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SUMMARY, CONCLUSIONS AND POLICY SUGGESTIONS

With the rapid growth of population and land fragmentation, the number of marginal and small holdings has been increasing over the years in India. Among all the states in the country, UP, Bihar, TN and AP take the highest positions, in a descending order, in terms of the number of small land holdings. The overall development of the economy depends on the development of small farmers as these categories form a major segment of the economy. Though the government of India has been implementing several developmental programmes for the upliftment of these, the results are not satisfactory. Therefore, in the eighth five year plan, high priority has been accorded to programmes designed to promote rural employment through diversification of agriculture. There are studies which strengthen the diversification and development of weaker sections.

Many studies find that before the Green Revolution an inverse relationship existed between the farm size and productivity. Because the small farmers were having high human resources and they employed their family labour to the maximum extent without any hesitation, they could produce more compared to their larger counterparts. However, after the introduction of new technology (through Green Revolution) positive relationship developed between farm size and productivity. The large farmers were having material resources, therefore, they were able to absorb the new capital intensive technology and be able to produce higher than the small farmers per unit of land.
Contradicting the above findings a few studies have shown that even after the introduction of new technology an inverse relationship exists. It is argued that oflate the marginal and small farmers use modern inputs and technology along with available family labour resulting in the inverse relationship. It is clear that there is no consensus with regard to the relationship between farm size and productivity. Therefore, in this study, an attempt has been made to examine three major issues, namely, 1) whether diversification helps in the upliftment of weaker sections? 2) what is the relationship between the size class and productivity when a new crop like sericulture is introduced which requires a package of new technology like chemical fertilisers, irrigation, skill and other resources? and 3) what has been the impact of sericulture on the farmers, in general, and weaker sections, in particular in AP.

The brief review of literature gives four major issues which prompted us to take up the present work with special reference to marginal and small farmers. Firstly, most of the existing studies deal with the performance of small farmers under different programmes like SFDA, MFAL, DPAP, Command Area Development Programme (CAD) and other programmes. Secondly, a few studies, even though dealing with the small farmers in general did not go deeper in to their problems. Thirdly, the studies, dealt with income and employment generation, asset creation and standard of living, are generally poor quality.

And finally, there are many studies on diversification in agriculture like animal husbandry, specially dairying, piggery, poultry, sheep rearing, apiculture, aquaculture and so on.
Changing from traditional technology to modern technology in agriculture includes plough to tractor, organic manure to chemical fertilisers, local breeds to cross-breeds and local seeds to HYVs. However, the studies are few about the diversification from traditional cropping system to new cropping system which is not similar to other crop enterprises. For instance, mulberry is a new crop which is different from other crop enterprises. It is a different crop because, mulberry cultivation is a farm activity, where mulberry leaf is not the marketable product but has to be fed to the silkworms to get silk cocoons spun by the silkworms. Therefore, only cocoon is the final product where cocoon growing is the non-farm activity. Only a few studies which are already mentioned deal with the difference between traditional crops and new crop like mulberry/sericulture. Hence, the present study has been taken up to examine the difference between traditional crops and new crops, like mulberry, in terms of employment and income generation for the farming community, in general, and marginal and small farmers, in particular.

The study has been undertaken with the objective of examining the income and employment generation in sericulture across farm size classes and various agricultural crops and also to study the impact of sericulture enterprise on different categories of farmers. To study these, two mandals in Anantapur district; one as a developed mandal and the other as an underdeveloped mandal have been selected. From each mandal 120 sericulture farm households, spread in about 19 villages have been selected based on a purposive sampling method. The data have been analysed by using statistical techniques like percentages and averages for the analysis of
primary data and regression, a statistical technique, for the analysis of secondary data.

Because of heavy investment and encouragement from the Government of India, the sericulture industry has been growing at the rate of 14.5 per cent which is faster compared to any other country in the world. The area under mulberry and production of cocoons show positive growth rates in AP state also. The growth rate in the state has been more than Karnataka state, which has been the country's highest in terms of mulberry area and production of cocoons.

The Government of AP has been mobilising infrastructure and also encouraging private investment for the development of infrastructure in the sericulture industry. The state has been implementing various special programmes for the development of sericulture industry by availing the financial assistance from Swiss, Dutch, World Bank and other funding agencies. These programmes resulted in the overall development of the industry in the state. Anantapur district, stands first in terms of area under mulberry cultivation, production of cocoons and raw silk and the number of farmers who have taken up sericulture when compared to other districts in AP state.

The family labour utilisation has been high among marginal and small farmers and the farmers try to reduce the usage of hired labour. The medium and large farmers use more hired labour for sericultural operations like mulberry cultivation, maintenance and silkworm rearing as they do not use, generally family female labour
in the activity. These categories of farmers feel that utilisation of family female labour is inferior. However, the marginal and small farmers utilise the entire family labour including female labour to the maximum extent. Therefore, the total employment generation has been high for marginal and small farmers in sericulture industry compared to their larger counterparts whose employment generation per unit of land has been lower.

