International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Economic Analysis of Integrated Farming Systems on Farm Income. A case Study of Sahiwal District, Punjab, Pakistan

Umer Bin Khalid[1], Pomi Shahbaz[2], Shamsheer Ul Haq[3], Sikandar Javeed[4]

[1,2,&3]Department of Agricultural Economics, Ondokuz Mayıs University, 55139, Samsun, Turkey
[4] Graduated University of Agriculture Faisalabad

[*]*Corresponding Author's : Umer Bin Khalid*

Abstract: The world's population is increasing day by day. More the population, more the resources required by the country to meet their basic demands. In developing countries the availability of lands, accessibility to quality water decreasing with the passage of time but on the other side population is on increasing side. People have fewer resources to fulfill their basic needs. Better resource management is a key to avert these shortages otherwise situation will become more complex. To confront the issue that people in rural areas are not utilizing their resources efficiently we had conducted a study in rural area of the country. In this study reviewed different types of Integrated Farming System (IFS) and their returns in Sahiwal District, Punjab, Pakistan. Structured questionnaires were used for data collection Total 120 respondents were randomly selected. Data were analyzed by different integrated farming system's margins, farm incomes from different agriculture enterprises. The highest net farm income was $1156.57. This Income was recorded by Crop-Livestock-Poultry-Vegetable Integration type. Farm cash income was significantly influenced by the level of farmer's education, years of experience, type of integration and cost of farm inputs. Farm cash income was influenced by the adoption of Integration, Provision of education, Family size and input costs. Income of the farmer could be improved by the provision of quality education and adoption of the Integrated farming system.

Key words: Integrated Farming Systems, Sustainable Agriculture, Resource Management, Farm Income, Education

1. Introduction

Farming is simply defined as practice of cultivating land or raising animals (Ugwumba et al., 2010). Agriculture is the main source of income in the country as most of the people extract their income from agriculture (Ghafoor, et al., 2010). But this source of income is under threat as agriculture has become very risky due to extreme climate changes and highly volatile agricultural markets. Pakistan is the 6th largest country inworld and still the population of the country is increasing day by day (Shahbaz[a] et al., 2017). The natural resources such as land, water are shrinking. With the increase of mechanization, only agriculture is not enough to fulfill income and employment needs of rural people.

Extensive research is being done in all developing countries in order to increase the productivity, to fulfill food and employment requirements of a large population and for sustainable agriculture. But these efforts to increase the productivity and employment should neither deplete natural resources nor imbalance the environment (Ugwumba et al., 2010). Although extensive use

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

of inorganic inputs (chemical fertilizer and pesticides) increased the agricultural productivity during last century but extensive use of these inputs had also destabilized natural environment along with an increase in the cost of production enhancing concerns about economic stability and sustainability (FAO, 2010; IAASTD, 2009). Unsustainable agriculture leads to environmental pollution and natural resources depletion.

Each individual subsector (Horticulture, livestock) of agriculture in Pakistan is facing different kinds of problems. For example in livestock sector, most farmers are small farmers with less education and fewer resources. Further there is as ubstantial loss of income due to livestock diseases (mastitis, Hemoglobinuria, FMD, and tick infestation) (Ashfaq et al., 2015). The farmers cannot access veterinary hospital due to poor infrastructure. Unavailability of quality medicines and veterinary doctors are also major issues of livestock sector (Haq[a], et al., 2016). Horticulture sector especially the productivity of mango is low due to poor management, pest disease, lack of credit, lack of technical innovations and due to technical inefficiencies (Shahbaz[a] et al., 2017, Haq[b], et al., 2016). Similarly the crop sector and poultry sector is facing similar kind of problems. Most of the farmers are performing only one activity (crop cultivation) so their income becomes dependent totally on crop price at the crop harvesting time. Additionally, imperfect market conditions, mismanagement of demand and supply of crop also affects adversely the income from crops Enhancing the capability of the farmers for sustainable agriculture as well as higher net income returns is a vital process to fulfill the needs of basic necessities of food in developing countries (Ravallion & Chen, 2007).

Agriculture integration or more commonly used word farm integration is one way of handling all these problems because farm integration provides better income returns to farm owners as well as higher productivity. As farmers involved in monoculture are under more threat as compared to those performing many farming activities under certain market and environment conditions. Monoculture activity could be the only cultivation of crops or raring animals (Shahbaz[c] et al., 2017). The integrated Farming system (IFS) is also unique approach to solve all these problems in different enterprises because in IFS approach different systems are developed according to geographical locations and available resources which leads to sustainable agriculture and more income availability to the farmers (Soni et al., 2009). Farm enterprise integration also increases the standard of living by providing higher food production (Singh et al., 2009).

