



Research Article

Comparative economic analysis and constraints in farming systems practiced in northern transitional zone of Karnataka

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SUMMARY : The study examined the economics of farming systems in northern transitional zone of Karnataka. It was based on primary data collected from the sample respondents in peri-urban and rural areas of the zone. The top four farming systems in each of the situations based on highest per cent of adoption were considered for economic analysis. In peri-urban area of Dharwad the net returns was highest in the system involving crops and dairy. In rural area of Dharwad, the net returns was higher in the system involving crops, dairy and plantation. Whereas, in the case of Belgaum peri-urban area the net returns were highest in system involving crop, vegetables, dairy and poultry. In rural area the farming system consisting of crops, dairy, goat performed much better. In peri-urban area of Dharwad, lack of field demonstrations, lack of funds to purchase improved inputs, labour shortage during peak operation and price fluctuation were the major constraints in adoption of farming systems. Similarly lack of training, too many formalities in getting credit, lack of irrigation and high marketing cost in rural areas of Dharwad. and lack of field demonstrations, lack of funds to purchase improved inputs, labour shortage in peak period and price fluctuation were the major constraints in peri-urban areas of Belgaum. In the case of rural area of Belgaum, lack of extension trainings, too many formalities in getting credit, lack of irrigation and high marketing cost were the major constraints.

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BACKGROUND AND OBJECTIVES

Agricultural progress is normally regarded as a pre-requisite of economic development. It is true that economic development in modern times has to be associated with industrialization, nevertheless, it is generally accepted that industrialization can follow only on the sound heels of agriculture. One of the finest Indian success stories of post independent era has been the green revolution of sixties, which salvaged the country from being a chronic importer of food grains into an exporter. During the last five decades, agricultural research has emphasized component and commodity based research leading to development of crop varieties, animal breeds, farm implements and machinery and other production and protection technologies, which enabled the farmers to grow more but at the same time over exploited the resources. This has

resulted in decreasing factor productivity, resource use efficiency and ultimately less profitability. It is further coupled with the problems like environmental degradation, groundwater contamination and entry of toxic substances in to the food chain. To tackle these problems, farming system approach has been widely recognized and advocated as one of the tools for harmonious use of inputs and their compounded response to make the production system sustainable.

Farming systems is a set of agro-economic activities that are interrelated and interact among themselves in a particular agrarian setting. In diversified farming, though crop and other enterprises exist, the thrust is mainly to minimize the risk. While in the farming systems a judicious mix of one or more enterprises along with cropping having complimentary effects through effective recycling of wastes and crop residues is

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emphasized which can be an additional source of income to the farmers. It is focused round a few selected inter-dependent, inter-related and inter-linking production systems, based on crops, animals and related subsidiary professions. In all the ecosystems, farming system approach with location specific models offer gainful employment and are highly profitable and sustainable. So far the studies conducted on economics of farming system are very few and produced diversified views. An economic analysis of farming systems throws light on the problems associated with different farming systems and enables the academicians and policy makers to formulate and implement appropriate policies for a balanced and integrated agricultural development. The specific objectives of the study were to work out the economics of the major farming systems in the study area and to identify the constraints in popularization of farming systems

RESOURCES AND METHODS

This study was conducted in the Northern Transitional Zone of Karnataka which consists of 14 taluks spread in Belgaum, Dharwad, Gadag and Haveri districts. The rain fall in the zone ranges from 619 mm to 1303 mm. The soils are shallow to deep medium black clay soils and red sandy loams in almost equal proportion permitting to grow almost all crops in the zone. The zone is also ideally suited for animal husbandry activities.

The study used primary data collected from randomly selected sample farmers in the zone. It was noticed that farming systems practiced in the zone are greatly influenced by the proximity of the farmers to the urban centers. Therefore, it was decided to classify the study area in to peri-urban and rural areas. The villages located within the radius of ten kilometers from the major towns or cities in the zone were considered as peri-urban areas and those located beyond the radius of 20 kilometers were considered as rural areas. Thus two distinct areas within the zone were demarcated for the study. Hubli-Dharwad and Belgaum cities are the two major urban centers of the zone. These two cities have been considered as focal points for demarcation of the study area.

