Status of Small Farming Units and Strategies for their Sustainable Development in India

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Abstract: More than fifty per cent share of agriculture in the total workforce of the country shows that the livelihood of most of the Indian population depends upon agriculture. The Indian agriculture is dependent on large number of small farming units which accounted for 85.01 per cent share in number and 44.58 per cent share in area of the total operational holdings of the country. There were 92.8 million marginal (67.10%) and 24.8 million small (17.91%) holdings out of the total 138.3 million operational holdings in India during 2010-11. The growth performance of agriculture in the country shows that long run and short run productivity growth was higher for food grains as compared to the fruits and vegetables. The maximum production growth was observed in the case of eggs and vegetables. In India the farm business mainly dominated by the crop production. The lion share of the households' income (more than 75 per cent) of the marginal and small farming units in the leading agricultural states of Punjab and Haryana was contributed by the farm business. The farm specialization increased over the period in Punjab shows the shift towards food grains in general and towards paddy and wheat cultivation in particular. The share of bottom 50 per cent farm households in per capita income (21.6 %) was comparatively on the lower side of the their related share of consumption expenditure (23.7%) highlights the consumption expenditure burden in the farms as compared to the labourers and others in the state of Punjab. As compared to the farms the relative cumulative share of per capita consumption expenditure over income was on lower sides for all others. The agricultural stress was also shown by the farmer suicide cases in India. During the year 2014, the 72.4 per cent of the total farmer suicide cases were observed in the small and marginal farmers in the country. The 59.5 per cent higher cases of suicide in the small farmers over marginal farmers shows worst condition of small farmers as compared to the marginal farmers in India. As compared to the marginal farmers, the population of small farmers were much lesser in number and their per capita income and resource base was on higher side but the higher dependency of the small farmers share on crop income generates comparatively lesser continuous monthly flow of income in the case of small farmers over marginal farmers therefore small farmers feel comparatively more household expenditure stress. Thus there is a need to regulate the relative flow of farm business income of the small farmers into monthly income flow with the help of efficient banking system. The stress of the consumption expenditure can also be mitigated with the help of adoption of farming system approach through increase in the on farm nutritional security. To boost the small farm income and sustainability, to conserve natural resources and increase in agricultural diversity farmer producer organisations can play a vital role. The income and growth disparities were also observed for small farming units. The disparities among agricultural and non-agricultural shows that households' income skewed towards the non-agriculture income over agriculture income. Therefore continues public sector research and development efforts are required to make a pace in the relative income growth of small farming units with other sections of the economy in long run. Protection and recognition of the small farming units for education and health expenditure can ease the feeling of stress among them.

Keywords: Agriculture, Development, India, Small farming, Sustainability

Introduction

India is second most populated country in the world after china, a home to more than 1.2 billion people [1]. In India,70 per cent of the total population of the country live in villages and mainly depend on agriculture and/or related occupations [2]. Indian agriculture is dominated by small and marginal farmers. Therefore small farming units are important for agricultural growth, food security and improved livelihoods in India. Thus the sustainable agriculture growth in India effected by the performance of small and marginal farmers. Small farming units can play important role in agricultural development and poverty reduction because global experience of growth and poverty reduction shows that GDP growth originating in agriculture is at least twice as effective in reducing poverty as compared to the GDP growth originating outside agriculture. A need for protection was realized for small holdings in the context of world-wide processes of farm change. The returns from investments in agricultural R&D, rural roads and other infrastructure and knowledge generation are also high. The processes of commercialisation is increasing the proportions of institutional developments such as super markets, privatization etc. output & process grades and standards indicate large farm focus [3]. It was reported in a study that small farming was prone to the challenges on integration of value chains, liberalization, market volatility and many risks and vulnerability, adaptation of climate change etc. [4]. During last decades swear distress was observed in small scale farming units in India. A large number of farmer's suicides incidents being reported in the country. It is reported in many studies that since the mid-1990s, large number of the farm households facing distress due to relative decline in agricultural income, reduced repaying capacity and increased debt burden. The farming stress in India has both the long term structural and institutional as well as, short term manifestation. The lessons from the experience of India on small farming units can also be useful for other countries.

