>Total amount</b>	<b>40884</b>	<b>13904.05</b>	<b>17469.2</b>	<b>11252.8</b>
Share in Total cost (%)	28.61	14.17	23.49	11.55
<b>Variable Cost</b>	<b>123476</b>	<b>83112.05</b>	<b>60734.2</b>	<b>82458.8</b>
Interest Rate@6%	7408.56	4986.723	3644.052	4947.53
<b>Total Variable Cost</b>	<b>130884.56</b>	<b>88098.773</b>	<b>64378.252</b>	<b>87406.3</b>
<b>Rent of own land for 6 months (Rs/ac)</b>	<b>12000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>
Share in Total cost (%)	8.40	10.19	13.44	10.27
<b>Total Cost/acre (Rs)</b>	<b>142884.56</b>	<b>98098.78</b>	<b>74378.26</b>	<b>97406.30</b>
Yield (Kgs/ac)	7814	6967	5638	8633
Sale price/kg (Rs)	31.25	26.3	29.15	17.55
<b>Gross revenue (Rs/ac)</b>	<b>244187.5</b>	<b>183232.1</b>	<b>164347.7</b>	<b>151509</b>
<b>Net income (Rs/ac)</b>	<b>101302.94</b>	<b>85133.33</b>	<b>89969.45</b>	<b>54102.80</b>
<b>C B R</b>	<b>1.71</b>	<b>1.87</b>	<b>2.21</b>	<b>1.56</b>

Source: Survey data, 2019-20

### Conclusion and Recommendations

Researchers are carrying out an in-depth study to learn how many vegetable producers are using hybrid

varieties, assess the profitability of vegetable growers, and compare the profitability of various vegetables cultivated by different districts across Balochistan's population. In particular, data on cropping systems,

input utilization, management techniques, and other relevant topics were gathered from primary and secondary sources. Balochistan's Kachhi (Bolan), Killa Saifullah and Loralai districts will host the investigation. The information was obtained from 109 vegetable crop growers who were chosen at random from 25 communities. Vegetable production statistics for 2019-20 were examined in depth using the data obtained.

Vegetable costs fluctuate widely during the season. Some of the causes include the availability of other vegetable sources, market supply, and demand, etc. The sale price of the early season was high as compared to the mid & late seasons. Overall, Rabi and Kharif vegetable sales prices are lower in the middle and late sessions than they were in the early sessions. Tomato hybrid production costs per acre were the highest, followed by other hybrid vegetables, while Luffa/Ridged Gourd (Turia) producers got high income from other hybrid vegetable growers throughout the research year. Tomato, Cauliflower, Luffa/Ridged Gourd (Turia), and Onion hybrid vegetable producers made Rs. 101303, 85133, 89969, and 54103 per acre in net revenue, respectively.

The government's direction to agriculture research departments made improved high-yielding vegetable seed varieties meet to national and international supplies of the market. Improved management techniques and scientific suggestions from local sources along with the research departments, progressive producers, and extension agents are needed for vegetable farmers. They need timely vegetable planting and adequate fertilizer and weedicide usage in particular. Balochistan faced huge-scale vegetable production is the lack of disease-free certified hybrid seeds of high-yielding vegetable types is the main problem. The private sector's engagement is strongly encouraged in providing vegetable producers with enhanced certified seed. Hybrid vegetable seed production at minimum cost should be encouraged. There was also an issue with load shedding. Load shedding lasts anywhere from 10 to 15 hours a day. Load shedding needs to be limited in duration. Due to the significant rainfall losses in the study region and throughout Balochistan, dams and mini-dam buildings can both reduce water loss and raise the groundwater table. The research policy is long-lasting for production issues of vegetable seed varieties solving through development free diseases, high yielding, and pest-resistant seed varieties for different growing areas in the province. The researcher must think of a feature policy increasing vegetable production improve through better management practices for increasing the vegetable production export for national demand.

#### Acknowledgments

This research was carried out by the Social Sciences Research Institute (SSRI), Pakistan Agricultural Research Council (PARC) at ARI Sariab Road Quetta and funded by the Pakistan Agricultural Research Council Islamabad, Pakistan for the research purpose from the main current budget of Social Sciences Research Institute (SSRI) Quetta.

