Is Smallholder Farming Economically Viable? Evidences from Village Dynamics Studies in Karnataka, Peninsular India[1]

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Abstract

Indian agriculture is numerically dominated by small and marginal farmers who constitute around 83 percent of the total holdings and Karnataka state is no exception. Over 56 % of the state population depends on agriculture for their livelihood. A majority of these are small and marginal farmers with land less than 2 ha. Thus, the viability of the small farmer holdings is at stake due to uneconomical size of holdings. The paper aimed at assessing the economic viability of smallholders farming considering the average incomes generated from different sources in typical semi-arid villages of peninsular India, in Karnataka. The farmers have been categorized into viable and non-viable based on economic surplus generated for the past 3 years after accounting domestic and production costs of farm enterprises. Empirical estimation is done through analysis of household level panel data collected from 160 households located in four villages of Tumkur and Bijapur districts of Karnataka for four years.

Considering average economic surplus generated on the farm by crops alone in rainfed situation, most of the smallholdings are not economically viable in Kapanimbargi village of Bijapur district, while 50 % of them are not viable in Belladamadugu and 17 % them are non-viable in Tharati villages of Tumkur district. However, all the smallholdings are viable in Markabinahalli of Bijapur district, as the rainfed agriculture in this village is characterized by low input use intensity with a combination of food and commercial crops. Even with access to irrigation, 25% of the small farmers in Kapanimbargi, 33% in Belladamadugu are non-viable. But all the smallholders are economically viable in Tharati with access to irrigation, as they are specialized in growing flower crops, with emerging water markets. In Belladamadugu the cropping pattern is dominated by groundnut and paddy even under irrigation they fail to generate surplus income. In Kapanimbargi village, large and medium farmers derived a significant proportion of income from horticultural enterprises like grapes, while small farmers did not derive any income from horticulture crops, as they are highly capital intensive and require irrigation. Considering both crop and livestock income majority of the smallholders are economically viable in all the 4 villages with and without irrigation. The net income derived

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from agriculture has been declining over the years, while income from non-farm sources has increased sharply over the years. Considering annual expenditure for both food and non-food per household, net annual income realized from crops indicated negative surplus from medium and small farmers in Bijapur district and all the farmers realized negative surplus in Tumkur district. Thus, the agricultural income realised from small holder farmers is inadequate to meet their living and hence diversified sources of income especially nonfarm income. Small farmers are likely to remain unviable if they do not get access to off-farm income. In order to enhance the viability of small farms, technology driven options to accelerate productivity and profitability are vital for policy intervention. In addition, non-farm diversification needs strong policy support towards infrastructure, transport, storage, credit and market.

Key words: economic viability, farm income, profitability, small holder farmers, semi-arid tropics, non-farm income

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Introduction:

Indian agriculture is numerically dominated by small and marginal farmers who constitute around 83 percent of the total holdings and Karnataka state is no exception. Over 56 % of the state population depends on agriculture for their livelihood. A majority of these are small and marginal farmers with land less than 2 ha. Thus, small holder agriculture is expected to continue in the foreseeable future with rise in population pressure on land and demand for land for competing alternative uses. Farmers to continue in the agriculture with declining resource base particularly land would require a steady flow of income from farming alone or farming along with other income generating activities. Of late, due to vagaries of climate change, rising labor costs and associate sharp fall in agricultural incomes, the viability of small holders farms is threatened and is at stake, hence many small farmers are drifting out of agriculture to non-farm activities. The key challenge is how to improve the income of small

farms with a focus on enhancing productivity and profitability which is sustainable on long-run so that small farmers can stay on their farming business. In this regard, this paper examines the economic viability of smallholders farming considering the average incomes generated from different sources in typical semi-arid villages of Karnataka.

Focus of the study:

Main focus of the study is to assess the economic viability of smallholder farming in typical semi-arid villages of Karnataka considering different sources of farm and non-farm income generated.

Methodology:

The ICRISAT Village Dynamics in South Asia, (VDSA) collects the panel data from the selected village households by employing resident Field Investigators who stay in the selected villages and collects the household data by personal interview. A sample of 40 respondent households was selected to represent four categories of household's landless labor, small farmers, medium farmers and large farmers. The farm household categories were defined on the basis of the pattern of landholding in each village. Ten households were randomly selected from each stratum inferring equal sampling fractions in each size group and for analysis purposes the cultivator sample is a uniform random sample. However, the labour category has not been included in the analysis as they do not have substantial crop based activities. The farmers have been further categorized into viable and non-viable based on average surplus income over costs generated for the past 3 years. Empirical estimation is done through analysis of household level panel data collected from 160 households located in four villages of Tumkur and Bijapur

districts of Karnataka for four years (2009-2012) by ICRISAT under the Village Dynamics Studies in south Asia (VDSA) project.

Characterization of Sample districts and villages

In Karnataka, Bijapur and Tumkur districts have been chosen for the VDSA project since 2009. The villages selected include Markabinahalli (BasavanaBagewadi, Taluk) and Kapanimbargi (Indi, Taluk) in Bijapur, Tharati (Korategere, Taluk) and Belladamadugu (Madhugiri, Taluk) in Tumkur district. Bijapur district is located in Northern *maidan* (plateau) region of Karnataka with semi-arid climate and a large proportion of this district is under marginal production environment with 37 rainy days in a year facing severe droughts. The district has high concentration of horticultural crops under groundwater irrigation. Both rainfed and groundwater based agriculture is heavily dependent on monsoons. Similar to Bijapur, Tumkur district lies in southern Karnataka, a typical semiarid region facing frequent droughts with hardly 33 rainy days in a year.

