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Impact of Climate Smart Extension Education on the Rural Community and their Livelihoods Promoted by Odisha Livelihoods Mission in Odisha as a Research and Review

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Abstract: ***Climate Smart Extension Education is an Emerging Research in the globe. The Research has been started at Odisha, India by a Young Researcher Bibhu Santosh Behera of Odisha Livelihoods Mission, a Government Organization under the aegis of Department of Panchayatiraj and Drinking Water, Govt. of Odisha. As Odisha is the capital of Disaster, in order to mitigate the disaster by providing cushion to the community, planet, society and livelihoods, in the Year 2014, the Researcher Innovated and Coined the Term Climate Smart Extension Education as a man of Agriculture Extension Education from OUAT University Bhubaneswar. Here the researcher studied the Impact of Climate Smart Extension Education on the Rural Community and their Livelihoods promoted by Odisha Livelihoods Mission in Odisha as a Research and Review. For Popularizing Climate Smart Extension Education, the researcher has presented his lecture, talk and researcher in various forums and appreciated by all by getting Young Scientist Award in the Theme of "Climate Smart Extension Education" by BRIATS Allahabad in 2014 and also treated as Father of Climate Smart Extension Education in the World. The Major Research Findings are reflected in this paper may help to the welfare of Farming Community. The whole research is for Doctoral research and this paper is for Awarding of Doctoral Degree as per UGC Norms and International University Norms.***
Keywords: Climate Smart Extension Education, Organic farming, Models, Impact, Odisha Livelihoods Mission

I. RESEARCH METHODOLOGY

For this study exploratory design had been followed. The Sampling used for Respondent selection is stratified random sampling. The statistical methods followed for data analysis and interpretation is Percentage, Mean, Correlation by using SAS softwire.The data used for study is the primary source received by OLM data base. A standard structured questionnaire impregnating 3 Points Liquort scale. The Hypothesis of the study was 1.Whether the climate smart agriculture extension education models of Odisha Livelihoods Mission is really reachable to subscribers? 2. Preference matrix(Impact) of climate smart agriculture extension models by subscribers?.

II. REVIEW OF LITERATURE

A. Review on Climate Smart Extension in India

Bibhu Santosh Behera(2014) in his study "Role of climate smart extension education for improving biodynamic livelihood status in global perspective for holistic development, a comparative research and study" opined that By reducing greenhouse gas emissions per unit of land and/or agricultural product and increasing carbon sinks, these changes will contribute significantly to the mitigation of climate change. The research and study will be conducted in global basis, where there may be possibility of Climate Relicense and Impact of Extension Education play major role for development of Biodynamic Livelihood for Holistic and Sustainable Development. The Sample size taken From Each country and continent was 30 and total sample size would be 600.This will be done by Ex-post Facto design via Randomized block Analysis. The Empirical models, conceptual frame work, concept road map and policy will be formulated for achieving MDG, SDG and Vision 2050 in the final part of this Study. Documentation and Data interpretation would be done accordingly for Future Research and Technological Advancement Refinement (TAR).(Journal of Agrotechnology)

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Bibhu Santosh Behera(2013) in his study opined that "Climate change and its impact on agriculture & allied sectors in India"opined that Here the researcher wants to study the co-relation of impact of climate change on Agricultural sector(Like Agriculture, Animal husbandry, Fishery, Forestry and hydro geological sector) and how the green house gases(GHG), Carbon dioxide, Temperature and all meteorological phenomena affect the agricultural production, it is mentioned in a analytical mode. As India is a developing and growing country here Agriculture and allied activity constitute the single largest component of gross domestic product (GDP) contributing nearly 25% of the total.

The tremendous importance of the sector to the Indian economy can be ganged by the fact that it provides ample employment opportunity to two-thirds of the total work force. The share of Agricultural products in exports is also substantial, with agriculture accounting for 15% of export earnings. Agriculture growth also has a direct impact on poverty alleviation and important factor for employment generation. Further Indian agriculture is fundamentally dependant on ?Asmani? (weather) and in political context ?Sultani? (Administration). For higher productivity the proof of this has been the increasing in agricultural production, Owing to good monsoons over the last few years.