#### AUTHOR'S CONTRIBUTION

J. Khan: Data collection, review of literature, wrote abstract, methodology, analysis, result and discussion and overall supervision of research paper, H. Amin: Data analysis, write up and technical input, S. Siddiqui: Data analysis and technical input, I. Raza: Data analysis and writes up, A. Ali: Data collection, analysis, and technical input, S. Pasand: Data collection and technical support and F. Muhammad: Data collection, Data analysis, and technical support

#### REFERENCES:

- Adenuga, A.H., A.M. Lawal and O.A. Rotimi., Economics and technical efficiency of dry season tomato production. *Agris online papers in Economics and Informatics in selected areas in Kwara State, Nigeria*, 5:11-19 (2013).
- Admin., Production status of major vegetables in Pakistan, Their problems and Suggestion (2020). Agricultural Research Service., United states department of agriculture (2000).
- Babalola D. A., Makinde, Y.O., Omonona, B.T., Oyekanmi. M.O., Determinants of Postharvest losses in tomato production: a case study of Emiko – afon local government area of ogun state. *Journal of Life and Physical Science. Acta SATECH 3 (2): 14 – 18 (2010)*.
- Biz., The break-even point, bristol, uk: university of bristol, institute for learning and research technology, (accessed June, 2006) (2002).
- Bonina, J., Cantliffe D. J., Seed production and seed sources of organic vegetables. HS 981. EDIS. (2004).
- Byerlee D., Technical change and returns to wheat breeding research in Pakistan's punjab in the post-green revolution period. *The Pakistan Development Review*, Vol. 32, No. 1 (Spring 1993), pp. 69-86 (18 pages). Published By: Pakistan Institute of Development Economics, Islamabad (1993).
- Devarreware M.P., National strategies for vegetable production and status of hybrid seed technology development in Sub-tropical and tropical Asia (1995).
- Diver, S., Kuepper, G., Born, H., Tomato acreages, yields, economics, and harvest. national sustainable agriculture information service (1999).



- Estes, E., Kleese, T., Lauffer, L., North carolina organic vegetable production cost study. Department of Agricultural and Resource Economics (2003).
- Gall, M. D., W. R Borg and J. P. Gall., Educational research (6th ed.). White Plains, NY: Longman Publishers USA (1996).
- Government of Pakistan., Agricultural Statistics of Pakistan. Economic Wing, Federal Ministry National Food Security & Research (MNFSR), Islamabad (2018-19).
- Hofstrand, D., Farm analysis terms. Iowa, USA: Iowa State University, (accessed June, 2006) (2005).
- Hood, K., Walden, C., Budget for greenhouse tomatoes. Extension Service Mississippi State (2005).
- <https://knoema.com>., Pakistan - Vegetables primary production quantity (2020).
- Khushk, A.M, I.Lashari, J.A.Lund, M.A. Memon and U. Shar., Factor Responsible for higher wheat yield in Sindh. Research Report of AERU, ARI, Tandojam (2001). Khushk A.M and M.I.Lashari., Improving the marketing system of vegetables, DAWN - Business\_ 09 August, (2004)
- Kirschenbaum, J., Saving your own garden seed. The Year Round Gardener Terrestrial Seed Company (2000).
- McCraw, D., Motes, J., Schatzer, R., Commercial production of fresh market tomatoes. Okalahoma cooperative extension service. (2007).
- Moustafa A., Protected agriculture: a different greenhouse effect, Coordinator of ICARDA's Arabian Peninsula Regional Program, based in Dubai, UAE. Issue No.24 June 2007 (2007).
- New Jersey Agricultural Experiment station., Organic production practices (1996).
- Qasim M., Farooq W. & Akhtar W., Preliminary report on the survey of tomato growers in Sindh, Punjab and Balochistan (2018).
- Scarborough, V. and J. Kydd., Economic analysis of agricultural markets: A manual natural resources Instt. Chatham (1992).
- Siemonsma, J. S., & Piluek, K. Plant resources of south-east Asia. No. 8: Vegetables. (1993).

---

Publisher's note: PJBT remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. To

view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

---