Chapter 8

Summary of Findings and Conclusions

In this last chapter, we present a summary of findings obtained in the previous chapters. In addition, the chapter highlights some thrust areas where further research on the subject matter can be taken up.

The first chapter is the introductory one. The review of literature in the proposed research area is presented in this chapter. It is structured around two schematic sections−general literature and quantitative literature. The review of literature clarifies the fact that the study on the present research problem is rather scant and this makes the present study worth meaningful. Since this research work makes an endeavour towards evaluation of productivity and efficiency performance of small tea sector using both parametric and non-parametric techniques, each of which requires specific discussion on model specification and other aspects of the methodology to be used, we prefer to explain the appropriate methodology in respective chapters and, therefore, gave a broad outline of methodology of the research study in this chapter.

The second chapter is devoted to giving a brief discourse on how this sector evolves through time in a phased manner. It evolves from the study that the process of expansion of tea smallholder sector had undergone three distinct phases: the first phase covered a period from the early 1980s to late 1980s, the second phase from late 1980s to mid-1990s, and the third phase covered the rest of the period and till date. Following this three-phase expansion process, three types of plantation establishments have come into existence−'project gardens' or 'new divisions' of existing estate gardens (during 1st phase), 'medium-sized proprietary gardens' (during 2nd phase) and 'small tea plantations' (during 3rd phase). The first category of gardens is held by management of traditional tea estates, the second category by the financially well-off people having close connectivity with tea business for a long time in different capacitates such as a supplier of fertilizers, pesticides, ration articles etc and, the third category predominantly by the smallholder peasant cultivators themselves. The establishment of such gardens has not generally taken place in the designated land areas for tea cultivation but rather into non-traditional areas comprising mostly of agricultural lands with differentiated degrees of suitability for traditional crop cultivation like paddy, jute etc. Moreover, these gardens had made their appearance in large

number in the non-tea districts of the region like Uttar Dinajpur and Coochbehar. Following this development, the tea growing region of North Bengal has extended its periphery from Darjeeling hills, Terai (the foothills of Darjeeling) and Dooars (the northern part of Jalpaiguri district) to Uttar Dinajpur and Coochbehar. The analysis done in this chapter helps us identify some of the economic push and pull factors leading to the advancement of this alternative structure of production of tea in a quick succession of time. The significant pull factors gearing up the process of proliferation of this sector to an unprecedented scale include both supply and demand side factors− the projections of the shortfall in supply of tea due to declining productivity of century-old estate gardens and the accelerated growth of domestic consumption demand vis-à-vis export demand for tea by Tea Board in early 1980s. Besides, the study finds that the acquisition of knowledge by the peasant cultivators that tea can be grown as a smallholder cop without requiring much investment is also a major corroborative factor for the promulgation of the sector. However, there are also some adverse factors behind the extension of tea plantation areas. One such factor is the digging up of deep drainage trenches on the tea gardens established earlier. This has drained off the water of adjacent lands rendering those plots unproductive for traditional crop cultivation.

The third chapter presents an analysis of the socio-economic profile of sample tea growers. This is followed by an analysis of characteristics of land holdings on which plantations stand and land utilization pattern of the sample STGs. Using facts and figures drawn from such analyses, some relevant hypotheses are tested. These concern the general perceptions among the people about the identity and socio-economic background of STGs vis-à-vis the pattern of land transfer which seems to be a deeply contested issue in the agrarian regions of North Bengal.

The study reveals that the educational attainment of the small tea growers stands at a relatively low level with more than two-third of them is educated up to the secondary school level. The age distribution pattern indicates that cultivation of tea on small land holdings provides ample avenue for self-employment to unemployed rural youth, besides engaging the middle age rural people with this enterprise. The analysis of the occupational distribution of the respondents reveals that a vast majority of STGs (54 percent) are from the agricultural background with traditional crop cultivation as their prime occupation previously. The other constituents of growers include small businessmen (25 percent), servicemen (8.87 percent) and informal

