

## Economics of Off -Season Vegetable Crops in Himachal Pradesh

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**Abstract:** The hilly State of Himachal Pradesh is blessed with varied topography and favorable climatic conditions which offers numerous opportunities of diversification and commercialization of agriculture in the state. The farming system of the State are showing a prominent change, where diversification with incorporation of commercial vegetables has become the focus of agricultural development planning process. Himachal Pradesh offers most suitable climate for the production of cabbage, cauliflower, capsicum, peas, tomato, bean etc. Most of the commercially vegetables grown in the State are termed as off – season because these are cultivated and reached in the market at a time when similar produce from the plains is not available. Hence the prices they fetch are quite high in comparison to the prices received from the vegetable produce in the market. Present study tried to analyze returns from the selected commercial vegetable crops on various sizes of farm income and employment potential of these selected vegetable crops during the agriculture year 2011-12. Five major vegetables namely cabbage, capsicum, cauliflower, peas and tomato are grown in the state accounts 66% of total vegetables. On the basis of higher proportionate share under the selected commercial vegetable crops Shimla, Mandi and Solan districts were purposively selected for the present study. The study revealed that per hectare cost of cultivation for tomato was estimated highest i.e. Rs.288178 on average farm followed by capsicum Rs. 226118, cabbage Rs. 193424, cauliflower Rs.177756 and peas Rs.128351. Net farm income over total cost of cultivation (Cost D) worked out to be highest for tomato i.e. Rs. 331893 per hectare followed by capsicum Rs. 229802, cabbage Rs. 190340, cauliflower Rs. 159254 and lowest in case of peas Rs. 89803 on average farm. The gross annual income per hectare of selected vegetable crops was highest in case of small farms (Rs. 446586) as compared to other categories of farms. Such farmers are getting better returns per unit of land devoted to vegetable crops as compared to other crops. The production of these selected vegetable crops enhance the income of farmers through high pay of crops as well as by providing more employment opportunities to the members of the farmer families. Among the selected vegetable crops, the higher employment generating crop was tomato and lowest was peas. The number of man- days, per hectare employed in different crops suggest that cultivation of commercial vegetable crops generate better employment opportunities to the farmers of Himachal Pradesh. By cultivating commercial vegetable crops the growers in the state are getting various economic benefits over non – grower. Briefly these are (i) more employment, (ii) higher return per unit of land, (iii) best use of these resources, (iv) higher income. Himachal Pradesh has the regional advantages in the cultivation of these vegetable crops during off season vegetable produce in hills is comparatively less perishable more tasty and more nutritious as compared to plains. It reflect the fact that the growers of vegetables have comparative advantage for the production of these vegetables in hilly Sate like Himachal Pradesh.

**Keywords:** Diversification, Commercialization, Vegetable, Returns, Himachal Pradesh.

### I. Introduction

In Himachal Pradesh there seems to be good scope for commercialization of agriculture sector for enhancing Income and generating additional gainful employment opportunities. Himachal Pradesh has emerged as a leader in planning and implementation of strategies for optimum utilization of the so termed marginality of the hill. It is now well accepted that the State has made significant development in the field of agriculture, including that of horticulture and livestock rearing, and has emerged as a model State for the hilly regions of the country. Now, the farming system of the State are showing a prominent change, where diversification, with incorporation of commercialization of vegetables have become the focus of agricultural development planning process. Himachal Pradesh offers most suitable climate for the production of commercial vegetables like cabbage, cauliflower, capsicum, peas, tomato, beans, etc. Most of the commercially grown vegetable in the State are termed off –season because these are cultivated and reached in market at a time when similar produce from the plains is not available. So, these off-season vegetables fetch premium prices in the neighbouring markets of the plains. Thus the cultivation of these commercial vegetables has proved to be a boon to the farmers of the State.