Materials and methods

Secondary data from various sources like publications, reports and agricultural statistics, published data by Ministry of Agriculture Government of India, Department of Animal Husbandry and Dairying etc. were used in the study. Various studies on small farming, growth trends, income and consumption patterns, income disparities, participation of small holding in agriculture, distress among small and marginal farmers etc. were analysed to chalk out the strategies for sustainable development of small farming units in India. To estimate the compound growth following formula was used:

$$\text{Log } Y = a+\beta t$$

$$\text{Growth rate} = (\exp(\beta)-1)*100$$

Simple mathematical and statistical tools were used in the study to bring forth with the fruitful decisions.

Results and discussion

Status of Small Farming Units in India

There were 117.6 million small and marginal holdings out of around 138.3 million total land households in India during 2010-11 (Table 1).Therefore the share of marginal and small farmers accounted for around 85.01 per cent of the total operational holdings with an average size of 0.61 hectare. As compared to it, about 62 per cent operational holdings were there in 1960-61. Similarly, the area operated by small and marginal farmers has increased from about 19 per cent to 44.58 per cent during the same period. This small holding character of Indian agriculture was mainly contributed by the growth of the population in this segment. The average size of holdings in India declined from 2.3 ha in 1970-71 to 1.15 ha in 2010-11 and 67.1 per cent of land holdings belong to marginal farmers with average size of 0.63 ha. The average size of small holdings was 1.42 ha. Therefore Indian agriculture is dominated by small farming units.

Table 1: Number and area of operational holdings in India, 2010-11

Category (ha)	Number	Per cent	Area (ha)	Per cent	Average holding size (ha)
a) Marginal (less than 1)	92825979	67.10	35908264	22.5	0.39
b) Small (1-2)	24779150	17.91	35244061	22.08	1.42
i) Subtotal (a+b)	**117605129**	**85.01**	**71152325**	**44.58**	**0.61**
c) Semi-medium (2-4)	13895552	10.04	37704789	23.63	2.71
d) Medium (4-10)	5875017	4.25	33827908	21.2	5.76
e) Large (10 and above)	972763	0.70	16906832	10.59	17.38
ii) Subtotal (c+d+e)	**20743332**	**14.99**	**88439529**	**55.42**	**4.26**
Total (i+ii)	**138348461**	**100**	**159591855**	**100**	**1.15**

Source: Statistical Abstract of India 2014

Performance of agriculture in India over time and trends of specialization in the leading agricultural state

With the help of time series data, the compound growth rate was computed to know the performance of Indian agriculture (Table 2). Long period data was analysed for the period of 1985 to 2015 and the recent short period analysis was from 2005 to 2015. It was observed that there was negative growth of area put under agriculture during the long period as compared to the recent positive growth in the short period. The maximum growth was observed in the case of eggs and vegetables. It was due to increase in the consumer income and preferences for balanced nutrition habits due the increase in the awareness of the consumers. It is important to note that there is no minimum support price system and assured procurement system for eggs and vegetables in the country. The positive and higher growth of vegetables during the recent short period over the long period shows the better scope for vegetable farming in India during these days followed by eggs. The higher production and productivity trends among all the given agricultural enterprises show the better performance during recent past period over the long period. The only exceptional case is the performance of area under fruit crops which was showing poor performance in the recent short period over the overall long period apart from all the concentrated efforts done by the country to promote the fruit crops.

Table 2: Growth performance of agriculture in India

(Annual compound growth rate in %age)

Enterprise	Factor	2005-06 to 2014-15	1985-86 to 2014-15
Food grains	Area	0.07	-0.07
	Production	2.84	1.83
	Productivity	2.42	1.90
Vegetables	Area	3.35	3.27
	Production	5.12	4.84
	Productivity	1.72	1.52
Fruits	Area	2.45	4.32
	Production	4.91	4.61
	Productivity	2.37	0.27
Milk	Production	4.47	4.18
Egg	Production	5.78	5.63

Source: Agriculture Statistics and Animal Husbandry Statistics, Ministry of Agriculture, Government of India.