workers (3.23 percent). The analysis of occupational profile in post-tea cultivation situation reveals that a substantial number of small growers in the study regions have opted for a dual system of farming, that is to say, tea farming along with subsistence farming that includes paddy and vegetable cultivation. A segment of the small growers, on the other hand, supplement income from tea with other sources such as wage earnings and petty trades. There is also a big category of small growers who rely entirely on income from tea. From the analysis of the source of finance for initiating tea plantations, it appears that the presence of self-financed gardens is significantly high. This finding considerably refutes the general perception that tea plantation is a large-scale enterprise requiring huge initial investment and hence, beyond the ambit of smallholder cultivators. An analysis of land holding size shows that the average holding size of the sample gardens is just above one acre. This is clearly indicative of high concentration of small and marginal farmers in the smallholder tea sector during the period 1995-2002. The land utilization pattern of STGs points out that new plantations stand on two categories of land: wasteland and crop-replacing land. This amply contradicts the general perception that STPs have emerged predominantly out of the crop-replacing land, abandoning the cultivation of traditional crops and making vulnerable the present folk dependent on it. On the contrary, it appears that emergence of STGs has led to the expansion of the territory of smallholder agriculture through bringing uncultivable land into more economical use thorough cultivation of a remunerative crop like tea. The pattern of overall distribution of land between self-owned and acquired categories reveals the penetration of people from both agricultural and non-agricultural backgrounds into this newly envisaged venture of growing of tea on small land holdings. However, in a number of study locations, the possession of own-land is more than acquired land. Finally, the results arising from labour-use analysis reveal the important contributions of this sector in terms of creating a major source of alternative employment and livelihood option for the agriculturally dependent people of this region. Its role towards enhancing women labour force participation by way of engaging them in newly created plantation works deserves special mentioning.

Chapter four makes an endeavour to estimate technical efficiency (TE) of small tea growers with the application of the technique of Data Envelopment Analysis (DEA). The DEA model chosen for estimation of TE is the BCC-O model. This investigation is necessary to identify the efficient growers. It is also necessary in order to identify the inefficient growers as well as to find out how they can improve their productivity by following their peers who constitute the convex reference

technology under BCC model. It is relevant to mention here that the necessity of undertaking this performance measurement study of small tea growers arises to examine whether a surge in the number of STGs and the subsequent change in land-use pattern did happen in order to capture ample productivity and efficiency gains by way of changing land use from traditional farming to more seemingly economic and remunerative farming option of tea cultivation. The major findings of the chapter are summarized below.

The study shows that the average TE score in small tea plantations of North Bengal has been estimated to be extremely high, about 92 percent under the BCC-O model. Moreover, about 75 percent of the STGs within the sample are operating with TE score of 90 percent or above. The operating of about two-third of sample STGs with an efficiency score of 90 percent or above surely proves the fact that the productivity performance exhibited by this sector in recent time is highly satisfactory. The growers having efficiency score of 100 percent constitute 71 percent of the sample total. Thus, the presence of a high percentage of efficient growers in the sample plausibly indicates the long run viability vis-à-vis sustainability of this new farming option in this region. The mean TE scores in seven study locations have been found to be 90 percent or above. In the remaining two locations, these scores are found to be 80 percent or below. The achievement of extremely high mean TE scores across the majority of the study locations spread over three districts has the possible implication that the interference of zonal agro-climatic and soil characteristics differentials in achieving efficiency gain is not very significant. However, the wide-ranging variation in the zone-wise distribution of STGs into efficient and inefficient categories does imply that there are different levels of achievements in resource use efficiency among the growers no matter which location they belong. The result relating to mean TE scores as per size class of plantations reveals that there is as such no land holding size which could be designated as the optimum class of landholding. This implies that size of landholding does not interfere with the achievement of efficient productivity performance. It does not matter whether a small tea grower belongs to the bottom level or the uppermost level of land holding size he is well capable of functioning efficiently. In addition, the high mean TE score as well as the high percentage share of efficiently functioning gardens in the category of below 3 acres seem to give an indication why tea growing on small plots of land has become a very significant economic activity to a vast majority of people who were earlier connected with smallholder traditional farming activity in four districts of North Bengal. This result leads to acceptance of our

hypothesis analytically that tea growing on smaller plots of land is equally viable with tea growing on large holdings. There seem to be three-fold reasons for higher productivity and efficiency gains being observable for this land holding size– land suitability, bush productivity and use of family labour to the maximum potential.