As many as about 87 per cent of the Himachal farmers are small or marginal land holder's cultivating up to 2 hectares each. In the context of such a highly skewed land distribution, the cultivation and production of labour intensive crops like vegetables assume still greater importance. Vegetables are not only labour intensive but are also high pay-off crops cultivated with limited land base and, therefore, provide opportunities for raising the levels of employment and income of marginal and small farmers. The hill farmers have an absolute

advantage in producing vegetables over other crops while there is comparative advantage in their production in Himachal Pradesh as compared to other parts of the country. Vegetables acreage in the State has increased from 15.6 thousand hectares in 1984-85 to about 67.9 thousand hectares in 2011-12. Production of Vegetables have increased from 258 thousand metric tons to 1356.6 thousand metric tons, during the same period.

Keeping in view the importance of commercial vegetable crops, the present study was under taken with the following objectives:

- i. Returns from selected vegetable crops on various sizes of farmers , and
- ii. Income and employment potential of selected vegetable crops.

## II. Methodology

Five important vegetables namely cabbage, capsicum, cauliflower, peas and tomato grown in the State were selected for inclusion in the present study. The criteria used for selecting a particular vegetable for detailed study is the relatively higher proportion of its area in the total area under vegetables in the State. While doing so, potato was excluded because (i) most of the tubers produced here are used as seed in plains rather than as vegetable and (ii) the problems of its production and marketing are entirely different. It was observed that the areas of concentration of these vegetables lie mostly in the districts of Mandi, Shimla and Solan. Therefore, these districts were taken as the main base for selection of a sample. During 2009-2010, Shimla district has the high percentage share in the total vegetables area (17.15 per cent) followed by Mandi and Solan districts i.e. 13.62 per cent and 12.86 per cent respectively. These three districts accounted for more than 40 per cent share of the State area under all the vegetables. Therefore on the basis of higher proportionate share under the selected vegetable crops Shimla, Mandi, and Solan districts were purposively selected for the present study. Multi-stage purposive-cum-random sampling technique has been employed for the selection of tehsils (Stage-I), villages (Stage-II) and the farmers (Stage-III) from the selected districts of Shimla, Mandi, and Solan. To fulfill the statistical requirement of the study in all 300 farmers (respondents), one hundred farmers each selected districts were selected for the present study. These farmers were classified in three size groups i.e., marginal up to 1 ha., small 1-2 ha., and other more than 2 ha. of operational holding. The other farm category includes semi-medium, medium and large because only 13 percent of the total farmers in the State fall in this category. Out of 300 hundred sample farms, 162 farmers are marginal farmers, 80 are small farmers and 58 are other farmers. In the proportion of marginal, small and other farmers of the total sample farmers cover 54.00, 26.67 and 19.33 per cent farm respectively. In all three selected districts, the data from these farmers is collected through pre-tested well designed questionnaires / schedules by adopting personal interview method during the agricultural year 2011-12.

To analyze the objectives of the study, different statistical tools have been adopted and the same are presented below:

**Cost A<sub>1</sub>** includes: value of hired human labour (permanent and casual), value of hired and owned bullock labour, value of hired and owned machine labour, value of manure (owned and purchased), value of fertilizer (N+P+K), value of Seed (farm produced and purchased), value of insecticides and pesticides, Irrigation charges, Staking/support material ,Interest on working capital, depreciation of implements and farm buildings, land revenue, cess and other taxes, miscellaneous expenses ( payment to artisan etc.)

**Cost A<sub>2</sub>**= Cost A<sub>1</sub> + rent paid for leased-in-land.

**Cost B**= Cost A<sub>1</sub> + imputed rental value of owned land (less land revenue paid there upon)+ interest on owned fixed capital (excluding land).

**Cost C**= Cost B+ imputed value of family labour.

**Cost D**= Cost C + managerial cost(10% of Cost A<sub>1</sub>)+ risk margins (10% of cost A<sub>1</sub> for tomato and 5% of cost A<sub>1</sub> for other selected vegetables).

**Marketing Cost** includes: assembling, packing, grading, transportation, commission and market fee etc.

**Gross Farm Income**= yield x average price.

**Average Price**= value of utilized produced price + total value of sold produce

**Net Farm Income** =Gross Farm Income - Cost D

**Standard Man-days:** The family labour/casual labour days spent in different activities have converted into standard man-days by attaching proper coefficient of efficiency. Eight hours of work and adult male in a day have been considered equal to one working day(GOI,1960)<sup>1</sup>

**One Woman Day**= 0.75 man-days

**One Child Day**=0.50 man-days

<sup>1</sup> Government of India (1960) , Family Living Survey among Industrial Workers, Ministry of Labour, Employment and Rehabilitation, New Delhi p8.