Contrasts between Bijapur and Tumkur villages

The size of holdings are higher ranging between 4 – 8 ha in north Karnataka (Bijapur), on the contrary, the size of holdings are extremely small ranging between 0.25 – 2 ha in the southern Karnataka (Tumkur). In Bijapur, farmers are under investing in dry land agriculture due to risk and uncertainty in rainfed agriculture, while groundwater irrigated farmers are over investing on well irrigation and horticultural crops production and processing. On the contrary, in Tumkur villages due to small holdings, there is intensification of agriculture with the use of external

inputs. There has been transition of agriculture from finger millet dominant mixed cropping to diversified commercial agriculture with access to borewell irrigation.

Profile of Villages

The salient features of VDSA villages are provided in the table (table 1)**.** The proportion of cultivated area out of the total geographical area is relatively higher in Bijapur district (94 – 95 %) villages as against Tumkur (44-73 %). With respect to size of holdings, the disparities are more discernible within Bijapur villages compare to Tumkur villages, as the proportion of landless households is more in Bijapur villages. Around 39 % of the area is irrigated in one of the villages in Bijapur and another village completely rainfed. While in Tumkur the area under irrigation is more in Thrati village compare to Belladamadugu, because of extremely small size of holdings in Tharati. The households in Bijapur have bigger family size and more literacy compare to Tumkur villages. Seasonal migration is observed in households belonging to Kapanimbargi village, as this village has highest number of landless households. Bijapur villages have black cotton and red soils, while Tumkur villages have red sandy soils. The cropping pattern shows a combination of food and commercial crops in all the 4 villages.

Table 1: Salient features of VDSA Villages in Karnataka

Particulars /villages	Bijapur		Tumkur	
	Markabinahalli	Kapanimbargi	Belladamadugu	Tharati
# of HH's	392	320	276	401
Total geographical area (Ha)	1001	826	496	519
% of net cultivated area	94	95	73	44
% of Irrigated area	0	39	27	29
% of landless households	28	33	10	28
Family size	6.47	6.23	4.43	4.24
Literacy	64	60	49	24
Size of holding (Ha)	3.29	3.6	1.45	1.03
Seasonal migration (% of HH)	-	12	-	-
Bio physical features				
Annual Rainfall (mm)	412.4	376.5	472.2	735.4
Soil type	Deep to medium black	Red	Red sandy	Red sandy loam
Crops grown during Kharif	Pigeon pea, Cotton, Onion	Pigeon pea, Maize, Groundnut, Pearl millet, Onion	Groundnut, Paddy, finger millet, Pigeon pea, Horse gram	Finger millet Paddy, Cut flowers, Horse gram, Ground nut
Crops grown during Rabi	Chickpea, Sorghum, Wheat, Safflower	Sorghum, Wheat, Chickpea, Maize, Onion	Paddy, Groundnut, Flowers and Vegetables	Flowers, Vegetables, Sorghum fodder
Perennial crops	-	Grapes, Ber, Pomegranate	Arecanut	Arecanut, coconuts, Betelvine

General Characteristics of sample farmers in VDSA villages of Karnataka:

The demographic features of the sample farmers in VDSA villages of Karnataka indicate that the average family size comprised of 5-6 members with a literacy level of 4-5 years (table 2). In terms of social profile, barring Belladamadugu village, majority of the farmers (>80%) belong to OBC. It is intriguing to note that only 5-8 % of the youth in Tumkur villages are engaged in agriculture as against 15 % in Bijapur villages. This indicates youth disinterest in agriculture. In general, higher proportion of farmers belongs to middle age in all the villages. The striking feature that differentiates between Bijapur and Tumkur villages is that of size of holdings, which are extremely small in Tumkur villages as compared to Bijapur.

Table 2: General Characteristics of sample farmers in VDSA villages of Karnataka

Particulars	Markabbinahalli	Kapanimbargi	Belladamadugu	Tharati
Family size	6	6	5	5
Literacy (yrs. of schooling)	5.6	4	3.9	4.8
Social classification (% of farmers)				
1. SCs	7	7	20	6
2. STs	10	-	20	-
3. OBC	83	93	60	94
Size of holdings (ha) (Base year)				
Large	9.40	9.36	2.45	0.98
Medium	2.30	2.27	1.04	0.43
Small	1.00	1.36	0.69	0.36
Pattern of Holding (ha) (Base year)				
Dry	4.12	2.28	1.05	0.35
Irrigated	-	2.04	0.36	0.26
Total	**4.12**	**4.32**	**1.41**	**0.61**
Age cohort of farmers				
1. Youth (< 35 yrs.) %	15	16	8	5
Average age in yrs	30.5	30.7	31	32.5
2.Middle aged (35-55 yrs) %	47	38	58	59
Average age in years	43.9	43.9	44.1	44.2
3. Aged farmers (> 55 yrs) %	38	46	34	36
Average age in yrs	65.1	61.5	65.8	65.4