When compared to other agricultural crops like paddy, groundnut, sugarcane, chillies and sunflower, employment generation per unit of land in sericulture has been more. This has been due to cultivation of increased number of crops in an year. All the agricultural crops which are grown in the region, on an average, are below two crops per year whereas in the case of sericulture it is around 4.5 crops in an year. Moreover, cocoon growing involves three processes, namely, mulberry cultivation, mulberry maintenance and silkworm rearing and therefore, the labour absorption is high compared to any other agricultural crop.

Silkworm rearing suffers from certain constraints like diseases. Silkworms are affected by four major diseases namely muscardine, flacherie, graserie and pebrine. Medium and large farmers apply more disinfectants to control the diseases compared to marginal and small farmers. The silkworm diseases reduce the total production of cocoons for all farm categories. However, it is still worse for marginal and small farmers, who have not been using the disinfectants on par with medium and large farm categories.
Medium and large farmers have better sericultural infrastructure and irrigation facilities compared to the marginal and small farmers. The marginal and small farmers have been trying to improve their economic condition in recent years. Basically, they are poor and, therefore, their infrastructure position has been low. The farmers in the developed mandal of Parigi, utilise the resources to the optimum extent but not the farmers in Lepakshi which is an underdeveloped mandal. This has been proved through their productivity per unit of land and total income generation.

The analysis clearly reveals that given the technology, infrastructure and inputs the marginal and small farmers can compete with medium and large farmers in the production front. An inverse relationship exists between farm size and productivity of land as production per unit of land has been greater for marginal and small farmers in sericulture.

It has been found that positive relationship exists between farm size and productivity in the case of other agricultural crops, quantity produced and the price realised as the marginal and small farmers do not give much importance to other agricultural crops. Marginal and small farmers concentrate more on sericulture crop, which, they feel, gives better returns, compared to other agricultural crops.

The difference in the application of organic manures and chemical fertilisers across size classes and crops reflected in the cultivation of agricultural crops. The marginal and small farm categories apply inputs at lower levels compared to their larger
counterparts. The cost of cultivation of agricultural crops has been lower for marginal and small farmers compared to the medium and large farmers, because the input costs of human labour and fertiliser is high in the latter group of farmers.

Generally, the cost of cultivation of mulberry, maintenance and silkworm rearing has been greater as compared to any other agricultural crops. The cost of mulberry establishment, maintenance and silkworm rearing has a positive relationship with size classes when the cost 'A' and cost 'B' are considered. As the size class increases the cost on these goes up in both the study areas. However, when imputed cost on family labour (cost 'C') is considered there is fluctuation in both the mandals.

There has been a negative relationship between the Farm Business Income and the size classes. As the size class increases the Farm Business Income decreases. The same negative relationship holds good between the Farm Labour Income and the size classes in Parigi but in Lepakshi, the marginal farmers get better income followed by medium, small and large farm groups.

There is positive relationship between Net Income and size class in both the study areas. As size class increases the Net Income also goes up with the exception of medium category of farmers who fare better than large farmers in both the places. The negative Net Income is found for small farmers in the Lepakshi study area.
Positive relationship exists between the cost incurred and the size classes for all agricultural crops. As the size class increases, the cost 'A', 'B' and 'C' also increases.

The Farm Business Income, Farm Labour Income and Net Income have a positive relationship with size classes. As size class increases all three kinds of income increases. However, when cost 'C' is considered, the negative returns have been found in the case of groundnut in both the study areas and also sunflower in the Lepakshi mandal.

The introduction of sericulture enterprise has influenced the farmers to extend their farm activities to the dairy sector also. Sericulture provides by-products like rearing waste which acts as a better substitute for fodder which is fed to the cattle, specially the milch animals. Therefore, the farmers have reached out to the dairy sector as it generates substantial employment and income.

The marginal and small farmers are encouraged to take up dairying which has resulted in an overall increase in their annual income. An inverse relationship between farm size and dairy income is found among the respondents as the medium and large farmers have shown less interest in dairying. The farmers of these categories observe that dairying involves constant supervision and more of manual labour which is difficult for the medium and large farmers to mobilise.
The impact of sericulture on dairy development has been significant as the number of milch bovines increased considerably for marginal and small farmers after taking up sericulture activity. Over a period of time, the growth rate of the milch animals has been higher for marginal and small farmers compared to their larger counterparts.

The aggregate family income has positive relations with the farm size. The income of all the categories in Parigi, a developed mandal, has been higher compared to their counterparts in Lepakshi, a less developed mandal. Generally, the sericultural income per household has been higher for marginal and small farmers compared to their other sources of income. The medium and large farmers get greater part of the family income from agricultural activities compared to the sericulture enterprise.