**One Old Man Day**= one child day (0.50 man ).

### **III. Results And Discussion**

#### **COST AND NET RETURNS ON CABBAGE:**

In Himachal Pradesh with the development of tourism, **Chinese/ momo culture** has created rapid demand of cabbage throughout the year. On the sample farmers as a whole the proportion of paid out cost (i.e. cost A<sub>1</sub>) to total cost comes to 22.06 per cent (Table 1). The marketing cost contributes about 23 per cent of the total cost of production. In hills for the determination of profitability of any agricultural commodity, it is the paid out cost which has the real relevance rather than the total cost because of the farmer's own assets e.g. bullocks, implements, machinery and family labour for which the opportunity cost is minimum. Therefore, the net returns include a significant proportion on account of economic rewards for these items. The total cost of cultivation per hectare of cabbage is estimated to be Rs. 2,34,108/- on marginal farmers, Rs. 2,86,992/- on small farmers, Rs. 2,83,503, /- on other farmers and the average being Rs. 2,51,220/-. The average gross return from cabbage crop is 3,83,761/- per hectare for all sample farmers. The net return over paid out cost is Rs. 3,28,343 excluding the marketing expenses. Among the three categories of farmers, small farmers realized Rs. 49,850 /- per hectare more net returns over cost A<sub>1</sub> than the marginal farmers. On the whole, average net returns over total cost of all farmers from one hectare of cabbage is Rs. 1,32,541/- . Thus it can be concluded that production of cabbage on commercial scale on all sizes of farmers in Himachal Pradesh is a profitable enterprise.

#### **COST AND RETURNS ON CAPSICUM:**

In Himachal Pradesh Capsicum is commonly known as Shimla mirch/ pepper. The total cost of producing and marketing of capsicum from one hectare land is observed different for three categories of selected farmers (Table 2), On average farmer it is Rs.2,79, 841/- per hectare which is highest on small farmers (Rs.3,01,834/- ) and lowest on other farmers (Rs. 2,69,915/- ) . It is an interesting fact that small farmers are getting highest gross return as well as net return. It may be seen that producers of capsicum earned a profit or net income of Rs. 3,87,722/- per hectare. Marginal farmers are getting Rs. 70,327/- more net return than other farmers. However the difference between small and marginal farmers is Rs. 22,664/- in the case of net return per hectare. On the whole, profitability of capsicum cultivation in Himachal Pradesh is more on small farmers followed by marginal and other farmers. Thus it can be concluded that capsicum cultivation in the State is a profitable enterprise for all categories of farmers.

#### **COST AND RETURNS ON CAULIFLOWER:**

Cauliflower is another important vegetable crop in the State. Average cost of cultivation on all size of farmers worked out to be Rs. 2,09,922 / -per hectare (Table 3). In total cost of cultivation marginal, small and other farmers categories incurred Rs.2,13,586 / - ,Rs.2,09,747 /-and Rs.2,07,174 /- cost per hectare respectively. Net returns over paid out cost are highest for small farmers Rs. 2,92,625 /-followed by marginal and other categories of farmers Rs.2,80,224 /- and Rs.2,63,659 /- per hectare respectively. Same trend with different figures may be observed in the case of gross returns as well. The marketing cost forms about 15.32 percent of total cost of production. Thus it can also be concluded that cauliflower being a purely off-season crop, it gives maximum returns in the hilly State like Himachal Pradesh.