Farm integration has brought agriculture income to new heights. The farm integration could be in the form of the crop- livestock, crop-poultry, crop-horticulture enterprises or combination of some of these enterprises (Olele, et al., 1999; Thy, 2006; Chan, 2006). The benefits of integrated farm management system cannot be over emphasized but at least integrated farming system is helpful in decreasing the cost of production, increases income and productivity (Ugwumba & Orji, 2006; Tokrishna, 2006). Farm integration could be partial or complete. Complete farm integration could involve crop cultivation, dairy farming, and processing and bio gas units (Chan, 2006; Igbinnosa and Okporie, 2007). The partial integration could be a combination of any two activities (Igbinnosa and Okporie, 2007; Eyo et al., 2004).

The farm integration can decrease farmer's constraints (expensive and unavailable inputs) by providing not only higher income, solving ecological problems but also by providing quality

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

inputs such as fertilizer at home and increasing productivity. It also decreases the use of chemical fertilizer thus helpful in solving pollution issues (Ugwumba et al., 2010). Integrated farming system (IFS) works as a system of systems. IFS ensure that waste from enterprise becomes a resource for another enterprise (CARDI, 2010). The integrated farming system is multidisciplinary and effective whole farm approach which solves the problems of small and subsistence farmers. Integrating farming system stabilizes and increases the farm income by having different enterprises at one farm and recycling residues for reuse thus also decreasing the cost of the overall farm. In Pakistan integrated farming systems are more important due to imperfect market conditions and the severe problem faced in each and every individual sector. The waste of animals and poultry could be used as organic fertilizer in agriculture.

As farm integration may involve two or more than two farming activities at one farm. So the benefits of enterprise integration could only be achieved if there are enough resources and same time success of the farm enterprise depends upon the skills of the farmer (Jill & Erin, 2005; Shahbaz[b] et al., 2017). The involvement in non-farming activities is also playing a vital role in improving the living standards of poor rural households (Chadha, 1993; Kumar et al., 2003).

In the21stcentury the researchers are moving toward integrated farming system approach with more emphasis on participatory on farm research (PDFSR, 2013). This is also a reality that due to increased urbanization highly productive agriculture lands have been converted into shopping malls and residential societies. The only way of survival is to increase the productivity of the land with the limited availability of arable land. Integrated farming is one solution to all these problems (Soni et al., 2009). So the main objective of the study is to assess the economic benefits of partial and full integrated farm system in the study area.

2. Methodology

2.1 Selection of Study area

The selected area was Sahiwal district in Punjab due to its prime importance in agriculture of the province. The total area and population of the selected district were 3201sq Km and 7.3 million respectively (Pakistan bureau of statistics, 2017).The Sahiwal district is not only prominent in cotton and grain production but also famous due to its buffalo milk as well as due to the ancient civilization of 3000 to 5000 B.C. The climate of Sahiwal is very hot but agriculture land is very fertile. The average rainfall in in the study is 177 mm. Wheat, sugarcane, maize and rice are major crops there but the farmers are involved in cultivating vegetables (potato, tomato, turnip and onion) (Government of Punjab, 2017).

2.2 Sample Selection

A well designed question was prepared after conducting pre testing in the study area as well as consulting with experts in this filed. Previous studies were also taken into account while preparing questionnaire in order to fulfill research gap in those studies. Both open ended and close ended questions were asked from 120 farmers through face to face interviews in 8 villages of the district. During the data collection, the farmers were hesitant in disclosing their cost and income information due to tax problems. This problem was solved by creating a friendly environment and explaining the purpose of the study. Both partially and fully integrated farms were included in the study.

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

2.3 Analytical Framework

Microsoft excels and SPSS-20 was used for data analysis. These software's are commonly used in studies to analyze the data. The techniques used to analyze the data in this software are given below.

2.3.1 Descriptive Statistics

The simple descriptive analysis was used to calculate to find out frequency, average values and percentages of different characteristics of the farmers in the study.