After taking up sericulture, consumption expenditure of the marginal and small farmers has gone up compared to the medium and large farm categories. This change can be attributed to increase in income level of these categories. Though the income level of the large farmers has gone up, the consumption expenditure has not increased proportionately as income is not a constraint for them.

The weaker sections who could not afford to spend on many items have started spending significantly but it has always been lower than the medium and large farmers who were spending more earlier also. It is concluded that sericulture made a dent in increasing the standard of living of the weaker sections, i.e,
marginal and small farmers, which is reflected in terms of consumption expenditure.

The sericulturists consumption expenditure has been more than the state general public. This has been proved by comparing the NSS consumption data published in Sarvekshana (1996) and the consumption data of the sample households. This clearly shows that the sericulture has positive impact on the standard of living of the sample households.

The percentage increase in agricultural implements has been low in Parigi and it has been negative in the Lepakshi study areas, whereas the percentage increase in sericultural implements has been greater. This is a clear indication that farmers have shown more interest in sericulture but not agriculture activities. In the case of sericulture, certain infrastructure like trays, leaf-cut-chamber, sickle and rearing space are essential and therefore, farmers try to own these implements at least to the minimum and this compulsion has resulted in the increase of sericultural infrastructure.

The asset value has gone up from 1981-82 to 1995-96 at 1980-81 prices. Few farmers, specially the medium and large farm categories, have bought consumer durables like gas and gasstove, refrigerator, fan and television. The farmers admit that the positive change in their lifestyle is due to sericulture industry and later dairy development also. Therefore, many farmers remark that "we were not having even a cycle and radio before the introduction of sericulture and dairying. At least now, we have cycle to transport milk, and radio to get agriculture and sericulture news".
7.1. POLICY SUGGESTIONS

As a consequence of the foregoing analysis some policy suggestions have emerged regarding the development of all categories of farmers and, in turn, sericulture, particularly, in the state and the country, in general. Though the Government of India and AP have been trying their utmost to improve the industry and sericulturists, the programmes are not consistent. For instance, the National Sericulture Project, the Indo-Dutch programmes and the Seri-2000 projects. These projects have not been continued. Certain programmes initiated during the project cannot be continued due to paucity of funds. And, hence, the growth rate in terms of area under mulberry cultivation, production of cocoons and rawsilk is below the expected level.

The policy suggestions have been categorised under three major groups: 1) mulberry cultivation/mulberry maintenance; 2) silkworm rearing; and 3) general suggestions. These three different areas require different kinds of services for which the sericulture department and the government have to play a major role in this area. This also requires that farmers should show sustained interest.

7.1a. Mulberry Cultivation/Maintenance

While selecting a plot farmers should take greater care as the soil quality is a determinant of mulberry leaf production. Therefore, the farmers require proper extension service so that

36. Based on the discussion with the officials of the sericulture department and also with experienced sericulture farmers.
they do not commit such a mistake but instead equip the land to the required standard.

Due to lack of the extension service there has always been a mismatch between the advised dosage of chemical fertilisers and the farmers' actual use. The discrepancy exists because of the ignorance and illiteracy of the farmers. The soils have to be tested and farmers have to be advised on the type of fertiliser and the quantity of the fertiliser to be used.

The farmers are not judicious as far as the use of chemical fertilisers as they erroneously think that just use of chemical fertilisers result in greater production. Therefore, the farmers have to be properly educated in the use of equal proportion of chemical fertilisers and farmyard manure.

Very often the farmers get planting material from their neighbours or relatives. Most of the times the planting material is of substandard quality resulting in poor growth of plants. The department also supplies the planting material but there has been lack of coordination between the time of cutting and planting which results in drying up of shoots which again end in poor growth, resulting in wastage of human and capital resources. Therefore, the role of the extension staff is crucial to the success of the enterprise.

37. Based on the discussions with a technical expert in mulberry cultivation, Directorate of Sericulture, Hyderabad, AP.
Diseases like leaf-spot and caterpillar menace have been observed in the field. The leaf-spot disease is noticed during rainy and winter seasons. Farmers are not aware of any preventive or curative measures and this has resulted in low yield of leaf during these seasons. Secondly, the caterpillar menace, during the months of January and February, has been a serious problem. These, black and brownish caterpillars eat away the mulberry leaf resulting in poor yield of leaves. Except some indigenous methods farmers are not aware of any scientific method of controlling the menace. Even though the problem is not serious, the department has to take measures to prevent it.

And lastly, the farmers have to be made aware of the scientific utilisation of available irrigation facilities which are scarce. Farmers have a tendency to waste irrigation water and water the fields even when not required, believing that this would lead to better yield. They do not realise that excess water could lead to crop loss due to crop diseases.