#### **COST AND RETURNS ON PEAS :**

In Himachal Pradesh peas occupy a position of consideration value because of its importance in the rural economy. It satisfies the dual responsibility as a pulse and as a vegetable crop in human diet. In peas cultivation, paid out cost forms 32.20 percent of total cost, on all the farmers (Table4).However the proportion differs significantly on different categories of farmer i.e. on marginal 33.21 percent, small 29.55 percent and other 34.57 percent .The total cost of cultivation varies on different category of farms. It is highest for small farmers Rs.161,609 /- per hectare followed by other farmers and marginal farmers. Net returns over paid out cost is highest for small farmers Rs. 1,94,819/- per hectare followed by other and marginal categories of farmers with Rs. 1,63,041 and Rs.1,54,813 per hectare respectively . The average gross returns is Rs. 2,18,254 /-per hectare. It reflects the fact that cultivation of peas is also profitable in Himachal Pradesh.

#### **COST AND RETURNS ON TOMATO:**

Tomato is one of the most adoptable vegetable crops in Himachal Pradesh. It is one of the important protective foods due to its special nutritive value and widespread production. In tomato cultivation, paid out cost forms 20.11 per cent of total cost (Table 5), on all farmers and it is almost similar on marginal farmers, small farmers and on other farmers. The marketing cost accounts for Rs. 69,766/- per hectare on all farmers and share of marketing cost in total cost is 19.49 per cent per hectare. The tendency of gross and net returns on cost A<sub>1</sub>, A<sub>2</sub>,B,C,D, and marketing cost, the profitability of other farmers and small farmers is higher as compared to

marginal farmers. Net returns over paid out cost are highest for tomato among all five selected commercial crops. No unit of land was reported lease -in in the study area thus cost A<sub>2</sub> is same as Cost A<sub>1</sub> under all crops. The comparative analyses of gross returns and gross cost of all selected vegetable crops ( Fig.1 ) shows that the gross returns are highest in case of tomato followed by capsicum, cabbage , cauliflower and lowest in case of peas.

**IMPACT ON INCOME AND EMPLOYMENT:**

Commercial vegetable crops being highly labour intensive can help to a great extent in solving the problem of unemployment and their inclusion in the crop rotation can help the growers to increase their farm income also. The figures in Table 6 depicts that the gross annual income per hectare of selected vegetable crops is highest in the case of small farmers (Rs. 4,46,586/-). Such farmers are also getting better returns per unit of land devoted to vegetable crops as compared to other crops. This is followed by other farmers, who too are getting higher income from commercial vegetable crops as compared to marginal farmers. All this suggest that small farmers are producing vegetable crops efficiently and enhancing their farm income. The composition of farm income from various sources shows that commercial vegetable crops account 56.58 per cent of the total farm income on all farmers and this proportion decreases as the farm size increases. However, the gross income from other crops increases as the farm size increases. Fig.2 shows that the composition of agriculture income on various farm which reflect the fact that all the categories of the farmers are getting highest percentage of income from vegetable crops followed by horticulture and cereal crops. On the whole, it may be concluded that vegetable cultivation in the State is a profitable enterprise because of regional suitability in the production of these vegetable crops.

The above views suggest that the cropping system which involves more labour are to be preferred to less labour intensive ones. With the introduction of roads, communications and other infrastructural facilities in the agricultural sector of the State, farming is becoming commercialized day by day. Now the traditional crops are substituted by commercial crops. The cultivation of off-season vegetable during recent decade is a good example in the commercialization of agriculture in the State. Production of commercial vegetable crops enhances the income of farmers through high pay-off crops as well as by providing more employment opportunities to the members of the farming families. The employment potential presented in the Table 7 shows that higher employment generating crop is tomato and lowest one is wheat. The rate of employment per hectare ranges from 67.38 man-days in wheat to 338.36 man-days in tomato. As regards the selected commercial crops, peas account the lowest i.e. 169.44 man-days per hectare which is still higher than that of the crops other than vegetables. On the whole, number of man-days, per hectare employed in different crops suggests that cultivation of commercial vegetable crops generates better employment opportunities to the farmers of Himachal Pradesh.