Cropping pattern for different size of holdings in VDSA villages of Karnataka:

Cropping pattern across different size groups in VDSA villages of Karnataka is given in table-3. The cropping pattern indicates a combination of food and commercial crops in all the 4 villages. In Bijapur villages' major share of the area was under pigeon pea and cotton in Kharif and Sorghum and chick pea in post-rainy season. In Belladamadugu village groundnut is the major crop in both the seasons, while in Tharati village the major crops grown are finger millet in kharif and flowers in all the 3 seasons. Grapes in Kapanimbargi village of Bijapur district and Chrysanthemum, areacanut and betelvine crops in Tharati village in Tumkur district are major horticultural crops. The cropping pattern shows that most of the small farmers in Bijapur allocated their meager area towards food crops, while in Tumkur villages small farmers allocated their area for both for food and commercial crops. On the contrary, majority of the large and medium farmers allocated more area towards commercial crops. Thus, most of the small farmers are food security oriented, while most of the large farmers are economic security oriented.

Table 3: Cropping pattern for different size of holdings in Bijapur district.

Land holding	Village	Kapanimbargi			Markabinahalli		
	Kharif	**Area covered (ha)**	**% of GCA (ha)**	**% of season area (ha)**	**Area covered (ha)**	**% of GCA (ha)**	**% of season area (ha)**
Large	Pigeon pea	7.5	8.4	19.8	17.4	15.3	40.1
	Pearl millet	6.9	7.7	18.2	-	-	-
	Groundnut	3.5	3.9	9.2	-	-	-
	Cotton	-	-	-	4.2	3.7	9.8
	Maize	4.4	4.9	11.5	-	-	-
Medium	Pearl millet	5.5	6.2	14.5	-	-	-
	Groundnut	2.4	2.7	6.4	-	-	-
	Maize	1.2	1.4	3.2	-	-	-
	Green gram	1.3	1.4	3.3	-	-	-
	Cotton	-	-	-	2.9	2.6	6.7
	Pigeon pea	-	-	-	9.6	8.5	22.1
Small	Pearl millet	1.8	2.0	4.7	-	-	-
	Pigeon pea	2.6	2.9	6.8	5.6	5.0	13.0
	Groundnut	0.9	1.0	2.3	-	-	-
	Cotton	-	-	-	3.1	2.8	7.2
	Onion	-	-	-	0.5	0.4	1.2
	Total kharif area	38.1	42.5	100	43.4	38.2	100
Rabi							
Large	Sorghum	17.8	19.9	48.4	20.0	17.6	28.4
	Wheat	3.8	4.2	10.3	8.7	7.6	12.3
	Chickpea	2.1	2.3	5.6	29.1	25.6	41.4
Medium	Sorghum	5.3	5.9	14.3	2.3	2.0	3.2
	Wheat	2.6	2.9	7.0	1.6	1.4	2.3
	Chickpea	0.7	0.8	2.0	2.7	2.4	3.9
Small	Sorghum	4.0	4.5	10.9	3.6	3.1	5.1
	Chickpea	0.6	0.6	1.5	1.0	0.9	1.5
	Wheat	-	-	-	1.4	1.2	2.0
	Total Rabi area	36.8	41.1	100	70.3	61.8	100

Annual							
Large	Sugarcane	3.78	4.21	100.0	-	-	-
	Total Annual area	3.78	4.21	100	-	-	-
Perennial							
Large	Grapes	7.99	8.9	73.1	-	-	-
	Jasmine	0.10	0.1	0.9	-	-	-
	Lemon	0.84	0.9	7.7	-	-	-
Medium	Ber	1.21	1.4	11.1	-	-	-
	Jasmine	0.20	0.2	1.9	-	-	-
	Lemon	0.40	0.5	3.7	-	-	-
Small	Ber	0.17	0.2	1.6	-	-	-
	Total Perennial area	10.93	12.2	100	-	-	-
	GCA	**89.6**	**100**		**113.7**	**100**	

Table 4: Cropping pattern different size of holdings in Tumkur district.

Land holding	**Village**	**Belladamadugu**			**Tharati**		
	Kharif	**Area covered (ha)**	**% of GCA**	**% of season area**	**Area covered (ha)**	**% of GCA**	**% of season area**
Large	Pigeonpea	1.9	5.2	6.0	0.7	4.6	6.8
	Groundnut	11.1	31.1	35.7	-	-	-
	Paddy	2.4	6.6	7.6	1.4	9.5	14.2
	Finger millet	1.1	3.1	3.6	2.1	14.6	21.7
	Chrysanthemum	-	-	-	0.6	3.9	5.9
Medium	Groundnut	5.6	15.7	18.1	-	-	-
	Pigeonpea	1.3	3.5	4.0	-	-	-
	Paddy	1.0	2.7	3.1	0.6	3.9	5.8
	Finger millet	0.7	1.9	2.2	1.7	11.4	16.9
	Chrysanthemum	-	-	-	0.4	3.1	4.5
Small	Pigeonpea	0.5	1.5	1.7	0.3	2.1	3.1
	Groundnut	3.8	10.6	12.2	-	-	-
	Paddy	1.3	3.7	4.2	-	-	-
	Finger millet	0.6	1.6	1.8	2.1	14.1	21.0
	Total kharif area	31.2	87.2	100	9.8	67.2	100
Rabi							
Large	Groundnut	0.8	2.4	22.2	-	-	-
	Paddy	0.8	2.3	21.3	-	-	-
	Chrysanthemum	-	-	-	0.5	3.4	64.2