A) Average value

The average or Mean value was obtained by following formula

$$AM = \sum Y / N$$

Where; AM = Average value or Mean value
$\sum Y$ = Sum of all observations or variables
N = Total number of variables

B) Percentage

The percentage of the farmer responses was obtained by using

$$P = F / N * 100$$

These were obtained in order to have comparison among different respondents

Where; F = Frequency of a class
N = Total number of observations

C) Gross Margins

Gross Margin (GM) = PiYi – XiCi (i = 1, 2, 3 ……, n)

Pi = Market price of produced output
Yi = Total output produced
Xi = Different input variables
Ci = Cost of the input variables
N = number of enterprises

NFI= GM-VC

Where, NFI=Net farm income
GM= gross margins
VC= variable cost

3. Economic Analysis

Economic analysis provides insight into how markets operate, and offers methods for attempting to predict future market behavior in response to events, trends, and cycles. The calculation of net benefits can be done by net present value (absolute terms), or in the relative terms by the measure of benefit cost ratio and internal rate of return (Thampapillai and Sinden, 1995).

Benefit Cost Ratio (BCR)

Benefit cost ratio could be calculated by using following formulla.

$$BCR = \sum_{t=1}^{n} B_t / (1+r)^t \Big/ \sum_{t=1}^{n} C_t / (1+r)^t$$

The decesion is made

- If BCR > 1, project is worthwile and accept it
- In case of a lot of projects or policies accept that which one has the highest BCR

4. Results and Discussion

The type of Agriculture Enterprises integration involves in this study is shown in Table 1.Only 30.00 percent farmers are engaged in full type of integration (Crop-livestock-poultry-vegetable). The highest percentage of selected respondents 36.66 in study area involved in Partial Integration Farming type (Crop-Livestock-poultry). Other type of Partial Integration adopted by the farmers is (Crop -livestock-vegetable) which is 33.33. The most common enterprise in all type of Farming Integration is dairy sector.

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Table 1. Type of Integrated Farming systems adopted by Farmers

Type of Integrated Farming system	Number of Farmers	Percentage
Crop -livestock-vegetable	40	33.33
Crop-Livestock-poultry	44	36.66
Crop-livestock-poultry-vegetable	36	30.00
Total	120	120

Age is an important factor in allocation of resources, decision making, ability to perform task and efficient decision making. Table 2 shows that 25 percent of the farmer's age lies in the range of 20-29 and 27 percent having age 30-39 years. The percentage of farmers having age 40-49 is 30.83 and 50 and above is 21.66. 18.33% of the farmers in study area are illiterate, 28.33 percent have primary education. The percentage of farmers having middle and tenth grade education is 35 percent and 15 percent respectively. Only 3.3 percent farmers having education of twelfth grade and graduation. The farming experience of the selected farmers. The percentages of 5-10 years' experience and 11-15 years' experience is 38.33 and 16.66 respectively. The percentage of the farmers having experience between 16-20 years is 26.66. Only 18.33 percent of the farmers having experience of more than 20 years. Table 2 also depicts the size of selected respondent's family. The percentages of the respondent who have up to 5 members and 6-10 family size are 23.33 and 48.33 respectively. The percentage of 11-15 members' family and above 15 members are 12.5 and 15.83. The percentage of farmers having less than 5 acre is 26.66. The highest percentage is 58.33 of the farmers having landholdings 5-10 acre. Only 15 percent of the farmers having landholding above 10 acre. Table 2 also depicts the health status of the selected farmers. Smallest percentage 18.33 of the farmers having best health status. The percentage of those who have good and fair health status is 39.16 and 20 respectively. The percentage of the selected farmers having poor health status is 22.5.

Table 2. Socio-Economic Characteristics

Distribution of Farmers according to their age		
Age	No. of Farmers	Percentage
20-29	30	25
30-39	27	22.5
40-49	37	30.83
50 and above	26	21.66
Total	120	100
Mean (Standard deviation)		39.87 (11.20)
Distribution of farmers according to age		
Education level	No. of Farmers	Percentage
Illiterate	22	18.333
Primary	34	28.33
Middle	42	35