**IV. Conclusion And Suggestions:**

On the basis of foregoing analysis one can suggest that cultivation of commercial vegetable crops in the State is very successful enterprise. It is particularly more beneficial to marginal and small farmers having land holding up to two hectares. This is because of about 87 % of farmers in the State falls in these categories. By growing off -season vegetables , farmers in the state are fully utilizing agro –climatic advantages by cultivation of commercial vegetable crops the growers in the State are getting various economic benefits over non –growers. Briefly these are (I) more employment (II) higher returns per unit of land (III) best use of their sources (IV) higher income etc. To improve the skill and potentials of the rural vegetable growers, it is essential to strengthen the network for the dissemination of technical know-how to the farmer. Extension agencies in the State should educate the farmers about the economic incentives by growing organically vegetable crops, the natural advantages of the hilly region in this regard to be fully exploited. The present study suggests adopting the organic farming in the state. Financial co-operative societies should be established to provide the adequate amount of credit to the farmers for purchasing sophisticated inputs and equipment especially in rural areas. Like cereal crops, minimum support price and crop insurance would be expected by the growers to increase the area under vegetable crops in near future. Therefore, it is concluded that Himachal Pradesh has the regional advantages in the cultivation of vegetable crop during off –season.

**TABLE 1- COST AND RETURN FROM CULTIVATION OF CABBAGE ON SAMPLE FARMERS (Rs./ha.)**

Item	Marginal Farmers	Small Farmers	Other Farmers	All Farmers
<b>I. Cost of Cultivation</b>				
Cost A <sub>1</sub>	49169	58782	58804	55418
A <sub>2</sub>	49169	58782	58804	55418
B	160356	194305	166815	172662
C	176257	206098	175871	185108
D	183643	214915	184691	193421
MC	50465	72077	53812	57799

<b>TOTAL COST</b>	<b>234108</b>	<b>286992</b>	<b>283503</b>	<b>251220</b>
2. Gross Returns	384643	444106	352742	383761
3. Net Returns over Cost- A <sub>1</sub>	335474	385324	293938	328343
A <sub>2</sub>	335474	385324	293938	328343
B	224287	249801	185927	211099
C	208386	238008	176871	192653
D	201000	229191	168051	190343
MC	334178	372029	298930	325962
<b>TOTAL COST</b>	<b>150535</b>	<b>157114</b>	<b>114239</b>	<b>132541</b>

**TABLE 2- COST AND RETURN FROM CULTIVATION OF CAPSICUM ON SAMPLE FARMERS (Rs./ha.)**

Item	Marginal Farmers	Small Farmers	Other Farmers	All Farmers
1. Cost of Cultivation Cost A <sub>1</sub>	60283	69527	73870	68198
A <sub>2</sub>	60283	69527	73870	68198
B	207206	226224	204169	207736
C	219051	234314	210387	215888
D	228093	244744	221468	221468
MC	58113	57090	48447	53723
TATOL COST	286206	301834	269915	279841
2. Gross Returns	481200	513108	424460	455920
3. Net Return over Cost A <sub>1</sub>	420917	443581	350590	387722
A <sub>2</sub>	420917	443581	350590	387722
B	273994	286884	220291	248184
C	262149	278794	214073	240032
D	253107	268364	202992	234452
MC	423087	456018	376013	402197
<b>TOTAL COST</b>	<b>194994</b>	<b>211274</b>	<b>154545</b>	<b>176079</b>

**TABLE 3- COST AND RETURN FROM CULTIVATION OF CAULIFLOWER ON SAMPLE FARMERS (Rs./ha.)**

Item	Marginal Farmers	Small Farmers	Other Farmers	All Farmers
1. Cost of Cultivation Cost A <sub>1</sub>	53644	58904	62510	58558
A <sub>2</sub>	53644	58904	62510	58558
B	160365	158459	164474	161253
C	171233	165849	169782	168972
D	179279	174684	179159	177756
MC	34307	35063	28015	32166
TATOL COST	213586	209747	207174	209922
2. Gross Returns	333868	351529	326169	337010
3 Net Returns over Cost A <sub>1</sub>	280224	292625	263559	278452
A <sub>2</sub>	280224	292625	263659	278452
B	173503	193070	161695	175757
C	162633	185680	156387	168038
D	154589	176845	147010	159254
MC	299561	316466	298154	304844
<b>TOTAL COST</b>	<b>120282</b>	<b>141782</b>	<b>119025</b>	<b>127088</b>