A multistage sampling design was used to select the sample respondents for the study. The villages located in the peri-urban and rural areas of the two cities were considered in the first stage for both data enumeration. In the second stage one cluster of villages (2-4 villages) was selected randomly in all the four directions in each of the demarcated peri-urban and rural areas in each of the Hubli-Dharwad and Belgaum areas. Thus four clusters of villages in peri-urban area and four clusters of villages in rural area of Hubli-Dharwad and Belgaum were selected. In the third and final stage of data enumeration, for each of the selected farming systems a random sample of fifteen farmers were selected. A sample of 60

randomly selected farmers in peri-urban area and 60 randomly selected farmers in rural area of Hubli-Dharwad were interviewed to make up a total sample of 120 farmers. Similarly 120 farmers in Belgaum area were also selected. Thus the final sample for the analysis was 240 farmers spread in peri-urban and rural areas of Hubli-Dharwad and Belgaum areas in the zone. A detailed information on crops grown, input used, output obtained, animal husbandry activities taken up by the sample farmers was elicited with a help of pre-tested schedule through personal interview method. The data pertained to the agricultural year 2010-11. The budgeting technique was used to estimate input use pattern, cost and returns from different farming systems. Garrett's ranking technique was used to analyse the constraints in adoption of farming systems. The respondents were asked to rank the factors that are limiting the farmers in adoption of the farming systems. The order of merit given by the respondents was converted in to rank by using the formula:

$$\text{Per cent position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

where, R_{ij} = the rank of the i th item by j th individual and N_j = the number of items ranked by the j th individual.

The per cent position of each rank was converted into scores by referring tables given by Garrett and Woodworth (1969). Then for each factor, the scores of individual respondents are added together and divided by the total number of respondents for whom scores are added. The mean scores for all the factors are ranked.

OBSERVATIONS AND ANALYSIS

Of the different farming systems practiced by the sample respondents in the zone, the top four farming systems in each situation based on the highest per cent of adoption were considered for analysis.

Cost and returns structure of major farming systems:

The farming system wise per farm cost and returns in study are presented in Table 1. The components followed in FS-I of peri-urban area of Dharwad were crops (1.85 ha), vegetables (0.52) and dairy (1.97 animals). The per farm total variable cost was Rs. 167493. Total fixed cost was Rs.30788. The per farm total cost and gross returns were Rs.198282 and Rs.218135, respectively. The net returns over total variable cost was worked out to be Rs.50648. The net returns at total cost was Rs.19854. The returns per rupee was Rs.1.10.

Crops (3.88 ha) and dairy (1.94 animals) were the components of FS-II. The per farm total variable cost worked out to Rs.214379. The total cost was Rs.251976. The per farm gross returns was amounted to Rs.282824. The net returns over total cost were Rs.30847. The returns per rupee spent was Rs.1.12

In case of FS-III the components were crops (2.37 ha), vegetables (0.69 ha), flowers (0.39) and dairy (1.66 animals). The return per rupee spent was Rs.1.03. The per farm total variable cost was Rs.231514. The total cost was Rs.271838. The per farm net returns over variable cost and over total cost was Rs.47135 and Rs.6811, respectively.

The farmers following FS-IV grew crop (1.74 ha), vegetables (0.56 ha), plantations (4.26 mango plants) and maintained the dairy animals (2.80). The return per rupee spent was Rs.1.06. The per farm total variable cost was Rs.204091 and total cost was Rs.243241. The per farm gross return worked out to be Rs.258883. The net returns over total cost was Rs.15641.

The per farm net returns over total cost was the highest in FS-II (Rs.30848) followed by FS -I (Rs.19854), FS -IV (Rs. 15641) and FS -III (Rs.6812).