The study finds only a relatively smaller proportion (about 29 percent) of technically inefficient STGs in the sample study region. They are the STGs who are potentially subject to improving their efficiency level further by following their peers. One source of inefficiency has been found to be excess use of fertilizers and other purchased inputs. The lack of technical knowledge about the proper application of inputs including fertilizers and pesticides perhaps is responsible for this problem to occur. The other source of inefficiency has been identified to be the shortfall of the quantum of yield relative to the optimal level. The yield gap problem is perhaps attributable to a set of factors determining land suitability which is either in excess of or lower than what is optimally required for tea growing. If this problem is given due attention, the yield gap problem could be mitigated.

The study reveals that there is ample potential for improvements in efficiency further by way of the realization of higher yield for all sizes of plantations while keeping the usage of inputs unchanged. The alternative avenue for potential efficiency improvement could the opportunity for input savings without any reduction of yield.

Chapter five examines DEA scale efficiency and returns-to-scale for small tea plantations. A detailed theoretical framework for examining these issues has been set out in this chapter. On the basis of the empirical work, the average scale efficiency score has been worked out to be of the order 89 percent which implies a scale inefficiency score of 11 percent. On the contrary, the mean pure technical efficiency score has been figured out to be 92 percent which implies pure technical inefficiency score of 8 percent. Thus, on an average, the magnitudes of both forms of inefficiency have been observed to be of very quite low. This seems to suggest that neither pure technical inefficiency nor scale inefficiency does constitute any major constraint for the efficient functioning of small tea plantations at the aggregate level. On the contrary, the robust average index for both SE and PTE measures is clearly indicative of an overall high level of productivity performance of the STGs included in the sample.

The results relating to attainment of both forms of efficiency at the plantation level indicate that about 42 percent of the STGs are both pure technical and scale efficient, about 29 percent of the STGs are PTE only, and another 29 percent of the DMUs are neither pure technical efficient nor scale efficient. It, therefore, appears that about 58 percent of the DMUs are subject to experiencing scale inefficiency. Thus, at the plantation level, the presence of scale efficiency has been found to be quite significant. For the determination of the exact form of scale inefficiency, we need to find the break-up of gardens under different forms of technology using the CCR model. The result shows that CRS prevails for all gardens that are both PTE and SE. However, all the gardens experiencing PTE only show IRS. The gardens that are neither purely technical nor scale efficient come under all forms of technology− CRS, IRS, and DRS. It is also important to see that the only DMUs that are experiencing DRS are both technical and scale inefficient. Using these results, it is possible to identify two sources of scale inefficiency. First of all, a notably large number of gardens are operating under IRS and, therefore, be of sub-optimal scale size. Secondly, a smaller fraction of gardens are operating under DRS and, therefore, be of above-optimal scale size. Besides scale efficiency, there is another source of inefficiency, namely pure technical inefficiency, which is attributable to supervisory underperformance as indicated by BCC score. From these results, it quite obviously follows that a vast majority of DMUs, whether or not efficient, are capable of operating under decreasing or minimum cost conditions and a relatively smaller proportion of DMUs have been facing increasing cost conditions. It is perhaps these efficiency gains in terms of cost saving that could perhaps be considered as a major "pull factor" contributing to the proliferation of STGs in this region. Finally, the result relating to the effect of the size of landholding on the productivity performance of STGs in the sample is not found significant. Irrespective of the size class of land, about 94 percent of STGs are operating under conditions of decreasing or minimum cost.

In chapter six, an attempt has been made to estimate technical efficiency of STGs using the parametric stochastic frontier method. It is relevant to mention here that the same empirical work has been carried out in chapter four but with the application of DEA technique. This method has the advantage that statistical inference can be made from the obtained results. Another advantage of this method is that it can make a distinction between technical efficiency and statistical noise-effects in the data set. The Cobb-Douglas specification of the stochastic frontier production function is used in this efficiency study. It has been revealed from the study that the average