Medium	Groundnut	0.4	1.1	9.9	-	-	-
	Paddy	0.5	1.5	14.2	-	-	-
	Chrysanthemum	-	-	-	0.2	1.4	27.1
Small	Groundnut	0.8	2.2	20.4	-	-	-
	Paddy	0.5	1.3	12.0	-	-	-
	Chrysanthemum	-	-	-	0.1	0.5	8.7
	Total Rabi area	3.8	10.6	100	0.8	5.2	100
Annual							
Large	Acarus Calamus	-	-	-	0.20	1.4	57.1
	Banana	-	-	-	0.15	1.0	42.9
	Total Annual area(ha)				0.35	2.4	100
Perennial							
Large	Arecanut	0.64	1.8	80.6	2.02	13.9	55.5
	Betel Vine	-	-	-	0.11	0.8	3.1
	Coconut	0.15	0.4	19.4	0.22	1.5	6.1
	Banana	-	-	-	0.06	0.4	1.7
Medium	Arecanut	-	-	-	0.86	5.9	23.5
	Betel Vine	-	-	-	0.04	0.3	1.1
	Jasmine	-	-	-	0.15	1.0	4.1
Small	Jasmine	-	-	-	0.18	1.3	5.0
	Total Perennial area	0.8	2.2	100	3.7	25.1	100
	GCA	**35.8**	**100**		**14.5**	**100**	

Income from crop, livestock and off farm in VDSA villages of Karnataka during 2009-11:

The income realized from crop, dairy and off farm is indicated in tables 5-6 for all the 4 VDSA villages and it is represented in figure 1. The economic analysis of different sources of income across different size groups reveals a wide gap in all the 4 villages. In Markabinahalli, on an average, the total net return derived from crops by a large farmer is 7.5 times higher than a small holder farmer. However on hectare basis, the net returns realized is only 1.4 times higher. Similarly, in Kapanimbargi village, the total net return realized from crops by large farmer is 65 times higher than smallholder and on hectare basis, it is 14 times higher. This disparity is mainly because of two factors. In Markabinahalli, entire cultivated area is under rainfed and

farmers do not have any access to irrigation and hence the choice of cropping pattern is a combination of food and commercial crops, while in Kapanimbargi, around 40 % of the area is under irrigation and hence majority of the farmers grow high value horticultural crops like grapes under groundwater irrigation. The return to cost ratio indicates that the ratio is quite significant for large farmers compared to small farmers in Kapanimbargi but not much variation in Markabinahalli, while in Tharati, the cost benefit ratio is very appreciable. This is due to the effect of horticultural crops grown in these two villages, which are more lucrative.

The net income derived from crops per hectare by small farmers is almost 2.8 times higher than medium and large farmers in Belladamadugu, since the proportion of irrigated area of small farmers is much higher (40%) than large farmer (20%). While in Tharati, virtually all the farmers comes under small holders and their income realized is quite high per hectare, as they grow commercial flower crops under irrigation. Studies also indicated that the small farmers increased their income through diversification even under shrinking farm sizes (Hazell and Rahman, 2013). As evident, the income derived from crops/ha by the small holders is inadequate to meet their living and hence diversified sources of income especially nonfarm income in Bijapur villages. Hence seasonal migration is evident in Kapanimbargi village. On the contrary, the income derived from crops by small holders in Tumkur villages is quite significant. This is mainly because of intensive cultivation as well as the nature of crops grown.

In terms of total income from all the sources, it is substantially higher in Kapanimbargi when compared to Markabinahalli in Bijapur district for all the groups. But in case of Tumkur district, total income was higher in Tharati than in Belladamadugu.

It is striking to note that the proportion of non-farm income realized by small farmers is much higher (66 to 85 %) in Bijapur villages, while the proportion of non-farm income is quite remarkable across all the groups in Tumkur villages (65 to 73 %). The % of households depending on non-agricultural activities is relatively more in Tumkur villages compared to Bijapur villages. This is due to; 1) in Tharati, land holdings are extremely small (0.2 to 1.5 ha) hence, many households depend on other non-agricultural activities 2) in Belladamadugu, groundnut based farming system is dominant, but its performance is highly uncertain due to vagaries of nature. Hence majority of the households are involved in non-agricultural activities like brick making, leaf plate making, and petty business. In Tumkur villages, the livestock and milk production are the major sources of income to the households especially in Belladamadugu village. Thus, small farmers are likely to remain unviable if they do not get access to off-farm income Singh *et al*., 2009) In general, there has been sharp fall in the proportion of income derived from agriculture and rise in the non-farm income derived across all size groups (specifically in medium and small holders), particularly this is more evident with small holders under rainfed situation in Kapanimbargi and Belladamadugu. Considering annual expenditure for both food and non-food per household, net annual income realized from crops indicated negative surplus from medium and small farmers in Bijapur district and all the farmers realized negative surplus in Tumkur district. This result mystify how the small farmers with less annual income from crops mange their livelihood. Thus it is evident that the agricultural income realised from small holder farmers is inadequate to meet their living and hence diversified sources of income especially nonfarm income.

