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Sustainable Farming and Climate Change Situation

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Abstract
Abiotic stresses are the major constraints in agricultural crop production across the globe. The use of some plant–microbe interactions are established as an environment friendly way of enhancing crop productivity, and improving plant development and tolerance to a biotic stresses by direct or indirect mechanisms. India to arrive a profitable farming system module where major population is scheduled tribes. Rice-Maize system, Paddy - Dairy - cum poultry system, Paddy- Fish – Banana-Vegetable system and Paddy-Dairy cum Apiary system were the test modules, where rice- maize is the traditional system considered as check. Among different integrated farming system modules showed that, Paddy -Dairy - poultry system recorded 202 % higher rice equivalent yield, 97% higher gross returns, 191% higher net returns and 134 % additional man days over sole crop component, while B:C ratio was higher with Paddy-Dairy cum Apiary system. Key words: Integrated farming systems, Rice equivalent yield, Economics, Employment generation.

Introduction
The global population is presently around 7.7 billion and may further swell in the next few years to become 10 billion by 2050 (UN.,2019). Population ballooning severely impairs the land holding capacity, particularly in Asian countries. Increasing anthropogenic activities, such as the release of greenhouse gases, result in heating of the natural environment. Perturbations in climatic conditions, in turn, negatively impact food security, jeopardizing food availability and the livelihood of people. Feeding such a large population is an evolving challenge for the agricultural sector and scientists (FAO,2008) . Sustainable agricultural production is integral to food security; abiotic stressors, which are either the consequence of or are aggravated by climatic elements, attribute to about a 50% loss in agriculture Physical and chemical environmental factors, such as light, temperature, moisture, salinity, nutrient availability, presence of industrial and agrochemical contaminants in soil and water resources, etc., impact the growth rate and productivity. The osmotic stress caused by abiotic factors disrupts ion distribution and cell homeostasis in plants. Abiotic stresses also interact with biotic stresses, making the plant more susceptible to infestations. Phenomenon of unchecked population growth, urbanization and industrialization are leading to continuous reduction in availability of vital agricultural resources and also fragmentation of farm holdings, making farming operationally uneconomic. The Indian economy is principally agraian economy and the declining trend in size of land holding poses a serious threat to the sustainability and profitability of farming. Majority (82%) of our farmers at national level falls under marginal and small categories. The process of marginalization of land holdings is likely to continue further due to various demographic reasons. The per capita arable land has

decreased from 0.34 ha in 1950-51 to 0.15 ha in 2000-01 and is expected to shrink to 0.08 ha in 2025. On the other hand, with more intensive agriculture, there has been an increasing stress on natural resource base in several parts of the country. Therefore it is very essential to develop Sustainable technologies and strategies especially for small and marginal farmers who constitute the major share of the farming community today. In this context, "farming system approach is one of the important solutions to face this peculiar situation as in this approach the different enterprises can be carefully undertaken and the location specific systems are developed based on available resources which will result into sustainable development" (Dashora and Hari, 2014). Integrated Farming system is a "judicious mix of one or more enterprises with cropping in which there is a complementary effect through effective recycling of waste / residues and encompasses additional source of income to the farmers". Integrated Farming system is a multidisciplinary holistic approach and proved to be effective in solving the problems of small and marginal farmers throughout the world and suits well for Indian conditions in general and hilly tracts of Andhra Pradesh in particular where majority of population is scheduled tribes with very small holdings with poor economic status.