Finally the author wants to address the relationship of climate change on agriculture by relating with the crop, soil, rainfall, green house gas, temperature and how the threatening of Agriculture can be mitigate in a sustainable and viable way by adopting suggested agricultural measures like crop diversification, adoption of new crop varieties, drought and flood management, restoration of waste and degraded lands. One of animal agriculture?s greatest environmental impacts is its contribution to global warming and climate change. According to the Food and Agriculture Organization (FAO) of the United Nations (UN), the animal agriculture sector is responsible for approximately 18%, or nearly one-fifth, of human-induced greenhouse gas (GHG) emissions. In nearly every step of meat, egg, and milk production, climate-changing gases are released into the atmosphere, potentially disrupting weather, temperature, and ecosystem health. Mitigating this serious problem requires immediate and far-reaching changes in current animal agriculture practices and consumption patterns.(Journal of Ecosystem Ecograph)

B. Review on Climate Smart Agriculture in Abroad

The literature attests to West Africa as being vulnerable to climate change and variability, on account of socio-economic and physical characteristics (Baptista et al., 2013). Farmers have to cope with highly variable, short and unpredictable rainfalls. Yet, agriculture in this region is essentially rain fed. With increasing variability of climate change, water resources for agriculture may become more unpredictable. In addition, increased run-off frequency and soil erosion has rendered many agricultural lands degraded (Zougmoré et al., 2014).

This therefore necessitates adopting agricultural innovations that improve the efficient use of green water (rain water available in soil for plant use) and offer the opportunity to improve soil productivity and mitigate climate-related risks.

Climate change impacts are already known to West African farmers. Using Scopus, 121 peer-reviewed journals confirmed large proportions of farmers (between 71 and 95%) in West Africa were aware of climate change and already facing its impacts (Limantol et al., 2016, Yéo et al., 2016, Koura et al., 2015). The observations by farmers are consistent with the numerous scientific assertions from models and empirical evidence.

The fourth and fifth assessment reports of the Intergovernmental Panel on Climate Change (IPCC) estimate 5% decline in rainfall by 2050 (IPCC, 2014) while simulations by Jalloh et al. (2013) also projected 1.5 °C–2.3 °C increases in temperature by 2050. Reduced crop yields due to intense drought as well as negative consequences of climate change and variability on aquatic ecosystems and productivity of fish and livestock are also reported (Omitoyin and Tosan, 2012, Niang et al., 2014, Rhodes et al., 2014). The paper by Zougmoré et al. (2016)already gives a comprehensive coverage of climate change and variability impacts and projections for West Africa.

The empirical evidences and future projections of West Africa's climate suggest that without sustainable intervention mechanisms to curtail the risks posed by climate on agriculture, most countries in the region will fail to meet set targets of the sustainable development goals. The adoption of climate-smart agricultural practices and technologies is viewed as one mainstream opportunity. FAO (2010) defined climate-smart agriculture to encompass agricultural innovations that achieve (1) increased productivity for improved food security, (2) improved adaptation and resilience to climate change and variability, and (3) reduced greenhouse gas emissions (mitigation) where possible. Recently, the concept of CSA has been introduced to cover technical and institutional options for dealing with climate change (Lipper et al., 2014). With strong regional partnerships involving non-governmental organizations, civil society organizations, the private sector, governments and farmer-based organizations, it should be possible to design and implement the most applicable CSA interventions in different economic regions of West Africa for wider promotion of best practices.

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III. WHAT AGRICULTURAL INNOVATIONS IN WEST AFRICA HAVE THE POTENTIAL TO DELIVER ON THE PRINCIPLES OF CLIMATE-SMART AGRICULTURE?

Evidence from the literature suggests that farmers are using several agricultural innovations developed from indigenous knowledge or introduced technologies to improve their adaptive capacity to climate change and variability. Some of these practices are ex ante, meaning they are based on pre-informed climatic events while others are ex post (measures adopted after a climatic event has been realised) (Burke and Lobell, 2010). Below, we used evidence from the literature to discuss how six agricultural innovations selected through participatory testing in 5 locations within 5 countries (Ghana, Mali, Niger, Senegal and Burkina Faso) have been promising in achieving one or more of the three pillars of CSA: productivity, mitigation and adaptation.

IV. RESULT & DISCUSSION

Since a decade Odisha Livelihoods Mission Played a vital role for development of Rural community through Climate Smart Agriculture Extension Education Models which are in accordance with the thumb rule " Economically viable,Technicaly feasible and Locally acceptable" .Among all Innovative models some models which are really tested at field level for the empowerment of rural artisans are enlisted as below. Here we have analyzed Table No:-1.1.1, 1.2.1 and 1.3.1 for making this research more concrete. There are 5 subscribers for using this model intermittently at rural base are 1.Rural youth, 2.Women, 3.Farmers, 4.Ultra Poor stakeholders & 5.Barefoot Enterpreneurs.