Table 5: Income from crop, livestock and off farm in Bijapur district during 2009-11

Particulars	Markabinahalli			Kapanimbargi		
	Large	Medium	Small	Large	Medium	Small
Area (ha)	9.6	2.2	1.8	8.1	3.3	1.8
Gross income from crop (Rs. / farm)	243611	65261	47117	613323	74776	23735
Total cost of production (Rs. / farm)	153954	44920	35258	255568	50083	18289
Net income from crops (Rs./ farm)	89658	20341	11860	357754	24694	5447
Net income /ha	9339	9245	6588	44167	7483	3026
Return to cost ratio	1.58	1.45	1.34	2.4	1.49	1.3
Gross income from livestock (Rs.)	48715	3377	11892	78028	32311	6334
Total cost of livestock (Rs.)	14418	1223	4245	22421	9852	1992
Net income from livestock (Rs.)	34298	2154	7647	55607	22459	4343
Non-farm income (Rs.)	68321	47970	37431	118823	59512	57564
Total income from crops, livestock and off farm(Rs.)	192277	70464	56937	532184	106664	67353
Average expenditure for food and non-food per household	42862	34686	31085	147955	103134	77282
Net annual income (only crops)	46796	-14345	-19225	209799	-78440	-71835
Net annual income	149415	35778	25852	384229	3530	-9929
% share of income from crops	47	29	21	67	23	8
% share of income from livestock	18	3	13	10	21	6
% share of income from non-farm	36	68	66	22	56	85

Table 6: Income from crop, livestock and off farm in Tumkur district during 2009-11

Particulars	Belladamadugu			Tharati		
	Large	Medium	Small	Large	Medium	Small
Area (ha)	2.54	1.16	0.95	1	0.5	0.4
Gross income from crop (Rs. / farm)	52955	28447	34055	91449	39687	17754
Total cost of production (Rs. / farm)	45566	25596	26052	45908	22493	10482
Net income from crops (Rs. / farm)	7389	2851	8003	45541	17194	7272
Net income/ha	2909	2457	8424	45541	34388	18180
Return to cost ratio	1.16	1.11	1.31	1.99	1.76	1.69
Gross income from livestock (Rs.)	28336	25766	39253	29227	16605	24043
Total cost of livestock (Rs.)	17935	12927	15480	11406	6292	7250
Net income from livestock (Rs.)	10401	12839	23773	17821	10313	16793
Non-farm income (Rs.)	55196	38848	59768	78858	52078	64774
Total income from crops, livestock and off farm(Rs.)	67908	54538	91543	142220	79585	88840
Average expenditure for food and non-food per household	78340	52367	57790	82974	55143	46756
Net annual income (only crops)	-76029	-49516	-49787	-37433	-37949	-39484
Net annual income	-10432	2171	33753	59246	24442	42084
% share of income from crops	10	5	9	32	22	8
% share of income from livestock	14	24	26	13	13	19
% share of income from non-farm	76	71	65	55	65	73

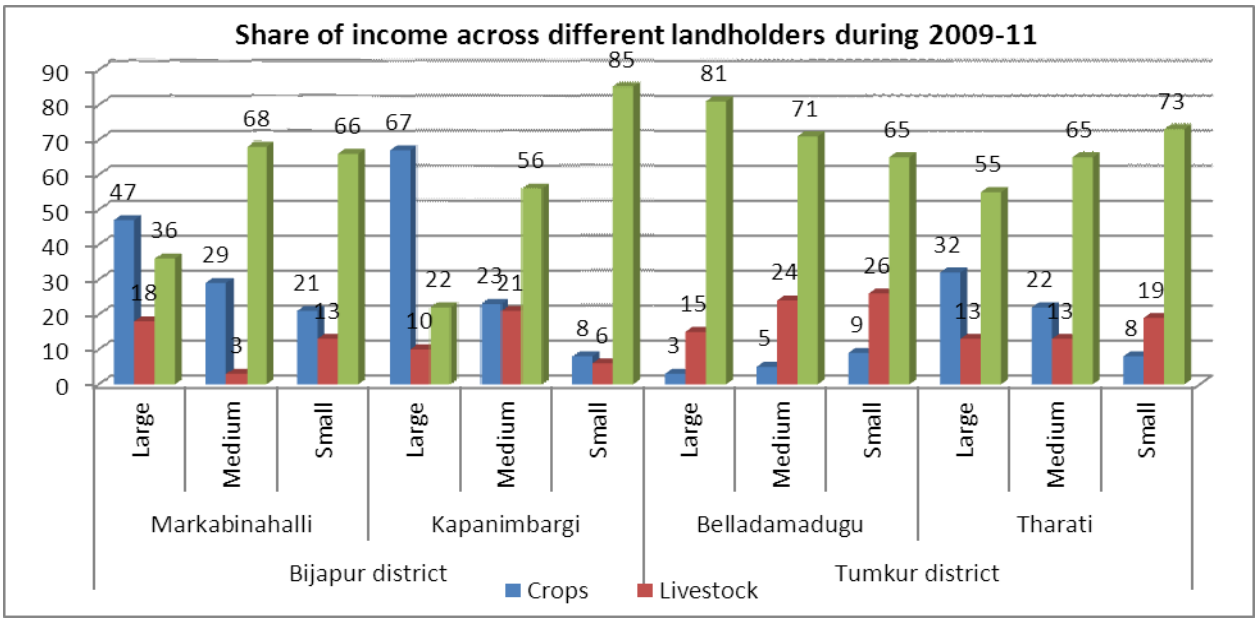

Figure 1: Share of income across different landholders during 2009-11

Income from different enterprises over the years for small farmers:

Income realized from different enterprises for small farmers in both dry and irrigated situations in VDSA villages of Karnataka is indicated in table 7-9. The disaggregation analysis of dry and dry+irrigated is not analyzed for village Markabinahalli from Bijapur district, since it is completely rainfed area. The results indicate that the net income derived from crops is relatively higher in irrigated situations than dry conditions. On an average, net returns realized from crops is negative being Rs. -1135 in dry land as against Rs. 10817 per farm in irrigated area in Kapanimbargi. In Belladamadugu, net returns realized from crops in rainfed situation is very low to the tune of Rs. 128 and Rs. 15316 per farm under irrigated area. In Tharati village, net returns realized under rainfed conditions is Rs. 5558 as against Rs. 8683 under irrigated conditions. This indicates that under dry situations the farmers realized paltry returns which are less than the minimum wages prescribed for a decent living. The share of income from non-farm is more than half of the total income in all the villages in dry and irrigated conditions,

which is supported by the study by Hazell, 2003. Barring Tharati village, on an average, the total income is higher for farmers with irrigation facility compared to the farmers without irrigation in other two villages. The share of non-farm income of irrigated farmers is slightly less compared to dry farmers. In Belladamadugu village, it is observed that total income is relatively higher for irrigated farmers than dry farmers.

Table 7: Income from different enterprises over the years for small farmers in Kapanimbargi

Particulars	**2009**	**2010**	**2011**	**Average**
Dry(n=12)				
Area(ha)	1.05	0.88	0.71	0.89
Net income from crops	-5313 (-8)	4453 (6)	-101 (0)	-1135 (-2)
Net income from livestock	8832(13)	7818(11)	5880(11)	7510 (12)
Non-farm income	67063 (95)	61636 (83)	46077 (89)	58259 (90)
Total income	70582	73906	51857	64634
Dry+irrigated(n=15)				
Area(ha)	1.64	3.27	2.41	2.44
Net income from crops	10785 (21)	10456 (16)	11209 (14)	10817 (16)
Net income from livestock	1168 (2)	2072 (3)	3120 (4)	2120 (3)
Non-farm income	38937 (77)	52560 (81)	67923 (83)	53140 (80)
Total income	50890	65088	82252	66077

Note: figures in parenthesis indicate % of income over total income.

Table 8: Income from different enterprises over the years for small farmers in Belladamadugu

Particulars	2009	2010	2011	Average
Dry (n=13)				
Area(ha)	0.51	0.83	0.91	0.72
Net income from crops	3719 (5)	-179 (-0.2)	-5346 (-5)	128 (0.1)
Net income from livestock	10243 (15)	32079 (33)	18056 (16)	21684 (24)
Non-farm income	55544 (80)	64268 (67)	98777 (89)	68876 (76)
Total income	69506	96168	111487	90688

Dry+Irrigated (n=14)				
Area(ha)	0.91	1.14	1.35	1.16
Net income from crops	32581 (32)	16077 (14)	3298 (3)	15316 (14)
Net income from livestock	30906 (30)	35304 (30)	44644 (39)	38050 (34)
Non-farm income	38825 (38)	65175 (56)	66133 (58)	58057 (52)
Total income	102312	116556	114074	111423

Note: figures in parenthesis indicate % of income over total income.

Table 9: Income from different enterprises over the years for small farmers in Tharati

Particulars	2009	2010	2011	Average
Dry(n=14)				
Area(ha)	0.26	0.43	0.56	0.39
net income from crops	2121 (2)	5194(7)	9360(9)	5558(6)
Net income from livestock	16248 (17)	18454(25)	24397(24)	19700(22)
Non-farm income	76220 (81)	50994(68)	66125(66)	64446(72)
Total income	94589	74642	99881	89704
Dry+irrigated(n=13)				
Area(ha)	0.66	0.33	0.33	0.38
net income from crops	4017 (6)	14821 (16)	7212 (8)	8683 (10)
Net income from livestock	7403 (12)	13546 (14)	16752 (18)	12567 (15)
Non-farm income	51780 (82)	67005 (70)	69875 (74)	62887 (75)
Total income	63200	95372	93839	84137

Note: figures in parenthesis indicate % of income over total income
Crops cultivated: wheat, pearl millet, sorghum, maize, ground nut, pigeon pea, chickpea, green gram, cotton etc….

Number of viable and non-viable farmers with crop and livestock income:

The economic viability of farm defined by the surplus income derived from crop enterprises after deducting all costs is provided in the table 10 and represented in the figures 2-3. Considering the surplus income over costs from crops alone, all the large and small farmers and

50 % of the medium farmers are viable in Markabinahalli, while 50 % of the small, 40 % of the medium and 75 % of the large farmers are viable in Kapanimburgi. Similarly, in Belladamadugu, and Tharati most of the small farmers are viable. It is intriguing to note that even by considering both crop and livestock incomes, around 22-29 % of the medium and large farmers in Belladamadugu are not viable, while most of the small farmers are viable with livestock income across all the villages.