In the case of rural areas of Dharwad, it was noticed that, only crop component (2.42 ha) was include in farming system-I. The total variable cost incurred was Rs.83076 and the total fixed cost was Rs.14403. The per farm gross returns obtained from various crops was Rs.94929. The returns per rupee invested at total cost was Rs.0.97.

In FS-II, the components included were crops (3.21 ha) and dairy (2.46 animals). The total expenditure incurred on all variable items (TVC) worked out to Rs.158574. Per farm total

cost and gross returns worked out to Rs.191710 and Rs.212433, respectively, resulting into net returns of Rs.20722. The return on per rupee invested at total cost was Rs.1.11.

FS-III consisted crops (0.83 ha), mango plantation (0.55 ha or 46.5 plants) and dairy (2.20 animals). The per farm total variable cost was Rs.144495 and per farm total cost and gross returns were Rs.175875 and Rs.228322, respectively. The net returns at total cost was Rs.52447. The returns per rupee invested at total cost was Rs.1.30.

FS-IV included crops (2.63 ha), vegetables (0.89 ha) and dairy (2.27). The total variable cost and total fixed cost amounted to Rs.218546 and Rs.51297, respectively. The gross returns were Rs.271858. The net returns at total cost were Rs.2014. The return on per rupee invested was Rs.1.01.

Among the farming systems followed in the region, the per farm gross returns was highest in FS-IV (Rs.271858) followed by FS-III (Rs.228322), FS-II (Rs.212433) and FS-I (Rs.94929). The net returns at total cost was highest in FS-III (Rs.52447) followed by FS-II (Rs.20722). The returns per rupee of investment at total cost were ranging from 0.97 (FS-I) to 1.30 (FS-III).

In the case of peri-urban areas of Belgaum, farmers following FS-I have undertaken crops (0.91 ha), vegetables (0.91 ha), coconut plantations (6.98 plants) and dairy (1.53 animals) activities. Per farm total variable cost and total cost

Table 1 : Cost and returns structure of major farming systems in study area (Rs./farm)

Sr. No.	Farming systems	Total variable cost (TVC)	Total fixed cost (TFC)	Total cost (TC)	Gross return	Net return over TVC	Net return over TC	Returns per rupee at TVC	Returns per rupee at TC
Peri-urban, Dharwad									
1.	FS I - C+V+D	167493.20	30788.46	198281.66	218135.84	50642.64	19854.18	1.30	1.10
2.	FS II -C+D	214379.93	37596.18	251976.11	282823.91	68443.98	30847.80	1.32	1.12
3.	FS III -C+V+F+D	231514.22	40323.50	271837.72	278649.39	47135.16	6811.67	1.20	1.03
4.	FS IV -C+V+P+D	204091.11	39149.73	243241.83	258882.99	54791.87	15641.15	1.27	1.06
Rural Dharwad									
1.	FS I - C	83075.86	14403.39	97479.24	94929.38	11853.52	-2549.86	1.14	0.97
2.	FS II -C+D	158574.34	33136.65	191710.99	212433.39	53859.04	20722.39	1.34	1.11
3.	FS III -C+P+D	144494.89	31380.10	175875.00	228321.91	83827.02	52446.91	1.58	1.30
4.	FS IV -C+V+D	218546.16	51296.89	269843.06	271857.55	53311.39	2014.49	1.24	1.01
Peri-urban, Belgaum									
1.	FS I - C+V+P+D	151940.55	25013.55	176954.09	174670.62	22730.08	-2283.47	1.15	0.99
2.	FS II- C+V+P+D+Po	170747.82	30193.95	200941.77	197262.75	26514.93	-3679.82	1.16	0.98
3.	FS III-C+V+D+Po	170231.16	29267.24	199498.40	206690.27	36459.11	7191.87	1.21	1.04
4.	FS IV- C+D+Po	115982.42	25510.10	141492.52	128453.46	12471.04	-13039.07	1.11	0.91
Rural Belgaum									
1.	FS I -C+V+P+D	156641.26	25858.11	182499.37	167791.34	11150.08	-14708.03	1.07	0.92
2.	FS II- C+D	123082.15	24705.63	147787.77	150717.19	27635.04	2929.42	1.22	1.02
3.	FS III- C+D+G	192490.63	39336.33	231826.97	252041.27	59550.64	20214.31	1.31	1.09
4.	FS IV- C+G	80041.04	13602.14	93643.17	89927.01	9885.97	-3716.17	1.12	0.96