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Tenth grade	18	15
Twelfth grade and Graduation	04	3.33
Total	120	100
Mean (Standard deviation)		4.83 (3.69)
Distribution of farmers according to their farming experience		
Farming experiences	Number of Farmers	Percentage
5-10 years	46	38.33
11-15 years	20	16.66
16-20 years	32	26.66
21-25 years	22	18.33
Total	120	100
Mean (Standard deviation)		13.77 (5.75)
Distribution of farmers according to family size		
Size of Family	Number of Farmers	Percentage
Up to 5 members	28	23.33
6-10 members	58	48.33
11-15 members	15	12.5
15 and above	19	15.83
Total	120	100
Mean (Standard deviation)		8.25 (4.82)
Distribution of participants according to their farm size		
Farm Size	Number of farmers	Percentage
Less than 5 acre	32	26.66
5-10 acre	70	58.33
10 and above	18	15
Total	120	100
Mean (Standard deviation)		6.72 (2.96)
Distribution of farmers according to their health status		
Health status	Number of farmers	Percentage
Best	22	18.33
good	47	39.16
Fair	24	20
Poor	27	22.5
Total	120	100

Table 3 shows the overall picture of overall total expenditure and gross margins of integrated farming system. The dairy sectors shows the highest gross margin which is $ 866 but with highest expenditure $1708. The poultry sector shows the lowest gross margin of $ 10.27 only with lowest expenditure of $ 109.73**.** The gross margins of cotton crop and tomato crops are $ 118.53 and $ 161.77 respectively.

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Table 3. Expenditure and Gross Margin Estimates in Whole Farm budget

Dairy Particular	Price ($) Quantity (Kg)	Poultry particulars	Price ($) Quantity (Kg)	Crop Particulars	Price($) Quantity (Kg)	Vegetable particulars	Price ($) Quantity (Kg)
Land rent	300.0	-	-	Land rent	200.0	Land rent	200.0
Fodder (green+ dry)	170	cost of bird	40.00	Land Preparation	35.66	Land preparation	41.66
Concentrate cost	468	cost of feed	30.00	Seed	14.00	Seed	.500
Labor cost	360	cost of vaccination	11.40	Fertilizers	71.66	Fertilizers	96.83
Vet+ medicine cost	150	Labor charges	10.00	Chemicals	13.83	Chemicals	65.66
		Electricity charges	0.0	Irrigation	36.66	Irrigation	64.66
Maintenance cost	160.0	miscellaneous Expenditure	18.33	Harvesting (manual picking)	60.00	Picking	12.26
Equipment cost	100.00	-	-	Casual Hired Labor	17.00	Transportation	26.00
		-	-	Intercultural operation cost	37.66	Casual hired labor	6.66
Total cost	1708	Total cost	109.73	Total cost	486.47	Total cost	514.23
Revenue		-					
Price of Milk/kg	0.55	Total Number of Eggs produced	720	Revenue		Revenue	
Total milk produced	4680(kg)	Price of single egg	.10	Total Production (Kg)	880	Total Production (kg)	6760
		Total value	72	Price /kg	.6875	Price /kg	.10
	-	Total gain weight(kg)	12				
	-	Price/kg	4.0	-		-	
	-	Total meat value	48	-		-	
Total milk Revenue	2574	Total Revenue	120	Total Revenue	605.00	Total Revenue	676.00
Gross Margin	866.0	Gross Margin	10.27	Gross Margin	118.53	Gross Margin	161.77

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Table 4 reflects the picture of Gross Margin from different integration type. The highest gross margins are observed in full integration (Crop-livestock-poultry-vegetable) which is $ 1156.57. The lowest gross margin is observed in partial Integrative system **(**Crop-Livestock-poultry) which is $ 994.8.

Table 4. Gross Margin of Integrated Farming systems adopted by Farmers

Type of Integrated Farming system	Margins ($)	Percentage Share of Gross Margin
Crop -Livestock-vegetable	1146.3	99.11
Crop-Livestock-poultry	994.8	86.01
Crop-livestock-poultry-vegetable	1156.57	100

Table 5 depicts the picture of Net Present Value and Input output ratio of dairy sector. The NPV and Input to Output ratio is observed in this sector which are 866 and 1: 1.50 respectively.

Table 5. Dairy sector Input to out Ratio and NPV value

Total Number of Animals	Total Expenditure($)	Total Revenue ($)	Net present value	Benefit Cost Ratio
4-6	1708	2574	866.0	1:1.50

Table 6 depicts the picture of Net Present Value and Input output ratio of poultry sector. The lowest NPV and Input to Output ratio is observed in this sector which are 10.27 and 1: 1.1.093 respectively.