The empirical study was conducted in the year 2018-19 at various remote rural pockets of Odisha where Odisha Livelihoods Mission is reachable. The research design of the study was exploratory design with stratified random sampling method. The Primary source of data is collected from Odisha Livelihoods Mission database from MIS&MLE unit of Livelihoods cell. A standard structured interview schedule was developed and data was accordingly collected by Google survey method, personal visit, telephonic interview and mail communication method.

After the data analysis , we may able to predict about the research questions that Out of 7 Top Models of Odisha Livelihoods Mission only 5 Models are really working at field level. Simillarly, out of all subscribers comprising of 300 respondents from all 30 Districts of Odisha, the study revealed that Rural Youth, Women and Farmer subscribers were preferably adopt the Mission Samrudhi thematic models like Quality Seed Multiplication Model(95 Percent) followed by Common Facility Centres(85 percent), Organic Clusters(80 percent) and Farmer Field School (75 percent) accordingly. This indicates that, Agriculture is the basic livelihoods approach in Odisha and more than 70 percent of population is involving in Agriculture sector.

If we look at the models preference, For making a sustainable and dignified farmer Quality seed Production may act as a catalyst for availing quality seed in time at doorstep of farmer, for Custom Hiring and facility avail to Farmers at low price by CFC is a revenue generation model and also a small enterprise for all first three subscribers, For chemical free food purpose all 3 subscriber follow Organic Cluster, accordingly for preaching of farmers knowledge to create a knowledge resource pool of wise farmers by using innovative extension model, Farmer field school may play as a change agent to popularize farmers knowledge. Simmillarly, Ultra Poor communities and Bare foot entrepreneur subscribers were preferred rest 3 Models like Nutrifarming Models for Nutrition generation by Nutrigarden(88 Percent),poultry and goatery model(82 percent), SVEP Model by non-farm activities after trained through DDU-GKY Skill courses(85 percent) and Arthik Sakhyarata Kendra for basic financial literacy and inclusion and Institution building(80 percent) for their adoption.

It revealed from the study that the ultra poor and barefoot entrepreneurs may be upgraded by providing start up support and basic financial facility through life skill based education hence be justified. As per the justification of the title of thesis Table No 1.4.1 proved that various collaborative climate resilient agriculture activities programmers like OLM-Mission Samrudhi, IRRI-OLM plays a very vital role by affecting the Farmer's fraternity in a very successful way w.r.t. all collaboration due to high adoption and outreach of program. Simillarly, Climate Resilient Based Agriculture Extension Activities are directly providing impact on farming community through high frequency and less gap percentage.

Lower gap percentage and higher frequency was found in case of Zero budgeting Natural Farming, followed by Biodynamic Livelihoods and Quality Seed Multiplication. Simillarly Medium Frequency and Moderate Gap was found in Ecological Agriculture, Fallow Management, Farmer's Field School and promotion of climate resilient varieties. Finally High gap and Low frequency was found in case of Head to Head Trial, Crop Water Budgeting, Permaculture and Season Long Training. This research proved that there is significant impact of Climate Smart Extension Activities for the prosperity of Farm Based Livelihoods in the State of Odisha.

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V. CONCLUSION

This paper made exposition of the inner dynamics of climate smart agriculture extension model and its adoption by the rural artisan by empowering them "financially sound", "literally eligible" and "socially recognizable" in Odisha State as well as establishing the fact that the survival instinct and the societal felt-needs inform most self-help activities. This community-based or community-dictated development approach involves the movement of the people designed to promote better living for the whole community within the active participation of, and if possible on the initiative of the community concerned. All the subscribers of Odisha Livelihoods Mission in Odisha must be exposed to all models is highly desired as because we have basketful of models, but the stakeholder's efficacy of use leads to empowerment of rural artisans in a meaningful and fruitful way. As per the Primary database of Odisha Livelihoods Mission, after Mission 2, 64 Mission Samrudhi program of Odisha Livelihoods Mission is a grand success .It covers around 5 lakhs rural families through empowerment by rural community models. Among 5 lakhs rural artisans only 300 bulk samples are taken for the empirical study and rest will be taken in near future for action research purpose. After this success NRETP (National Rural Economic Transformation Program) may be founded at Odisha Livelihoods Mission as a Panacea model by preaching the slogan "Rural Poor is millionaire" by adoption of Climate Smart Agriculture Extension based Entrepreneurship model with a large scale.