C- Crop, V-Vegetable, F- Flower crops, P-Plantation Crops, D- Dairy, Po- Poultry, G- Goat.

worked out to Rs.151941 and Rs.176954, respectively. The per farm gross returns amounted to Rs.174671. The returns on per rupee invested at total cost were Rs.0.99.

In FS-II paddy (0.88 ha), vegetables (0.88 ha), cashew plantations (12 plants), dairy (1.93 animals) and poultry (20.13 birds) were the activities under taken by farmers. It was observed that the per farm total cost and gross returns were Rs.200943 and Rs.197263, respectively. The per farm net returns at total cost was Rs.-3680 with returns per rupee invested at total cost of 0.98.

The components included in FS-III were crops (1.03 ha), vegetables (1.03 ha) dairy (1.60 animals) and poultry (34 birds). The per farm total variable cost was Rs.170231. The per farm total cost incurred was Rs.199498. The net returns over total cost worked out to Rs.7192. The returns on per rupee invested at variable cost and total cost were Rs.1.21 and Rs.1.04, respectively.

It was observed that in FS-IV, the crops (1.73 ha), dairy (1.46 animals) and poultry (19.66 birds) activities were practiced. The per farm total cost worked out to Rs.141493. The gross returns amounted to Rs.128453. The net returns over total variable cost was Rs.12471. The returns on per rupee invested at total cost was Rs.0.91.

Among the different farming systems practiced in the region, the per farm gross returns was highest in FS-III (Rs.206690) followed by FS-II (Rs.197262), FS-I (Rs.174671) and FS-IV (Rs.128453). The returns per rupee of investment at total cost ranged from 0.91 (FS-IV) to 1.04 (FS-I).

The farmers in FS-I of rural areas of Belgaum, preferred to take up crops (0.65 ha of paddy), vegetables (0.65 ha), cashew plantation (20 plants) and dairy (2.13 animals) activities. The total cost was Rs.182499 per farm. The gross returns were Rs.167791. The return on per rupee invested at total cost amounted to Rs.0.92.

In the case of FS-II, crops (0.81 ha) and dairy (3.33) activities were undertaken by the farmers. Per farm total variable cost amounted to Rs.123082. The total fixed cost was Rs.24706. The per farm gross returns obtained from various activities was estimated to be Rs.150717. The net returns over total cost were Rs.2929 and the return per rupee spent was Rs.1.02.

It was found that the farmers following farming system-III had undertaken crops (2.09 ha), dairy (2.07 animals) and goat rearing (3.56 goats) activities. The per farm total variable cost was Rs.192491. The total fixed cost was Rs.39336 resulting into a total cost of Rs.231826. The per farm gross returns amounted to Rs.252041. The return on per rupee invested at total cost was Rs.1.09.

The FS-IV consisted of crops (1.32 ha) and goat rearing (4.60 goats). The per farm total cost and gross returns were Rs.93643 and Rs.89927, respectively, the returns per rupee spent was Rs. 0.96.

Among the different farming systems practiced in the

region, Per farm gross return were highest in FS -III (Rs.252041), followed by FS -I (Rs.167791) and FS-II (Rs.150717).

Constraints in adoption of farming systems:

Various problems and constraints faced by farmers in practicing different farming systems in study areas of different regions were analysed. These problems and constraints were grouped in to Infrastructural, Production, Financial and Marketing constraints. Based on the information furnished by sample farmers, the constraints being faced by them in adoption of farming systems in the study area were ranked and prioritized by using the Garrett's ranking.