Specifically for small holder farmers, considering economic surplus generated on the farm all farmers are viable in Markabinahalli, while 50% of small farmers in Kapanimbargi, 63% of small farmers in Belladamadugu and 71% of small farmers in Tharati are viable with crop income per se. When considered both crop and livestock income, barring Kapanimbargi (88%) village 100% of small holder farmers are viable in Markabinahalli, Belladamadugu and Tharati villages.

Table 10: Percentage of viable and non-viable farmers with income:

Class of holdings	Bijapur district				Tumkur district			
	Markabbinahalli		Kapanimbargi		Belladamadugu		Tharati	
	Viable	Non-viable	Viable	Non-viable	Viable	Non-viable	Viable	Non-viable
Crop income								
Large	89658 (100)	-	368152 (75)	-9474 (25)	13000 (29)	-10994 (71)	45508 (100)	-
Medium	25341 (50)	-4400 (50)	40160 (43)	-16109 (57)	8039 (33)	-5092 (67)	22285 (71)	-5107 (29)
Small	11860 (100)	-	7404 (50)	-1810 (50)	13527 (63)	-5184 (37)	13037 (87)	-5538 (13)
Crop + Livestock income								
Large	123956 (100)	-	413361 (100)	-	20379 (71)	-8249 (29)	63362 (100)	-
Medium	26285 (50)	-4192 (50)	58686 (86)	-10922 (14)	18962 (78)	-3770 (22)	27507 (100)	-
Small	19507	-	12261	-2610	31776	-	24065	-

	(100)		(88)	(12)	(100)		(100)	

Note: figures in parentheses are percentage of farmers

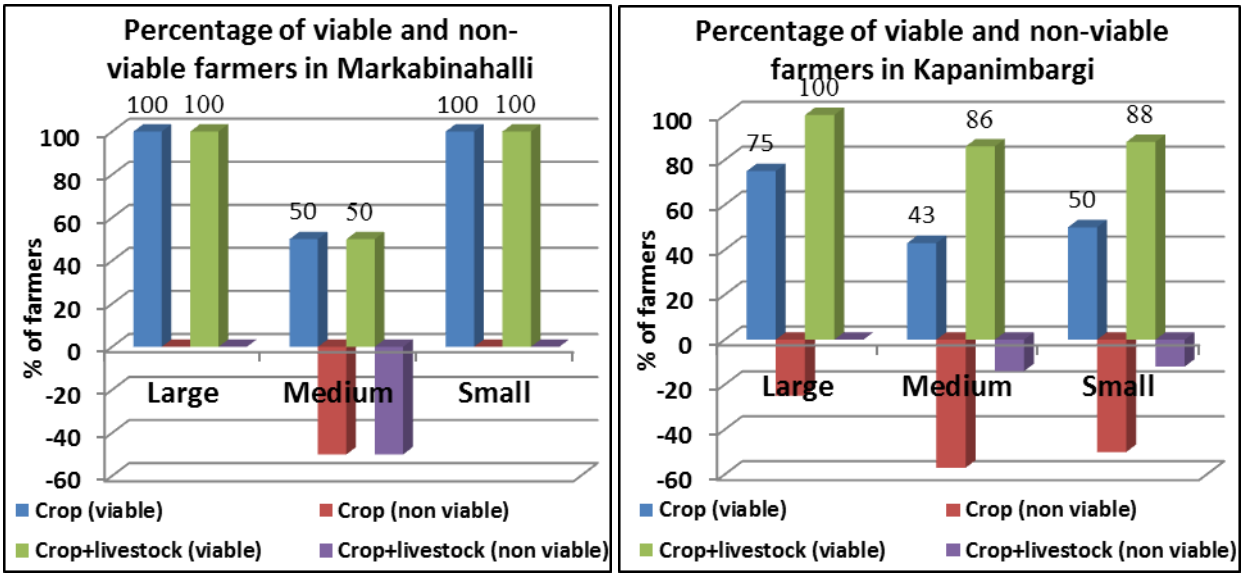

Figure 2: Percentage of viable and non-viable farmers during 2009-11 in Bijapur district