Agricultural diversification was suggested by many studies in the country for sustainable agriculture performance in the country. Therefore trends of diversification in the leading agricultural state (Punjab) were analysed. The Simpson index of extent of crop diversity in the state of Punjab observed that during 1960's the state was well diversified for the crops but over the given period the state agriculture was rolled towards the crop specialization (Table 3) [5]. As this is the leading state, the same trend can be followed by the rest of the country. The shift towards the specialization was mainly due to the preference for highest income yielding and secured return enterprises by the farmers. The technology based development, minimum support price and assured marketing system mainly for Paddy and Wheat crops in the country favours the crop specialization.

Table 3: Index of diversity in Punjab

Year	Simpson Index of Diversity
1960-61	0.791
1970-71	0.729
1980-81	0.708
1990-91	0.648
2001-02	0.631
2002-03	0.621
2010-11	0.600
2014-15	0.596

Source: Kaur, 2017

Income patterns of small farming units and disparities among agriculture and non-agriculture income

It is important to study the patterns and disparities of income for sustainable development of the farmers. The leading agricultural states in India i.e. Punjab and Haryana were studied to know the income patterns of marginal and small farmers. It is clear from the Table 4 that farm business mainly dominated by the crop production holds the lion share of the income (more than 75 per cent) of the marginal and small farming units in the states of Punjab and Haryana. The results shows that marginal farmers are lesser dependent on crop income as compared to the small farmers. The contribution of income from dairying, livestock, salaries & pensions and hiring out services were on higher side for marginal farmers as compared to the small farmers. It shows the comparatively lesser efforts done by the small farmers in these segments apart from better resource base of the small farmers as compared to the marginal farmers.

Table 4: Income patterns of marginal and small farmers in Haryana and Punjab, 2014-15

(Per cent)

Source of income	Haryana		Punjab	
	Marginal farmers	Small farmers	Marginal farmers	Small Farmers
Farm business	76.46	82.52	75.09	79.77
Dairying	9.21	7.01	9.48	6.76
Livestock	2.13	1.18	4.75	4.64
Hiring out agric-labour and machinery	3.37	1.8	1.93	1.83
Salaries and pensions	6.36	5.65	5.24	3.13
Other sources	2.47	1.84	3.51	3.87
Total	100	100	100	100

Source: Compiled data from [6] and [7]

The distribution analysis of per capita income of the sample is given in the Table 5 shows that the bottom 10 per cent of farm household had only 3.4 per cent per capita income access as compared to the 18.6 per cent access by the top 10 per cent households. The per capita distribution of income was comparatively better for Agricultural labour household over farm households for bottom population. The per capita consumption expenditure (4.5) was on comparatively higher side for farm households as compared to the others (3.8, 2.7). It shows higher stress for consumption expenditure for the farm households.

The disparities among agricultural and non-agricultural income in India (Table 6) shows that income skewed towards the non-agriculture income over agriculture income (N:F= 3.15 during 2011-12) [8]. It was also observed that the disparities between agricultural incomes increased over time with little fluctuations (2011-12). It shows the scope of research and development efforts to bridge the gap. Therefore, the pace in the growth of agriculture and non-agriculture income can be made with the help of research and development investment.

Table 5: Income and consumption expenditure among rural households in Punjab, 2013

Cumulative percentage of persons	Per cent share of per capita income				Per cent share of per capita consumption expenditure			
	Farm	Agricultural Labour	Other	Total	Farm	Agricultural labour	Other	Total
10	3.4	4.5	3.4	3.6	4.5	3.8	2.7	4.2
20	6.7	11.1	10.35	7.7	7.8	9.0	8.0	8.1
30	10.1	17.6	16.1	11.8	11.3	14.2	11.9	11.9
40	15.4	25.2	22.1	17.6	16.3	22.2	16.7	17.3
50	21.6	33.6	28.6	24.3	23.7	26.9	22.5	24.3
60	31.4	44.4	40.3	31.4	30.9	35.4	31.5	31.9
70	48.8	55.4	50.3	50.1	45.4	44.7	37.9	44.8
80	62.2	67.2	62.9	63.1	60.6	56.8	45.7	58.5
90	81.4	82.0	82.7	81.6	76.8	76.8	64.0	75.8
100	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Gini coefficient	0.338	0.218	0.266	0.312	0.346	0.324	0.418	0.346