VI. RECOMMENDATION FROM RESEARCHER

A. I Recommend the following

1) That Government at all levels should encourage rural communities for adoption of climate smart agriculture extension based models to partake fully in all issues concerning their development, morally, financially and otherwise conventionally.

2) That the local governments in Odisha should provide enabling environment to communities to initiate plan and execute climate smart agriculture extension models based projects that will be beneficial to them.

3) Communities that are embarking on self-help climate smart extension education projects should be encouraged by ways of financial and technical assistance from the government.

4) Communities should be aware that climate smart extension education model projects embarked upon by themselves through self-help projects are meant for their overall well being and as such should protect and ensure that they are maintained hence the involvement of these groups.

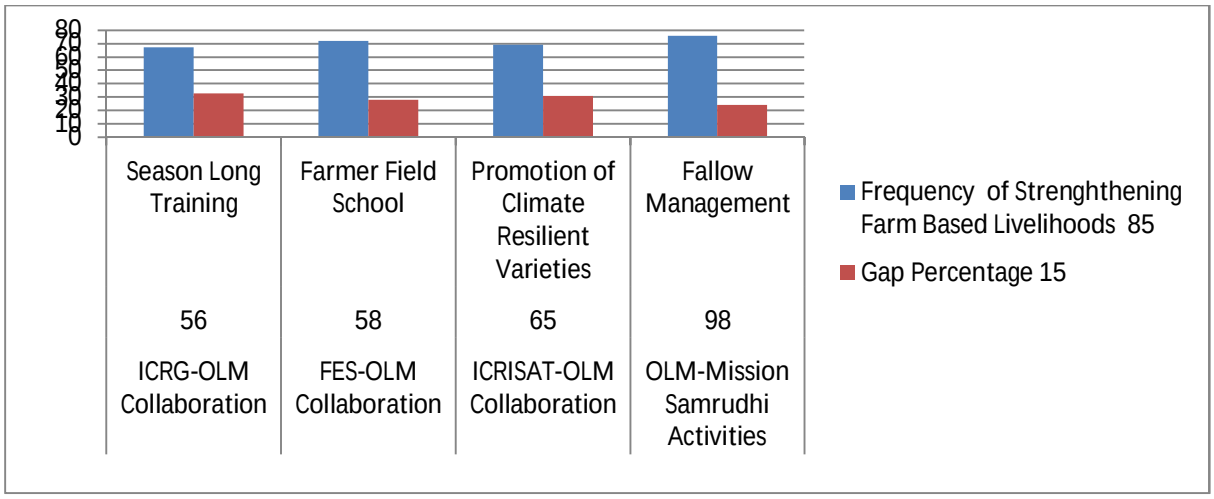
5) Despite the laudable and generally accepted values of self-help in climate smart extension education model is highly appreciated.

6) Development models, it is instructive to state that it should not be used to replace the role of Government in climate smart based development in Odisha.

7) Course Curriculum/Special Subject on Climate Smart Extension Education may be introduced in College,School,University for the awareness and popularization of the Climate Smart Extension Education model for the prosperity of community and betterment of society.

Annexure:-1

Table :-1.1.1(Adoption Rate of Climate Smart Agriculture based Extension Models of Odisha Livelihoods Mission by the Rural Subscribers)