In peri-urban area of Dharwad (Table 2), lack of field demonstrations was the major constraint in adoption of farming system with 73.20 garret score in infrastructural followed by lack of extension of training (68.27 score), lack of artificial insemination and veterinary facilities (57.67 score), less visits of village level workers (47.40 score), lack of processing facilities (43.70 score) and non availability of package of practices (35.73 score).

Lack of funds to purchase improved inputs (53.80 garret score), non availability of credit in time (48.73 score) and too many formalities in getting credit (46.20 score) were the major financial constraints in the adoption of farming systems in the study area. Udagatti (2005) reported scarcity of owned funds as a major constraint in his study on farming systems in tank commands of northern Karnataka.

Labour shortage during peak operational periods was ranked first in production constraints with the highest garret score of 81.20, followed by high wage rates (67.33 score), lack of power supply (62.60 score), high cost of fertilizers and chemicals (60.20 score), shortage of fodder (49.00 score), high cost of production (48.00 score), non-availability of fertilizers and chemicals on time (40.80 score), lack of irrigation / shortage of irrigation water (36.67 score) and non- availability of improved quality seeds (29.00 score) and improved breeds of livestock (22.00 score).

In the case of marketing constraints, price fluctuation was the major one with the highest garret rank of 76.27, followed by non-remunerative prices for their produce (68.40 score), lack of transportation or costly transportation (62.87 score), high marketing cost (58.00 score), lack of adequate storage facilities (54.33 score). The other constraints in marketing are defective and faulty weights (52.73 score), lack of regulated markets in the area (50.93 score), exploitation by the commission agents (48.47 score), delay in obtaining the sales proceeds (44.80 score) and improper handling (31.60 score) and pilferage in market place (29.47 score).

In rural areas of Dharwad (Table 2), lack of extension or training ranked first with 70.97 score. This was followed by lack of field demonstration (70.33), lack of insemination or veterinary facilities (47.67 score), less visits of village level

workers (44.07 score), lack of processing facilities (43.53 score), distance of the bank form the village (43.33 score) and non-availability of package of practices (27.80 score).

Most of the respondents felt that too any formalities in getting credit was the major constraint in financial group which was given first rank with 57.6 garret score followed by lack of funds to purchase improved inputs (53.8 score) and non-availability of credit on time (38.6 score).

Lack of irrigation or shortage of irrigation water was the major production constraint with a highest score of 77.20. Kumar and Prakash Kumar (2008) reported that scarcity of

water for irrigation was the major constraint in his study on contract farming. The labour shortage during peak periods of operation (77.80 score), high wage rates (58.00 score), high cost of chemical fertilizer (55.20 score), lack of power supply (54.80 score) were the important production constraints.

In the case of marketing constraints, high marketing cost was the major one with highest garret score of 79.60. This was followed by high fluctuation prices of the commodities in the market (77.40 score), non-availability or costly transportation (65.67 score), lack of regulated markets (56.13 score), non-remunerative prices for their produce in the market (55.27