Source: Compiled data from [6] and [7]

Table 6: Disparities in agriculture and non-agriculture income in India

(Rs./farm/annum)

Year	Farm income per cultivator (F)	Wage earning per agricultural labourer (L)	Income per non-agricultural worker (N)	Ratio L:F	Ratio N:F
1983-84	4286	1467	12786	0.34	2.98
1987-88	5653	2201	18036	0.39	3.19
1993-94	12365	4784	37763	0.39	3.05
1999-2000	24188	8938	78565	0.37	4.08
2004-05	26146	10043	106688	0.38	4.08
2011-12	78264	32311	246514	0.41	3.15

Source: Chand et al., 2015

Agricultural distress among the small farming units of India.

It was reported in media and many studies that during past decades, Indian farmers are facing a distress due to comparative decline in agricultural income and debt burden. The income disparities in agriculture and non-agricultural workers observed as a declined relative income productivity of agriculture workers with non-agriculture sector. It may create stress among the farmers. As a result a large number of farmer's suicides were observed in India. It was reported that 5650 farmer suicide cases were observed during the year 2014 (Table 7) [9]. Highest intensity of the cases was observed in the state of Maharashtra (45.5%) followed by Telengana (15.9%) and Madhya Pradesh (14.6%). The top agriculture developed states of India i.e. Punjab and Haryana were also affected by the incidences. It was observed that 72.4 per cent of the incidences were from small (44.5 %) and marginal (27.9%) farming units (Table 8). The highest number of farmer suicides was observed in Maharashtra.

The credit detail of the cases were studied with the help of a sample survey (table 9) and it was observed that 100 per cent of the households borrowed credit from Co-operative society/bank for farming purposes [10]. These household preferred institutional sources of credit for farming purpose due to lower interest rate and lesser exploitation burden. The interest rate charged from the household by the non-institutional sources was much higher (11.5 to 25 %) as compared to the institutional sources (5 to 6 %). It was also observed that 46 per cent of the total households borrowed credit from relatives and friends, out of these households 61 per cent of them used it for non-farming purpose. None of the farmers repaid the instalments as per schedule. The main cause of indebtedness burden were reported by the suicide cases were crop loans (62 %) followed by non-agriculture loans (18%), non-institutional loans (16%), etc. (Table 10). The stress due to repayment pressure from non-institutional sources was reported by 14 per cent households.

Table 7: Incidence of farmers' suicides in selected states in India, 2014

Sr. No.	State	Number of incidences	Per cent to total
1	Maharashtra	2568	45.5
2	Telengana	898	15.9
3	Madhya Pradesh	826	14.6
4	Chhattisgarh	443	7.8
5	Karnataka	321	5.7
6	Punjab	24	0.4
7	Haryana	15	0.3
	Total	**5650**	**100.0**

Source: Economic Survey 2014-15, Govt. of India

Table 8: Percentage share of farmers' suicides by land holding status in India, 2014

Sr. No.	Land Holding Status	Per cent to total
1.	Marginal farmers	27.9
2.	Small farmers	44.5
	Subtotal	**72.4**
3.	Medium	25.2
4.	Large	2.3
	Total	**100.0**

Source: Economic Survey 2014-15, Govt. of India

Table 9: Credit detail of sample household suicide cases in Maharashtra, 2015-16

Sr. No.	Source of credit	No. of borrowing HH (%)	Purpose of borrowing				Outstanding amount (Rs/HH)	Average interest rate (% per annum)	Repayments as per schedule (% HH)
			Farming		Non farming				
			No. of HH as % to total borrowing HH	Amount borrowed per HH (Rs)	No. of HH as % to total borrowing HH	Amount borrowed per HH (Rs)			
1	**Institutional**								
A	Co-operative society/bank	38	100	40211	0	0	38605	6	0
B	Commercial and RRB's	20	90	78300	10	40000	74300	5	0
C	Others	28	86	103750	14	37500	90000	5	0
2.	**Non-institutional**								
A	Landlord	6	67	27500	33	500000	118333	25	0
B	Money lender	6	67	82000	33	300000	154667	25	0
C	Traders and commission agents	0	0	0	0	0	0	-	0
D	Relatives and friends	46	39	239444	61	155357	96304	25	0
E	Others	4.0	0	0	100	125000	1255000	11.5	0
	Average	**-**	**-**	**95200**	**-**	**225074**	**99601**	**-**	**0**