Table 6. Poultry sector Input to out Ratio and NPV value

Total birds(No.)	Total Expenditure ($)	Total Revenue($)	NPV	BCR
8-10	109.73	120	10.27	1:1.1093

Table 7 depicts the picture of Net Present Value and Input output ratio of Cotton Crop sector. The NPV and Input to Output ratio observed in this sector which are 118.53 and 1: 1.1.243 respectively.

Table 7. Crop sector Input to out Ratio and NPV value

Total Acres	Total Expenditure ($)	Total Revenue ($)	NPV	BCR
1	486.47	605.00	118.53	1:1.243

Table 8 depicts the picture of Net Present Value and Input output ratio of Vegetable sector. The NPV and Input to Output ratio observed in this sector which are 161.77 and 1: 1.1.314 respectively second best in this study.

Table 8. Vegetable sector Input to out Ratio and NPV value

Total Acres	Total Expenditure ($)	Total Revenue ($)	NPV	BCR
1	514.23	676.00	161.77	1:1.314

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Table 9 depicts the picture of overall Net Present Value and Input output ratio of all the four sectors adopted by the farmers in the study area. The NPV and Input to Output ratio observed in this sector which are 1156.57 and 1: 1.1.410 respectively and is highest for full integrative farming system. Similarly Ugwumba et al (2010) explained that all types of integration has positive gross margins.

Table 9. Overall Economic Analysis of different Enterprises in selected Area

Total Expenditure ($)	Total Revenue ($)	NPV	BCR
2818.43	3975	1156.57	1:1.410

5. Conclusion

The study highlighted the returns from different type of Integrated Farming systems. Majority of the farmers are involved in Partial Integration farming system. Result clearly indicated that highest numbers of the farmer are involved in type of integration that has lowest returns. The small number of farmers involved in full type of Integration that have highest returns in our analysis. By achieving full type of integration more resources are required. A high inputs cost is key barrier to adoption of full integration. Farms gross margin can improve by introducing a policy that will reduce the cost of inputs and improve the market rates of agriculture products. Situation may be improved by providing subsidy to input sector rather than output. This will improve the adoption of full integration farming system and poverty can be eradicated in the rural areas of the country.

References

1. Ashfaq, M., Razzaq, A., & Muhammad, G. (2015). Economic analysis of dairy animal diseases in Punjab: a case study of Faisalabad district. JAPS: Journal of Animal & Plant Sciences, 25(5).Pp. (1482-1495).
2. CARDI, (2010). A Mannual on Integrated Farming System. Caribbean Agricultural Research and Development Institute, (Ministry Of Economic Development, Belize 2010), pp.1-58
3. Chadha, G.K. (1993) Non-farm employments for rural households: Evidences and prognosis. Indian Journal of Labour Economics, 38(3): 296-327.
4. Chan, G.L., (2006). Integrated farming systems. What does integration farming system do? http//www. scizerinm.org/chanarticle.htm.
5. Eyo, A. A., Ayanda, J. O., Falayi, B. A., & Adelowo, E. O. (2004). Economic prospects of investment in fish cum livestock farming Pp (82-104). Downloaded from http://aquaticcommons.org/861/1/FISON2003_082-104.pdf.
6. FAO, 2010. Sustainable crop production intensification through an ecosystem approach and an enabling environment: capturing efficiency through ecosystem services and management, FAO Committee on Agriculture, June 16-19.
7. Ghafoor, A., Hussain, M., Naseer, K., Ishaque, M., & Baloch, M. H. (2010). Factors affecting income and saving of small farming households in Sargodha district of The Punjab, Pakistan. Pakistan Journal of Agriculture: Agricultural

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Engineering Veterinary Sciences (Pakistan).vol 26 (2): 27-35.