Table 2 : Constraints in adoption of farming systems in Dharwad

Sr. No.	Particulars	Peri-urban area		Rural area	
		Score	Rank	Score	Rank
Infrastructure/ Extension					
1.	Package of practices is not available	35.73	6	27.80	7
2.	Lack of extension or training	68.27	2	70.97	1
3.	Lack of field demonstrations	73.20	1	70.33	2
4.	Lack of insemination or veterinary facilities	57.67	3	47.67	3
5.	Lack of processing facilities	43.07	5	43.53	5
6.	VLW (Agricultural Assistants) not visiting	47.40	4	44.07	4
7.	Bank branch far away	-	-	43.33	6
Financial					
1.	Too much formalities in getting credit	46.20	3	57.6	1
2.	Credit not available timely	48.73	2	38.6	3
3.	Lack of funds to purchase improved inputs	53.80	1	53.8	2
Production					
1.	Seeds of improved quality not available	29.20	9	23.13	10
2.	Chemicals and fertilizers not timely available	40.80	7	23.87	9
3.	High cost of chemical and fertilizers	60.20	4	55.20	4
4.	Lack of irrigation/ shortage of irrigation water	36.67	8	77.20	1
5.	Lack of power supply	62.60	3	54.80	5
6.	Labour shortage in peak period	81.20	1	74.80	2
7.	Improved breeds of livestock not available	22.00	10	39.00	8
8.	Shortage of fodder	49.00	5	40.00	7
9.	High wages	67.33	2	58.00	3
10.	High cost of the production	48.00	6	53.00	6
Marketing					
1.	Lack of regulated markets	50.93	7	56.13	4
2.	No remunerative prices	68.40	2	55.27	5
3.	Delay in obtaining the sales proceeds	44.80	9	47.60	7
4.	Exploitation by commission agents	48.47	8	48.40	6
5.	Transportation facility not available /costly	62.87	3	65.67	3
6.	Defective and faulty weighing	52.73	6	40.13	8
7.	Lack of adequate storage facilities	54.33	5	39.87	9
8.	Improper handling at marketing	31.60	10	29.73	10
9.	Pilferage in market place	29.47	11	28.80	11
10.	High marketing cost	58.00	4	79.60	1
11.	Price fluctuation	76.27	1	77.40	2

score), exploitation by commission agents (48.40 score), delay in obtaining the sales proceeds (47.60 score), defective and faulty weighing (40.13 score), lack of adequate storage facilities (39.87 score), improper handling in marketing (29.73 score) and pilferage in market place (25.80 score).

In peri-urban area of Belgaum (Table 3), lack of extension of training was the major constraint in adoption of farming system with 82.43 garret score in infrastructural or extension constraints, followed by lack of field demonstrations (71.27 score), lack of processing facilities (57.43 score), less visits of

village level workers (49.35 score), lack of artificial insemination and veterinary facilities (42.45 score), and non availability of package of practices (36.80 score).

Lack of funds to purchase improved inputs (52.98 garret score), too much formalities in getting credit (49.26 score) and non availability of credit on time (44.83 score) were the major financial constraints in adoption of farming systems in the study area.

Labour shortage in peak period was ranked first in production constraints with the highest garret score of 78.20,

Table 3 : Constraints in adoption of farming systems in Belgaum

Sr. No.	Particulars	Peri-urban area		Rural area	
		Score	Rank	Score	Rank
Infrastructure/ Extension support					
1.	Package of practices is not available	36.80	6	27.20	7
2.	Lack of extension or training	82.43	1	79.60	1
3.	Lack of field demonstrations	71.27	2	70.33	2
4.	Lack of insemination or veterinary facilities	42.45	5	47.67	3
5.	Lack of processing facilities	57.43	3	43.53	5
6.	VLW (Agricultural Assistants) not visiting	49.35	4	44.07	4
7.	Bank branch far away	-	-	43.33	6
Financial					
1.	Too much formalities if getting credit	49.67	2	57.60	1
2.	Credit not timely available	44.83	3	38.60	3
3.	Lack of funds to purchase improved inputs	52.98	1	53.80	2
Production					
1.	Seeds of improved quality not available	24.23	10	23.13	10
2.	Chemicals and fertilizers not timely available	26.85	9	23.87	9
3.	High cost of chemical and fertilizers	56.32	4	55.20	4
4.	Lack of irrigation/ shortage of irrigation water	37.80	8	77.20	1
5.	Lack of power supply	59.35	3	54.80	5
6.	Labour shortage in peak period	78.20	1	74.80	2
7.	Improved breeds of livestock not available	40.78	7	39.00	8
8.	Shortage of fodder	42.40	6	40.00	7
9.	High wages	72.28	2	58.00	3
10.	High cost of the production	48.67	5	53.00	6
Marketing					
1.	Lack of regulated markets	53.63	7	56.13	4
2.	No remunerative prices	68.67	3	55.27	5
3.	Delay in obtaining the sales proceeds	45.52	9	47.60	7
4.	Exploitation by commission agents	55.52	6	48.40	6
5.	Transportation facility not available /costly	58.02	5	65.67	3
6.	Defective and faulty weighing	50.62	8	40.13	8
7.	Lack of adequate storage facilities	63.97	4	39.87	9
8.	Improper handling at marketing	31.23	10	29.73	10
9.	Pilferage in market place	29.45	11	28.80	11
10.	High marketing cost	72.87	2	79.60	1
11.	Price fluctuation	82.87	1	77.40	2