HH: Household *Source: GIPE report 2017*

Table 10: Causes of indebtedness reported in suicide cases in Maharashtra, 2014-15

Sr. No.	Cause	Response of households	
		Number	Per cent
1.	Crop loan	31	62
2.	Non-agricultural loan	9	18
3.	Non-institutional loan	8	16
4.	Farm equipment loan	7	14
5.	Repayment pressure from non-institutional sources (mainly money lenders)	7	14
6.	Repayment pressure from institutional sources	6	12

Source: GIPE Report, 2017

Strategies Sugeted for Sustainable Development of Small Farming Units

Regulation of flow of farming income into monthly salary with the help of banking system

The farm income is seasonal in nature and associated up and downs with the related risks involved in the farming but consumption expenditure of households' is continuous in nature. Therefore in the study all the small farmers were not following the repayments schedule of the loans [10]. It was observed by the authors that many small farmers were faced difficulties to regularly pay the education fee of their children. The small farmers feel comparatively more stressed as compared to the marginal farmers due to the comparative lesser continue flow of the income and higher standard of living. Therefore it indicates a need to regulate the farm income into monthly flow of farm income to relieve the farmers form the stress and to manage their consumption expenditure. The farmer salary system may also help to manage the burden of the loans of the farmers and government can provide a helping hand for this purpose. It can be solved by multiple bank account system. One serving bank account (Farmer Bank Account) of the farmer is required for only deposit of the farming income, direct payments by the govt. agencies/subsidies, other income etc. Second account should be used as farmer salary account which will be operated by the bank to release the regular monthly salary from the attached first bank account. The monthly salary can be fixed according to the annual income deposits of the farmers. The excessive income if any will also be released periodically by the bank in the farmer salary account. Public Provident Fund Scheme and re-payments schedule, school fee, agric-insurance etc. can also be attached with the farmers salary account through auto deduction service. The farmer bank account should be started with first direct payments to the farmers of the main crop. On the basis of first deposit and rent out value of the land the bank can start a salary system to the farmers. Next year salary can be fixed roll on basis.

Farming system approach

As fifty per cent of the rural household who depends upon farm income were under stress for consumption expenditure over their comparative share of the income therefore, adoption of efficient farming system approach can help the small farming units to meet the consumption expenditure. Food consumption expenditure holds the major share of the total expenditure of the small farmers and its stress can be reduced through nutritional security technology. The ameliorating effect of nutrition gardening and its aesthetic value can also reduce the stress level of the family members and increase employment.

Farmer producer organisations

Farmer producer organisations can be promoted to get the benefits of the economy of scale and to link the farmers with competitive markets. These organisations can also help to provide group insurance to the farmers and may also help to obey the rules to conserve the environment and natural resources of the area. The diversification in the locality can be achieved with the help of these organisations who can regulate the large number of small specialized units into a diversified area.

Due to poor knowledge and skills; most of small farmers in India are unable to run these organisations. Therefore these organisation can be promoted through formation and adoption of the organisation by the agricultural universities/ institutes/ KVK's/ agricultural departments/ development agencies etc. in collaboration with the funding agency or development authority (ADC development) of the respective district.

Switching over from farm income to non-farm income

It was noticed that 85.01 per cent of operational holding in India were small. Switching over the dependency of small farming units from crop income to other alternatives enterprises and non-farm income can improve the livelihood of the small farmers. Good quality educational and skill development support to the small farming families can help them to switch over the source of income to high rewarding employment in other non-farm sectors.