8. Haq[a], S.U., Boz, I., & Shahbaz, P., (2016). Problems encountered by dairy farms and their possible solution in Punjab region of Pakistan. Journal of agricultural faculty of Uludag University vol. 30 (special edition). Pp. 176-183.
9. Haq[b], S.U.; Shahbaz, P.; Boz, I.; Yildirim, C., & Murtaza, M.R., (2017). Exploring the determinants of technical inefficiency in mango enterprise: a case of Muzafargarh, Pakistan. Custos e @gronegócio on line - v. 13, Apr/Jun. - 2017. Pp (218-236).
10. IAASTD, (2009).Agriculture at the Crossroads, International Assessment of Agricultural Knowledge, Science and Technology for Development, Washington, DC, Island Press. 2009.
11. Igbinnosa, I. & Okporie, (2007). Preparation of train toolkit for sustainabale farming system. Consultant draf report second national FADAMA development critical Ecosystem management project 2007.
12. Jill L.C., & Erin O.S. (2005). Land use and income diversification: Comparing traditional and colonist population in the Brazilian Amazon. Agricultural Economics, 32(3):221-237.
13. Kumar, R., Singh, N.P. and Singh, R.P. (2003) Non-farm employments for rural India. In: Basic Statistics, 2nd edition, Oxford University Press, New Delhi. pp. 362-393.
14. Olele, N. F., Nweke, F. U., & Agbogidi, O. M. (1999). Role of integrated fish farming in agricultural development in the delta region of Nigeria. *Delta Agric*, *6*, Pp.128-134.
15. Pakistan Bureau of Statistics (2017). Provisional summary results of 6th population and housing census-2017. http://www.pbscensus.gov.pk/sites/default/files/PAKISTAN%20TEHSIL%20WISE%20FOR%20WEB%20CENSUS_2017.pdf
16. PDFSR, (2013). Farming Systems Scenario. Vision 2050. Project Directorate for Farming Systems Research, Modipuram, pp. 1-23.
17. Ravallion, M., & Chen, S., (2007).China's (Uneven) progress Against Poverty, Journal of Development Economics, 82(1) Pp.1-42.
18. Shahbaz[a], P., Haq, S.U., Boz, I. & Murtaza, R., (2017). An Assessment of Determinants Responsible for Low Mango Productivity in District Muzzafargarh, Pakistan. Journal of Food Science and Engineering 7 (2017) 400-405.
19. Shahbaz[b], P., Boz, I., Haq, S.U., & Khalid, U.B., (2017). Mixed Farming and its impact on Farm Income; A study in District Faisalabad, Punjab Pakistan. IJRDO-Journal of Agriculture and Research Vol. 3(8). Pp. (16-25).
20. Shahbaz[c], P., Boz, I., Haq, S.U., (2017). Determinants of Crop Diversification in Mixed Cropping Zone of Punjab Pakistan. Direct Research Journal of Agriculture and Food Science. Vol 5 (11) Pp. (360-366).
21. Singh, S. P., Gangwar, B., & Singh, M. P. (2009). Economics of Farming Systems in Uttar Pradesh. *Agricultural Economics Research Review*, *22*(1) Pp. (129-138).
22. Soni, R.P., Katoch, M., & Ladohia, R., (2014). Integrated Farming Systems - A Review. IOSR Journal of Agriculture and

International Journal of Management and Economics Invention ISSN (e): 2395-7220
||Volume||3||Issue||11||Pages-1434-1444||Nov.-2017||
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i11.07

Veterinary Science (IOSR-JAVS). Vol.7 (10) Pp.36-42.

23. Thampapillai, D and J. Sinden. 1995, Introduction to Benefit-Cost Analysis, Longman Australia, Melbourne.
24. The government of Punjab, (2017). Sahiwal. Punjab portal, All about Punjab at one place. From https://www.punjab.gov.pk/sahiwal_quick_facts
25. Thy, S. (2003). *Management and Utilisation of Biodigesters in Integrated Farming Systems*. Sveriges lantbruksuniv., Inst. för husdjurens utfodring och vård. Pp1-18. Retrieved from https://www.betuco.be/biogaz/Biodigesters%20processing%20and%20utilization%20in%20integrated%20farming.pdf.
26. Tokrishna, R., (2006). Intergrated livestock-fish farming system in Thailnad. ftp://ftp.fao.org/docrep/fao/006/y5098e/y5098e00.pdf.
27. TRTA. TRTA Pakistan, (2010). Trade; A route to prosperity. Available at http://trtapakistan.org/sector-products/horticulture/mangoes
28. Ugwumba, C. O. A., & Orji, E. C. (2006). Traditional Farming System and Its Effect on Farm Cash Income in Old Njikoka Local Government Area of Anambra State. Int. J. Agric. Res. Politics, 1, 21-24.
29. Ugwumba, C. O. A., Okoh, R. N., Ike, P. C., Nnabuife, E. L. C., & Orji, E. C. (2010). Integrated farming system and its effect on farm cash income in Awka south agricultural zone of Anambra state, Nigeria. *Am.-Eurasian J. Agric. Environ. Sci*, vol. 8(1) Pp.1-6.