technical efficiency of tea smallholding sector is 62 per cent. This suggests that there is the scope for further increasing output by 38 percent without increasing the levels of inputs. The study also shows that there are large differences in technical efficiency scores among small tea growers in the sample with the minimum and maximum scores are estimated to be 13 percent and 94 percent, respectively. The region-wise break-up of mean TE of yield reveals that the regions of Chopra and Islampur have the highest mean TE scores of 74 percent and 71 percent, respectively. These regions, in fact, marked the inception of the adoption of the model of tea small growing in North Bengal. Evidently, these regions are highly specialized for growing of tea in small-scale plantations. The growers are technically skilled and highly experienced. Moreover, the availability of adequate skilled labour and earlier advent of bought-leaf factories for selling green tea leaf have provided them with enormous scope in raising yield efficiency. The analysis of efficiency scores according to the size of the gardens makes it apparent that the average TE score increases with the increase in the size class of land holdings excepting the holding size of 9-12 acres. This might be due to a fewer number of sample observations falling within this size class. The highest mean TE score (69.21 percent) has been found for the top size class of 15-25 acres. The land holding size for which the mean TE score comes very close to the highest figure happens to be the one preceding the uppermost land holding size. The mean TE score for this land holding size of 12-15 acres has been found to be 68.57 percent. These results bear the implication that relatively larger plantations are more efficient than smaller plantations. In addition, it can be inferred that the optimum size of plantation should be of 12 acres or more to achieve a maximum gain of efficiency.

As far as the relative contribution of different inputs to the production of green leaf is concerned, the study reveals that tea yield has a positive relationship with the size of land, the quantity of chemical fertilizer including nitrogen and phosphate, the quantity of nutrients and pesticides and employment of hired labour. It follows that there is the scope for further increasing yield through the increased use of these inputs including land. The positive and significant coefficient of hired labour input is supposed to have a further implication. This result indicates that the tea smallholding sector has a considerable potential for generating rural employment, thereby benefiting a large chunk of the captive agricultural labour force in a labour surplus rural economy of North Bengal.

Chapter seven examines the interdependencies among the small tea growers and the estate sectors. The study has found that an important dimension of this interdependency phenomenon is the outsourcing of a basic input of production, namely, tea leaf, outside the organized sector. To measure the impact of such sourcing dependence on the productivity (measured in terms of yield per hectare) of plantations within the organized sector, a linear regression analysis is used to which leaf sourcing is treated as a dummy variable. The regression results relating to leaf sourcing indicates that it has led to substantial productivity improvement in the organized sector of tea economy of West Bengal. The sourcing dependent gardens have an average additional yield of 254 kg./ hectare in absolute terms in comparison to non- source dependent gardens. This emerging phenomenon of the tea industry has the beneficial effect of increasing the aggregate tea output on a sizeable scale, thereby gradually redressing the supply shortfall problem in the domestic tea market. The interdependencies are, however, reciprocal in the sense that the small gardens also get the benefit of the additional market of their green leaf.

To sum up, this thesis examined the economics of tea growing on small land holdings in West Bengal. The major thrust area of the study has been taken to be parametric as well as non-parametric analysis of technical efficiency in order to make an objective assessment of productivity performance of this emerging sector. For the parametric analysis of efficiency, the stochastic production frontier approach has been employed. For the non-parametric study of efficiency, on the other hand, the deterministic DEA technique has been used. The results of the analyses reveal that the overall efficiency level of small tea growing operation is quite satisfactory. This finding is further substantiated by the decomposition analysis of overall efficiency. The zone-wise analysis of mean technical efficiency scores also corroborates this result. The major economic implication to be drawn from efficiency analysis is that tea growing on small landholdings has emerged as an efficient model of commercial farming replacing traditional agricultural farming in a phased manner in different areas of the region. The result of stochastic frontier regression analysis indicates that tea smallholding sector has a considerable potential for generating rural employment. The study, therefore, leads to acceptance of the hypothesis that the activity of tea growing on small plots of land has tended to emerge as a significant economic activity for the people at large in this region. Despite all efforts made to cover maximum dimensions of the research problem of the thesis, there is still ample scope left for future research on this topic. The urgent and important necessity may be to extend this study

to examine whether small tea gardens perform efficiently in terms of achieving allocative efficiency. Secondly, the study could be extended to make a comparative efficiency study between small tea growers and traditional paddy farmers. Finally, the same study could be extended to cover efficiency analysis of large tea estates in order to evaluate their performance in a comparative perspective.