7.1b. Silkworm Rearing

The analysis indicates that farmers are far behind in owning a separate rearing shed which is essential for maintaining the hygienic conditions, as it is responsible, to some extent, for the successful cocoon crop. In this connection, the government sanctions loan which has to be utilised for garden establishment, buying silk rearing equipments and owning a rearing shed. But the loan amount is not even sufficient for plantation and rearing

38. Based on the discussions with a technical expert on silkworm diseases and also with the experienced farmers in the study villages.
equipments let alone of a rearing house, which is just a dream. Therefore, there is need for the government to enhance the unit cost. This would help the farmers to use the amount judiciously for the construction purpose.

Rearing equipments, specially trays, owned by the sericulturists are not sufficient and this results in borrowing them from other fellow farmers. But there are cases where crops will have failed due to diseases and if the trays are taken for rent from such cases then there are chances of contamination. Therefore, to the extent possible it is safer to have own trays.

An important input in silkworm rearing has been the DFLs. During certain seasons, farmers have to struggle a lot to get the DFLs. The prices of these will not be uniform and the quality will not be assured. The price difference between the normal situation to abnormal situation is two to three times. Therefore, the sericulture department has to estimate the demand and supply positions and meet the requirements without giving room to the exigencies after having an understanding with private grainages, so that the marginal and small farmers are not affected by the price fluctuation. The price fluctuation has been too much in the study areas and also in the state.

Farmers are still not familiar with the chawkie rearing and each farmer follows different methods. Therefore, at this stage itself they lose 10-15 per cent of the worms resulting in the

Most of the respondents felt the same opinion as the unit cost is much lower than the required cost.
reduction of the overall production of the cocoons. Therefore, the extension staff has to be alert and take maximum interest to minimise the loss and train the farmers to get required skills.

The silkworms are prone to diseases like Muscardine, Flacherrie, Grasserie and Pebrine. Of all these diseases, Pebrine is the most dangerous disease. Farmers lose the entire crop in case this disease attacks. The farmers complain that the extension staff are unable to identify the disease and hence, the wastage of human and capital resources. If they identify the problem in the initial stages they can save the leaf, cost of labour and other expenses.

Farmers do not have the uniform practice of feeding the worms. A few farmers feed the worms three to four times, some four to five times and others five to six times a day. This has a bearing on the cost, labour and leaves used to feed the worms. It is suggested that the farmers have to be well informed of these so as to reduce the cost on inputs.

Farmers complain of health problems due to silkworm rearing. General problems like increase in body temperature resulting in eye irritation, stomachache, lose motions, body pain and asthma are prevalent. Therefore, more research in this direction has to be encouraged to find out the factors which responsible and remedial measures to control them.
7.1c. General Suggestions:

The analysis has brought out that given the inputs, sericulture helps the marginal and small farmers in getting income on par with medium and large farmers and even more, per unit of land. Therefore, the marginal and small farmers have to be given the following facilities to take up the sericulture activity wherever possible and feasible.

Irrigation has been one of the most important inputs in sericulture activity for growing mulberry. In the study area the marginal and small farmers hardly own either a borewell, open well or any other means of irrigation. As observed, the land size of these categories do not permit them to go for a borewell or a open well which is a costly affair and also not economical for them. Therefore, most of these farmers take the water, on rent, from the medium and large farmers who have surplus water. But during summer, when there is scarcity of water, their activity suffers. It would be beneficial to the farmers if the government can dig high capacity borewells, through Irrigation Development Corporation, and provide community irrigation to the weaker sections. Not only will the present cost on irrigation be reduced but also water can be supplied throughout the year. This facility is being provided in a few villages in AP and it has to be intensified and provided in all the villages to solve the above problems.

To establish the mulberry garden, buying rearing equipments and the initial rearing cost of 200 DFLs have to be supported by
the department of sericulture with a loan amount of Rs10,000.\textsuperscript{40} This will help the marginal and small farmers to sustain the activity. After the repayment of the first loan, farmers may be given a second loan to go in for rearing shed which is most essential for silkworm rearing.

It is observed in the study area that the department and government officials meet only the rural elites and rich farmers in the village and these become the first beneficiaries of extension service on any latest development. Therefore, these staff have to be advised to have village level meetings to communicate the latest developments in terms of technology, inputs and new varieties. This is seriously lacking among the officials.

To facilitate the farmers to avail these benefits and overall development of the sericulture industry, innovative developmental projects have to be taken up. The projects like National Sericulture Project (NSP), funded by the World Bank and Swiss Development Cooperation (SDC), The Seri 2000 project funded by the SDC and Indo-Dutch projects have to be encouraged to continue the financial and technical support for the development of the sericulture industry. There is a need to prepare a perspective plan for the next 20 years for sericulture development in different states. The initiative should come from Government of India.

\textsuperscript{40} Based on the discussions with sericulture farmers.