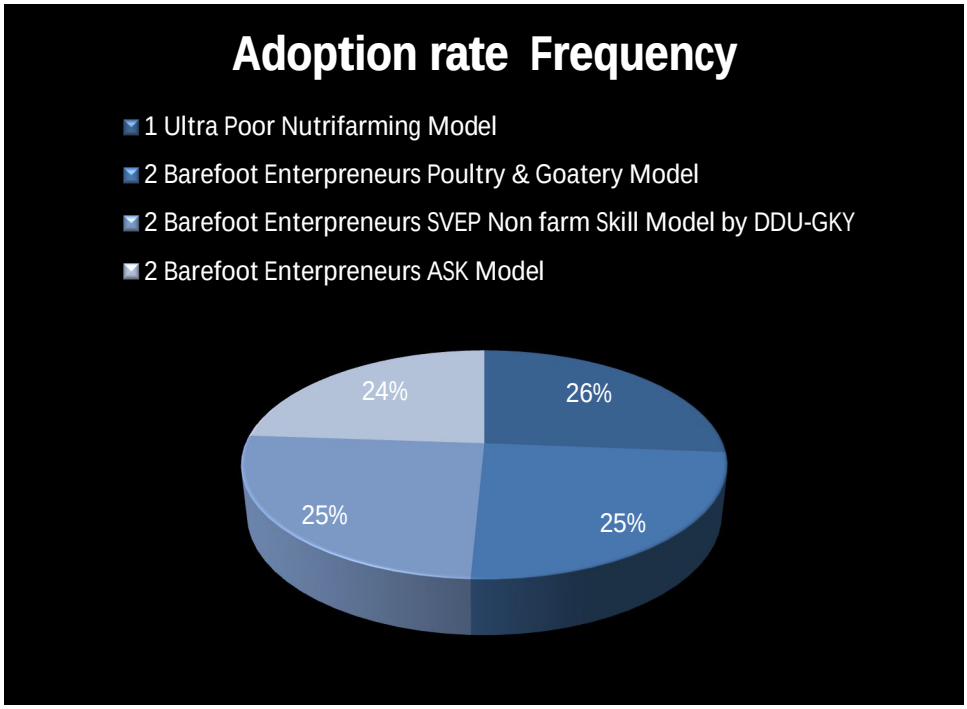


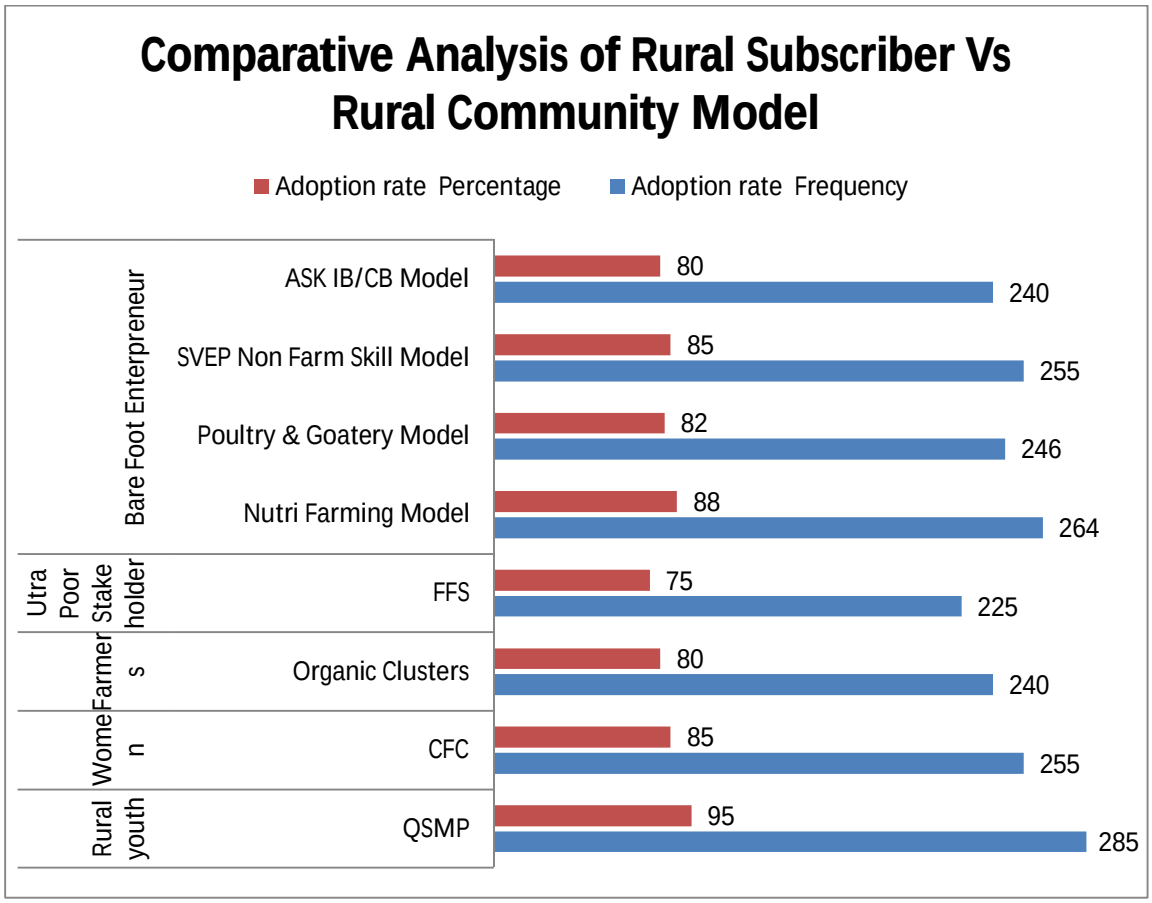
Source:-Primary data base of OLM
Total Respondents=300