Protection and recognition

The support to small farming units through protection and recognition can be of great help to improve their livelihood and to fight with the stressful environment. Due to high impact of the marginal value of the seed on the income of the farmers the free seed of improved varieties can help the highly stressed famers to fight their bad situation. Small farmers can be helped for payments of education fee of the children, to meet their health expenditure and a reserved quota may be fixed for admission of their children in good educational institutes.

Active participation of the farmers in *kisan melas',* rural area fairs, rural sports activities, cultural activities, festivals etc. can help the small farmers to relive stress and to think and do something positive in the life.

Public sector research and development efforts

There is a need to continuous boost up the public sector research and development efforts to make a pace in relative income growth of small farming units with other sectors. The public sector efforts can also focus explicitly on the social welfare and the poverty issues of the farmers.

Conclusions

It can be concluded that Indian agriculture is predominated by small farming units. There were 117.6 million small and marginal holdings (85.01%) out of the total 138.3 million operational holdings in India during 2010-11. The average size of these small units was 0.61 ha/ holding for the same period. This small holding character of Indian agriculture was mainly contributed by the population growth in the country. It was observed that the growth of area in the country put under agriculture was almost stagnant. The maximum production growth was observed in the case of eggs and vegetables. The productivity growth was higher for food grains (2.45) than fruits (2.37) and vegetables (1.72). Due to better performance of food grains, the agriculture in the country was mainly predominated by food grains in general and paddy- wheat adoption in particular. The leading agricultural state (Punjab) shows that during 1960's the state was well diversified but over the period the state was moved towards the crop specialization. It was also observed that the farm business mainly dominated by the crop production which holds the lion share of the income (more than 75 per cent) of the marginal and small farming units in the states of Punjab and Haryana. The distribution of per capita income shows that the bottom 10 per cent of farm household had only 3.4 per cent per capita income access but 4.5 per cent per capita consumption expenditure. The share of bottom 50 per cent farm households in per capita income (21.6) was on comparatively lower side of the their related share of consumption expenditure (23.7). This shows the stress of consumption expenditure of the farm households. The agricultural stress was also related by the disparities among agricultural and non-agricultural income in India which shows that income skewed towards the non-agriculture income over agriculture income (N:F= 3.15 during 2011-12). It was also observed that the disparities between agricultural and non- agricultural worker income was increased over time from the year 1983 to 2005 (2.98 to 4.08) with little fluctuations during 2011-12 (3.15). Therefore, due to comparatively lower agricultural income with income disparities for a long period, large number of Indian farmers were facing distress and feel poor and debt ridden. As a result of it a large number of farmer's suicides were observed in India. Therefore sustainable development of large number of small farming units is a challenge as agricultural growth was less performing as compared to the GDP growth of the country.

In contrary to the marginal farmers 59.5 per cent higher cases was observed in small farmers over marginal farmers indicating worst condition of small farming units as compared to the marginal farmers. The per capita income and assets base of the small farmers were better than the marginal farmers. The comparatively more dependency on farm business income (mainly crop production) in the total family income was observed in small farmers over marginal farmers. The share of income from dairying, livestock, hiring out agriculture labour and machinery was comparatively higher in marginal farmers as compared to the small farmers. Therefore regular flow of income was comparatively better in case of marginal farmers as compared to the small farmers who have higher level of income and resource base. Thus small farmers feel comparatively more distressed as compared to the marginal farmers by monthly consumption expenditure due to comparatively lower regular flow of the income. It was also told by the department of dairying and animal husbandry, Punjab that there were no case of suicide observed in the farmers having main income source from dairying as flow of income from dairying is comparatively regular. Therefore there is a need to regulate the relative flow of farm business income of the small farmers into regular monthly income flow with the help of banking system. The regulated monthly flow of income can help the farmers to reduce the stress of the loans and to manage their expenditure in a better way. The stress of the consumption expenditure of small farmers can also be mitigated with the help of farming system approach through increase in on-farm nutritional security. To boost the farm income, to conserve natural resources and to increase agricultural diversity in the locality economy of the scale in farm business is required which can be achieved with the help of farmer producer organisations. Protection, recognition and educational support to the small farming families can help to switch over to high rewarding non-farm income from farm income. Continuous research and development efforts are required for technological growth to make a pace in the relative income growth of small farming units with other sections of economy.

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