**TABLE 4- COST AND RETURN FROM CULTIVATION OF PEAS ON SAMPLE FARMERS (Rs./ha.)**

Item	Marginal Farmers	Small Farmers	Other Farmers	All Farmers
1. Cost of cultivation Cost A <sub>1</sub>	43549	47757	50978	47183
A <sub>2</sub>	43549	47757	50978	47183
B	104445	122589	117198	114524
C	113404	129382	121788	121274
D	119937	136546	129435	128351
MC	11187	25063	18015	18166
<b>TATOL COST</b>	<b>131124</b>	<b>161609</b>	<b>147450</b>	<b>146517</b>
2. Gross Returns	198362	242576	214019	218254
3. Net Returnover Cost A <sub>1</sub>	154813	194819	163041	171071

A2	154813	194819	163041	171071
B	93917	119987	96821	103730
C	84958	113194	92231	96980
D	78425	106030	84584	89903
MC	187175	217513	196004	200088
<b>TOTAL COST</b>	<b>67238</b>	<b>80967</b>	<b>66569</b>	<b>71737</b>

**TABLE 5- COST AND RETURN FROM CULTIVATION OF TOMATO ON SAMPLE FARMERS**

(Rs./ha.)

Item	Marginal Farmers	Small Farmers	Other Farmers	All Farmers
1. Cost of Cultivation Cost A1				
	68414	73503	73682	71989
A2	68414	73503	73682	71989
B	235034	280375	265557	260541
C	253634	293128	274588	273780
D	267316	307828	289324	288178
MC	68859	72746	67980	69766
<b>TATOL COST</b>	<b>336175</b>	<b>380574</b>	<b>357304</b>	<b>357944</b>
2. Gross Returns	544323	681615	682215	620071
3. Net Returnover Cost A1				
	475909	608112	608533	548082
A2	475909	608112	608533	548082
B	309289	401240	416658	359530
C	290689	388487	407627	346291
D	277007	373787	392891	331893
MC	475464	608869	614235	5150305
<b>TOTAL COST</b>	<b>208148</b>	<b>301041</b>	<b>324911</b>	<b>262127</b>

**TABLE 6- COMPOSITION OF AGRICULTURE INCOME ON SAMPLE FARMERS**

(Rs./ha.)

Sr. No.	Particulars	Marginal Farmers	Small Farmers	Other Farmers	All Farmers
1.	From selected commercial crops	388479 (57.42)	446586 (57.30)	399921 (55.29)	411593 (56.68)
2.	From horticultural crops	255398 (37.75)	297566 (38.18)	283967 (39.26)	278824 (38.39)
3.	From other crops	32694 (4.83)	35238 (4.52)	39414 (5.54)	35816 (4.93)
4.	Total agricultural income	676571 (100.00)	779390 (100.00)	723302 (100.00)	726233 (100.00)

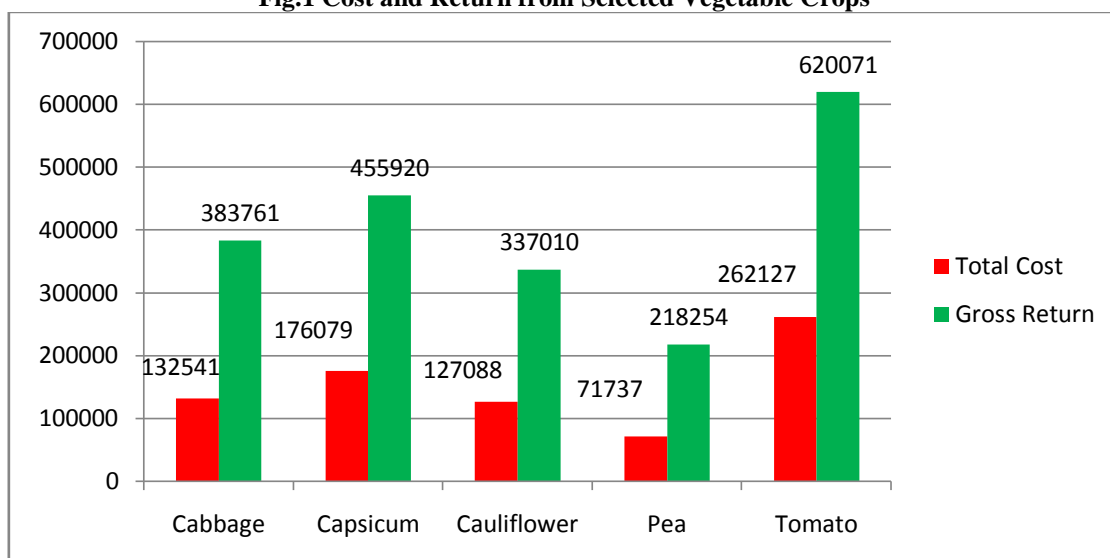
**Notes:** (i) Other crops include cereal crops etc.  
(ii) Figures in parentheses denote percentage of respective total.