Results and Discussion

Perusal of consecutive two years and mean of two years data revealed that, all the IFS modules performed well and enhanced productivity and returns besides employment generation over sole cropping system (Table.1 & 2). Among different IFS modules, Paddy - Dairy - poultry system produced higher rice equivalent yields and resulted to higher gross returns, net returns and generated more Man days per annum. Poultry component especially Vanaraja birds were proved to be regular with higher capacity of egg laying in case of layers and very swift natural growth of broilers with low cost of maintenance and steady and regular income from dairy component probably the reson behind the impressive performance of Paddy - Dairy - poultry system compared to other components. Biswas (2010) reported that "the farming system revolves around better utilization of time, money, resources and family labour and also the farm family gets scope for gainful employment round the year thereby ensuring good income and higher standard of living even from the small holdings". Two years mean of Paddy - Dairy - poultry system recorded 202 % higher rice equivalent yield, 97% higher gross returns, 191% higher net returns and 134 % additional man days over sole crop component. Better resource utilization with lesser dependence on costly off-farm inputs might be reason behind the superior performance of Paddy - Dairy - poultry system. Jagadeeshwara et al. (2011) reported that "the productivity of IFS was 26.3 per cent higher than the conventional system". Though the Paddy- Fish – Banana-Vegetable system was the second best module in terms of rice equivalent yield and gross returns, due to higher cost of production recorded lowest net returns and B:C ratio. Whereas Paddy-Dairy cum Apiary system proved better over Paddy- Fish – Banana-Vegetable system in terms of net returns and man days generated per ha besides resulted to the highest B: C ratio among all IFS modules. Ramasamy et al. (2008) reported that "the income from integrated crop+ livestock + goat + poultry was Rs. 98,270 than Rs. 28,600 in traditional farming system and similarly income of Rs. 99,209 in IFS with the crop +livestock +goat + poultry than conventional farming system". Higher employment generation and besides spread of income throughout the year are some of the positive notable aspects with IFS modules over sole cropping. Singh et al., (1997) observed that "the integration of various enterprises on various sizes of land holdings tend to be more profitable than arable farming alone, and generate more employment". The impressive productivity, profitability of different modules of IFS over sole arable cropping appeared to be the answer for averting the declining trend of factor productivity in many intensive farming situations especially for small and marginal farmers "Adoption of IFS

could generate additional income ranging from ` 9,000 to ` 2,00,000 per hectare, depending on inclusion of number and kind of additional farm enterprises and their effective combination was also previously" reported by Ponnusamy and Gupta (2009).

Conclusion

Among different IFS modules evaluated for two years for hilly areas of north coastal Andhra Pradesh showed that, Paddy -Dairy - poultry system recorded 202 % higher rice equivalent yield, 97% higher gross returns, 191% higher net returns and 134 % additional man days over sole crop component, while B:C ratio was higher with Paddy-Dairy cum Apiary system.

References

1. Biswas, B.C. 2010. Farming System Approach to Improve IUE, Employment and Income in Eastern India. Fertiliser Marketing News .41 (5): 6-12.
2. Dashora L.N., and Singh, H., 2014. Integrated Farming System-Need of Today. International Journal of Applied Life Sciences and Engineering 1(1), (pp. 28-37).
3. Jagadeeshwara, K., Nagaraju, Y., Bhagyavathi and Nagaraju, K. 2011. Livelihood improvement of vulnerable farmers through Integrated Farming Systems of Southern Karnataka. pp: 145 -146
4. Mohanty, D., Patnaik, S.C., Jeevan Das, P., Parida, N.K. and Nedunchezhiyan, M. 2010. Sustainable livelihood: a success story of a tribal farmer. Orissa Review, September: 41 - 43.
5. Ponnusamy, K. and Gupta, J. 2009. Livelihood contribution, prospects and problems of aquaculture in integrated farming systems. Indian Journal of Fisheries, 56 (4): 317-322.
6. Ramasamy, C., Natarajan, S., Jayanthi, C and Kumar, D. S. 2008. Intensive Integrated Farming System to boost income of farmers. Paper presented in the 32nd IAUN VC's Annual convention held at RAU, Ranchi.
7. Singh, S.N., Saxena, K.K., Singh, K.P., Kumar, H. and Kadian, V.S. 1997. Consistency in income and employment generation in various farming systems. Annals of Agricultural Research, 18(3): (pp. 40-43).