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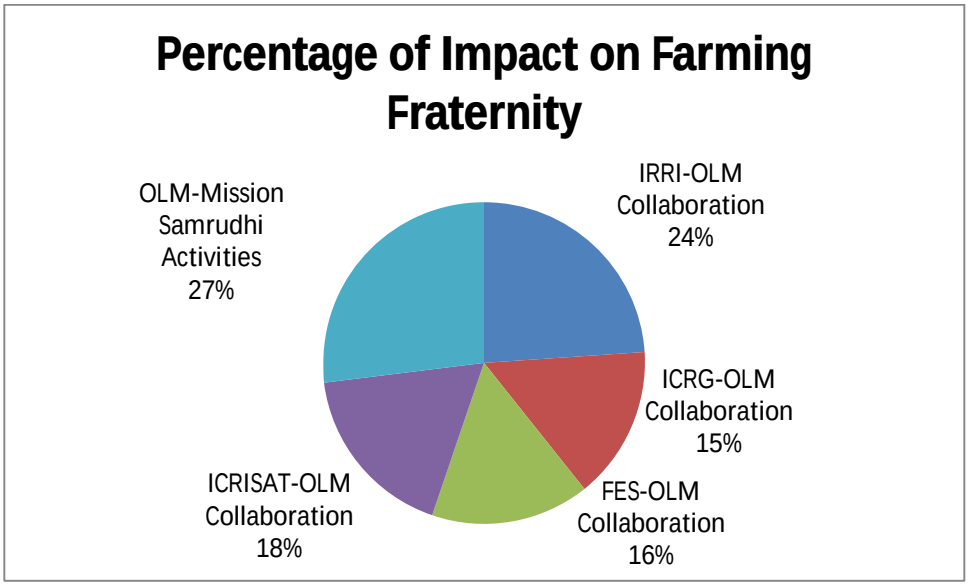
Table No:-1.2.1(Adoption Rate of Climate Smart Agriculture Extension Models with Odisha Livelihoods Mission)
Table No:-1.3.1 (Comparative Analysis of Rural Subscibers Vs Climate Smart Agriculture Extension Model w.r.t. Rate of Adoption

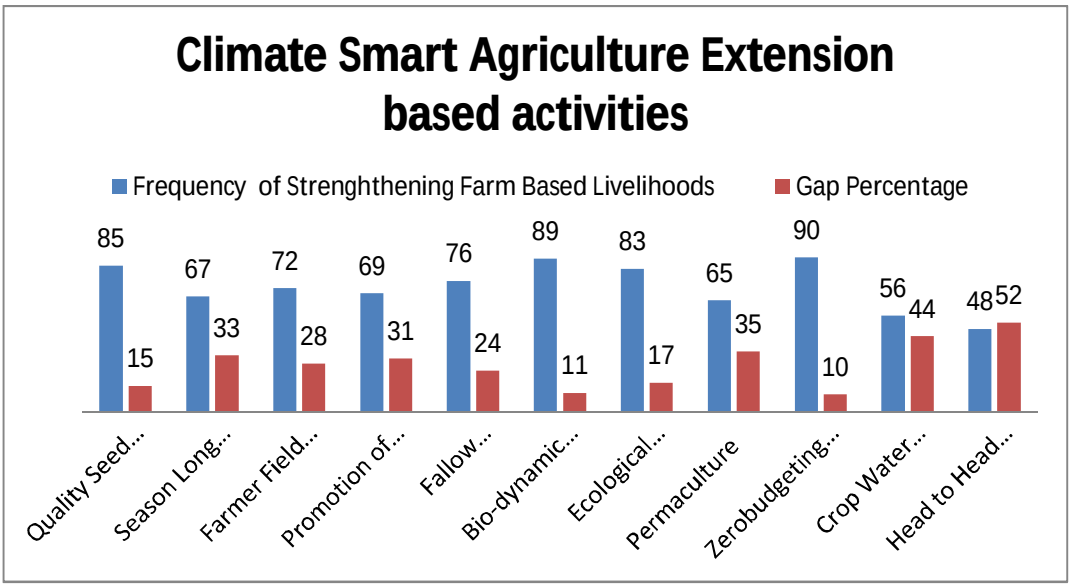




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Table No 1.4.1 Comparison of various Climate Smart Agriculture Extension Activities of Odisha Livelihoods Mission w.r.t. strengthening Farm Based Livelihoods Prosperity