**TABLE 7- EMPLOYMENT POTENTIAL OF DIFFERENT CROPS GROWN BY SAMPLE FARMERS IN STUDY AREA**

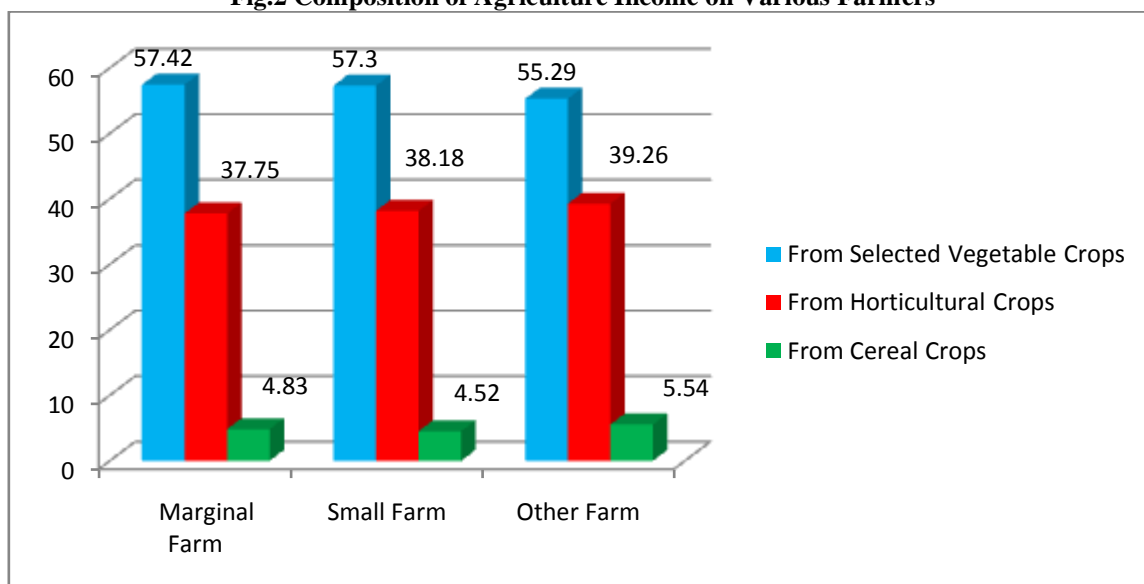
(Man-days/ha.)

Sr. No	Crops	Marginal Farmers	Small Farmers	Other Farmers	All Farmers
<b>A.</b>	<b>Selected vegetabl crops</b>				
1.	Cabbage	203.90	225.62	218.54	215.96
2.	Capsicums	249.95	275.14	238.85	254.62
3.	Cauliflower	199.16	206.15	195.88	200.76
4.	Peas	175.62	169.83	163.96	169.44
5.	Tomato	346.25	338.83	331.63	338.36
<b>B.</b>	<b>Traditional Crops</b>				
1.	Maize	69.27	74.68	79.94	74.96
2.	Paddy	88.62	93.71	99.43	93.33
3.	Wheat	61.56	67.72	73.28	67.68

**Fig.1 Cost and Return from Selected Vegetable Crops**



**Fig.2 Composition of Agriculture Income on Various Farmers**



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