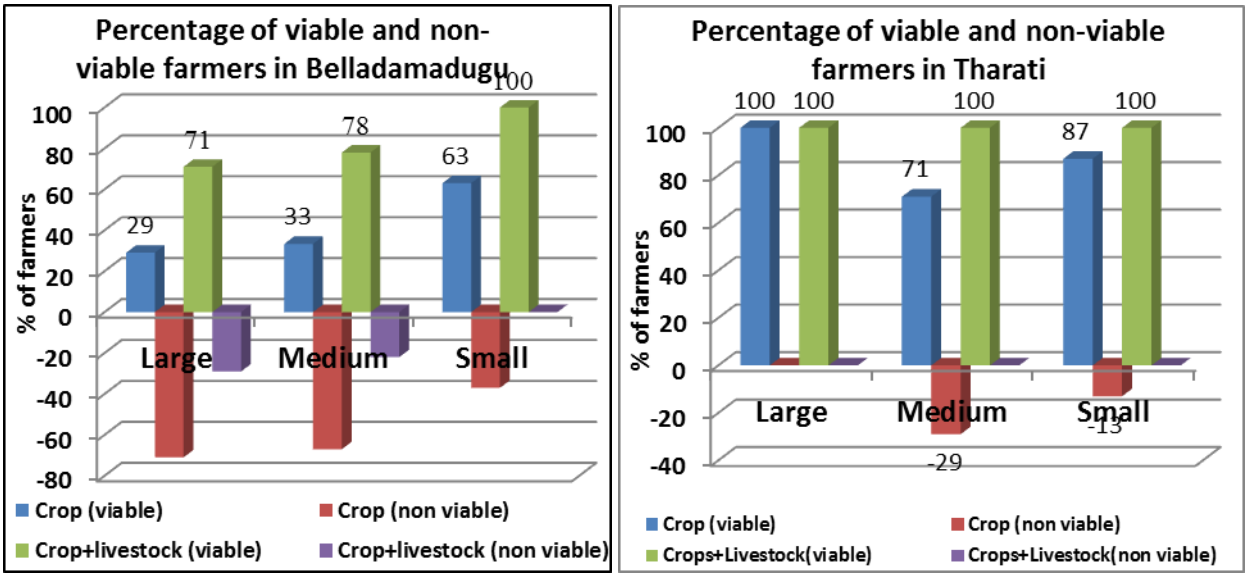

Figure 3: Percentage of viable and non-viable farmers during 2009-11 in Tumkur district

Viability of small farmers with crop income under dry and dry+irrigated conditions:

Considering average economic surplus generated on the farm for the past 3 years by crops alone in rainfed situation, most of the smallholdings are not economically viable in Kapanimbargi (Rs. -1135) village of Bijapur district, while 50 % of them are not viable in

Belladamadugu (Rs. -4900) and 17 % them are non-viable in Tharati (Rs. -1504) villages of Tumkur district. However, all the smallholdings are viable in Markabinahalli (Rs. 11860) of Bijapur district, as the rainfed agriculture in this village is characterized by low input use intensity with a combination of food and commercial crops like rabi sorghum, cotton, chickpea, safflower and onion. However, even with access to irrigation, 25% of the small farmers in Kapanimbargi (Rs. -6819), 33% in Belladamadugu (Rs. -3777) are non-viable. However all the smallholders are economically viable in Tharati (Rs. 9647) with access to irrigation, as they are specialized in growing flower crops, areca and betel-nut with emerging water markets (table 11). Though small holder farmers are viable, but the size of net margin (surplus income) generated per hectare is very meager and virtually not adequate to meet their livelihood, hence, they heavily rely on non-farm income. Unless the crop based productivity and profitability increase substantially, the viability of small holders is threatened.

Table 11: Viability of small farmers with crop income under dry and dry+irrigated conditions

Region	Particulars	Dry		Dry+ Irrigated	
		viable	non-viable	viable	non-viable
Kapanimbargi	Percentage	0	100	75	25
	Income		-1135	17062	-6819
Belladamadugu	Percentage	50	50	67	33
	Income	5028	-4901	19660	-3777
Tharati	Percentage	83	17	100	0
	Income	6584	-1504	9647	

Conclusions:

Cropping pattern across different size groups in VDSA villages of Karnataka indicates a combination of food and commercial crops. Most of the small farmers in Bijapur allocated their meager cultivated area towards food crops, while in Tumkur villages small farmers allocated their area for both for food and commercial crops. There has been sharp fall in the proportion

of income derived from agriculture and rise in the non-farm income derived across all size groups. In Kapanimbargi village, large and medium farmers derived a significant proportion of income from horticultural enterprises like grapes, while small farmers did not derive any income from horticulture crops, as they are highly capital intensive and need irrigation. Considering average economic surplus generated on the farm for the past 3 years by crops alone in rainfed situation, most of the smallholdings are not economically viable in Kapanimbargi, while 50 % of them are not viable in Belladamadugu and 17 % them are non-viable in villages of Tumkur district. However, all the smallholdings are viable in Markabinahalli of Bijapur district. However, even with access to irrigation, 25% of the small farmers in Kapanimbargi and 33% in Belladamadugu are non-viable. However all the smallholders are economically viable in Tharati with access to irrigation, as they are specialized in growing flower crops with emerging water markets. Though some of the small farmers are economically viable in terms of surplus income generated from crops, yet the size of the net margin realized per hectare is very low. Considering annual expenditure for both food and non-food per household, net annual income realized from crops indicated negative surplus from medium and small farmers in Bijapur district and all the farmers realized negative surplus in Tumkur district. Thus the agricultural income realised from small holder farmers is inadequate to meet their living and hence diversified sources of income especially nonfarm income. It is puzzling to note that most of the small holdings are not economically viable under rainfed conditions that constitute around 80 % of the total agricultural holdings and mange to live with such paltry income. Overwhelmingly, small farmers live at the margins, and survive through a large range of nonfarm income. Small farmers are likely to remain unviable if they do not get access to off-farm income. In order to enhance the viability of small farms, technology driven options to accelerate productivity and profitability are vital for policy intervention. In addition, non-farm diversification needs strong policy support towards infrastructure, transport, storage, credit and market.

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