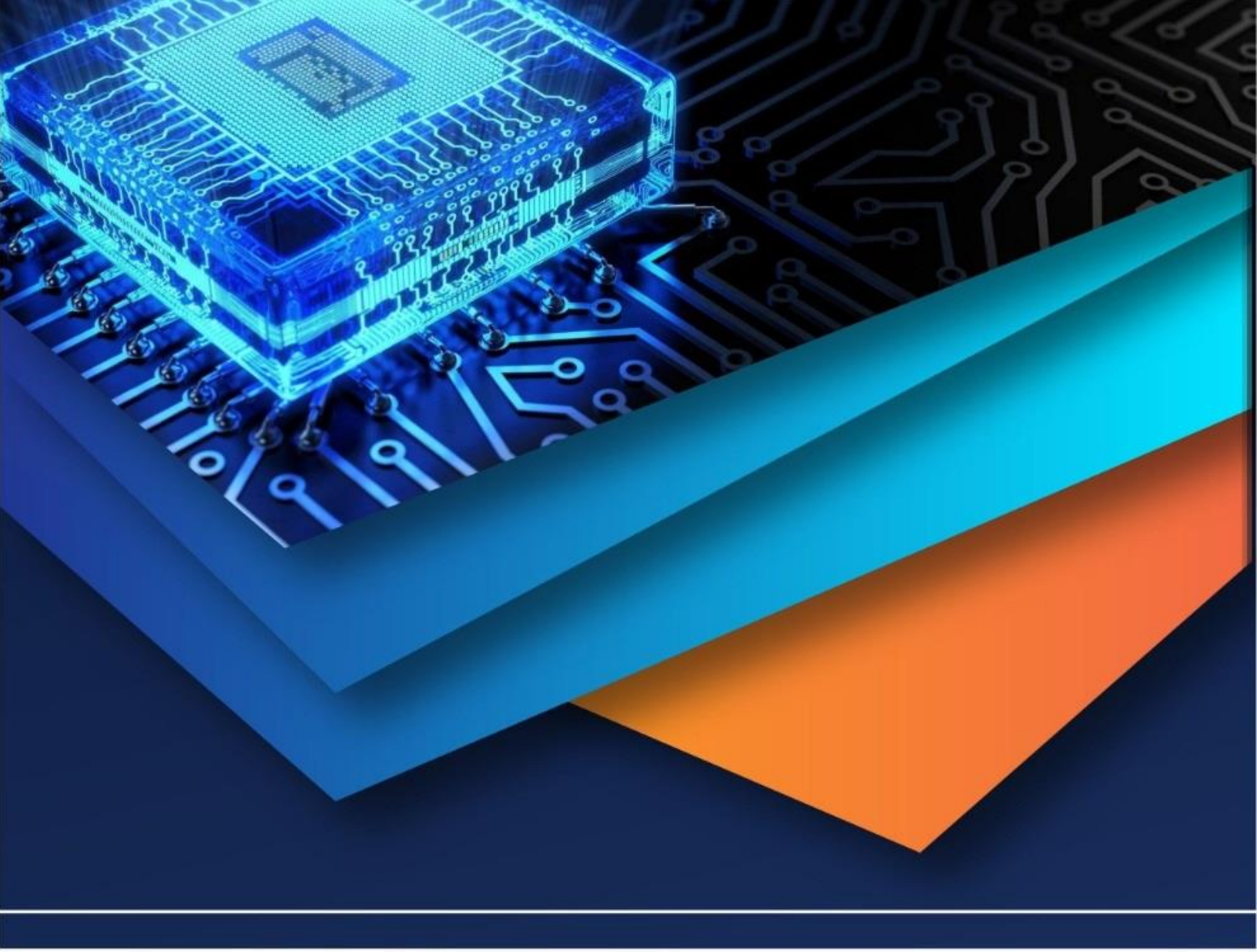
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