followed by high wage rates (72.28 score), lack of power supply (59.35 score), high cost of fertilizers and chemicals (56.32 score), high cost of production (48.67 score) shortage of fodder (42.40 score), and other constraints related production are non-availability of improved breeds of livestock (40.78 score).

In the case of marketing constraints, price fluctuation was the major one with the highest garret rank of 82.87, high marketing cost (72.87 score), followed by no remunerative prices for their produce (68.73 score), lack of adequate storage facilities (63.97 score), lack of transportation or costly transportation (58.02 score).

Similarly the constraints in adoption of farming systems in the rural areas of Belgaum (Table 3) revealed that in the case of infrastructural/extension problems lack of extension trainings was given highest rank with the Garrett score of 79.60, followed by lack of field demonstrations (70.33 score), lack of insemination or veterinary facilities (47.67 score), less visits of village level workers to the village (44.07 score) and lack of processing facilities (43.53 score).

The respondents in this region opined that too many formalities in getting credit was a major constraint with the Garrett score of 57.60 in financial constraints in the area. This was followed by lack of funds to purchase improved inputs with the score of 53.80 and non-timely availability of the credit with 38.60 score.

Lack of irrigation was the major production constraint as opined by the farmers which was given highest rank with the Garrett score of 77.20 followed by labour shortage in peak period, high wages, high cost of chemical fertilizer and lack of power supply with the score of 74.80, 58.00, 55.20 and 54.80, respectively. The high cost of chemical fertilizers and non-availability of inputs in time were the major production constraints in north Konkan region of Maharashtra (Torane, 2009).

In the case of marketing constraints, high marketing cost was the major constraint with Garrett score of 79.60, it was given the first rank. This was followed by price fluctuation (77.40 score), non-availability of or costly transportation facility (65.67 score), lack of regulated markets (56.13 score) and no remunerative prices for the produce (55.27 score). Saikumar (2005), reported low price for produce, high marketing cost and lack of storage facility as a major marketing constraints in tank command area.

Conclusion:

The net returns, cost and returns cannot be compared across the regions because the enterprises encompassing a farming system of the region do not coincide with each other. Still a critical look at the components followed in different farming systems suggested that the activities in farming system-I of peri-urban area Dharwad were identical with

enterprises of FS-IV of rural area of Dharwad. Similarly, FS-II of peri-urban area of Dharwad, rural area of Dharwad and rural area of Belgaum were having identical components. The FS-IV of peri-urban area of Dharwad was having the components identical with FS-I of peri-urban area of Belgaum.

A comparison of economics of more or less identical farming systems across the regions suggested that FS-I in peri urban area of Dharwad as more profitable than FS-IV of rural area of Dharwad. FS-II peri-urban area of Dharwad was more profitable compared to that in rural areas of Dharwad and rural area of Belgaum, with a net return of Rs.30847, Rs.20722 and Rs.2929, respectively. Similarly FS-IV of peri-urban area of Dharwad had higher net returns over its FS-I of peri-urban and rural areas of Belgaum.

It was observed that, in peri-urban area of Dharwad, lack of field demonstrations, lack of funds to purchase improved inputs, labour shortage in peak period and price fluctuation were the major constraints in adoption of farming systems. Similarly it was lack of extension or training, too many formalities in getting credit, lack of irrigation and high marketing cost were the major constraints in rural areas of Dharwad and in peri-urban areas of Belgaum lack of field demonstrations, lack of funds to purchase improved inputs, labour shortage in peak period and price fluctuation were the major constraints, whereas in case of rural area of Belgaum lack of extension trainings, too many formalities in getting credit, lack of irrigation and high marketing cost were the major constraints.

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