REPORT OF FARMERS AWARENESS PROGRAMME ON GRAMIN KRISHI MAUSAMA SEWA(GKMS), AMFU, G.UDAYAGIRI, RRTTS, OUAT, KANDHAMAL, ODISHA-762100 FOR THE YEAR 2014-15 HELD ON 27/03/2015 At Vill. GUTUGUDA , G.UDAYAGIRI, KANDHAMAL, ODISHA.

The programme held on 27/03/2015 at village Gutuguda,G.Udayagiri ,Kandhamal and chaired by Dr. Dillip kumar Bastia,Chief Scientist, DLAP, OUAT, Plulbani, Kandhamal Odisha. Akshaya Kumar Sethy, Associate Director of Research and Nodal Officer, GKMS,RRTTS, OUAT, G.Udayagiri, Kandhamal well come all the resource persons and introduced, with well come of all farmers in the Farmers Awareness Programme and explained the importance, aim and objective of this programme.The ADR has emphasized tha the Farmers Awareness Programme is very much crucial for the farmers in relation to climate change and its impact on agriculture.

The Topic is "**Farmers Awareness Programme on Climate Change and Its Impact on Agriculture under GKMS** and the following resource has attended the programme and presented the details and the combine report is as under

1. Dr.Dillip kumar Bastia , Chief Scientist, DLAP, OUAT, Plulbani, Kandhamal,Odisha
2. Dr.S.C. Sahoo, Director, India Meteorological Department, Bhubaneswar,Odisha
3. Sri Abhaya Kumar Sethy, Deputy Director ofAgriculture, Plulbani, Kandhamal,Odisha
4. Sri Hemanta Das, Deputy Project Director, ATMA, Kandhamal,Odisha
5. Dr. Gouri Shankar Singh, SMS(Agronomy), Krishi Vigyan Kendra,G.Udayagiri, Kandhamal

Orissa is the Indian state that is most affected by climate change. The states ecology and weather have undergone a noticable change. The last years it has been prone to severely extreme weather conditions. The people have almost yearly been shifted between floods and droughts, resulting in many casualties. The already dry lands are drying up even more, while the flood prone areas get more drowned. This already has shown its undeniable impact on agriculture in the state. If nothing is done, we have to worry for the future.

The state is located at the top of the Bay of Bengal, where the weather is created. The bay is more and more subject to low pressures. Heat waves are occurring in the same year as cyclones. The pattern of droughts and floods is becoming a yearly scenario.

Because of the fluctuation in temperatures due to deforestation, mahua and mango trees have been flowering early. This is known to produce a low yield in fruits, resulting in economic losses for horticulturists.

Weather is the condition of the atmosphere at a particular place and time. It is characterized by parameters such as temperature, humidity, rain and wind. Climate is the long term pattern of weather conditions for a given area. Climate change refers to a statistically significant variation in either the mean state of the climate or its variability, persisting for an extended period. India is home to extraordinary variety of climatic regions, ranging from tropical in the south to temperate and alpine in the Himalayan north, where elevated regions receive sustained winter snowfall. The nation's climate is strongly influenced by the Himalayas and the Thar Desert. Four major climatic groupings predominate into which fall seven climatic zones which are defined on the basis of temperature and precipitation.

Climate change is the most important global environmental challenge facing humanity with implications for natural ecosystems, agriculture & health . The perusal of general circulation models on climate change indicate that rising levels of greenhouse gases are likely to increase the global average surface temperature by 1.5-4.5℃ over the next 100 years. The difference of average temperature between the last ice age and present climate is 6℃. This will raise sea-levels, shift climate zones pole ward, decrease soil moisture and storms. Global warming is predicted to affect agricultural production.

Rice becomes sterile if exposed to temperatures above 35 degrees for more than one hour during flowering and consequently produces no grain. The rising temperatures will adversely affect the world's food production and India would be the hardest hit,

Rice and wheat production of India will drop significantly because of climate change. A 1.5℃ rise and two mm increase in precipitation could result in a decline in rice yields by 3-15 per cent.

Heat wave can reduce a milk yield by 10-30% in first lactation and 5-20% in second and third lactation periods in cattle and buffaloes . Mortality of fish lings in shallow water ponds . Reduction in fish catch in the water bodies due to movement of fish into the deeper layers.

Agriculture represents a core part of the Indian economy and provides food and livelihood activities to much of the Indian population. While the magnitude of impact varies greatly by region, climate change is expected to impact on agricultural productivity and shifting crop patterns. The policy implications are wide-reaching, as changes in agriculture could affect food security, trade policy, live.

The agricultural sector represents 35% of India's Gross National Product (GNP) and as such plays a crucial role in the country's development. Food grain production quadrupled during the post-independence era; this growth is projected to continue. The impact of climate change on agriculture could result in problems with food security and may threaten the livelihood activities upon which much of the population depends. Climate change can affect crop yields (both positively and negatively), as well as the types of crops that can be grown in certain areas, by impacting agricultural inputs such as water for irrigation, amounts of solar radiation that affect plant growth, as well as the prevalence of pestslihood activities and water conservation issues, impacting large portions of the population.

Overall, temperature increases are predicted to reduce rice yields. An increase of 2-4ºC is predicted to result in a reduction in yields.

Daily and seasonal temperature patterns could change with increases in both maximum and minimum temperatures. Temperature increases will be the greatest over land in the northern latitudes, with fewer cold days and nights and an increasing number of hot days and nights.

Rainfall patterns could be subject to significant changes, with subtropical regions of the world likely to receive significantly lower rainfall and the northern latitudes experiencing increased rainfall. It is not only the total annual or seasonal rainfall that may change, but also the distribution of rainfall within a year or season. Consequently, the same total precipitation in a rainy season could be delivered over a fewer number of rainy days.

Rising temperatures will lead to increased frequency of extreme weather events like heat waves, extremely heavy rainfall, and intense storms and cyclones. Seasonal climate patterns, such as the monsoon, could also undergo changes

Climatic variability and occurrence of extreme events are major concerns for the Indian subcontinents. There is need to quantify the growth and yield responses of important crops and also identify suitable land use options to sustain agricultural productivity under this large range of climatic variations. In India, the analysis of seasonal and annual surface air temperatures has shown a significant warming trend of $0.57^{\circ}C$ per hundred years. The warming is found to be mainly contributed by the post-monsoon and winter seasons. Climate change scenarios include higher temperatures, changes in precipitation, and higher atmospheric CO2 concentrations which may affect on yield (both quality and quantity), growth rates, photosynthesis and

transpiration rates, moisture availability, through changes of water use (irrigation) and agricultural inputs such as herbicides, insecticides and fertilizers etc. Environmental effects such as frequency and intensity of soil drainage (leading to nitrogen leaching), soil erosion, land availability, reduction of crop diversity may also affect agricultural productivity of the country.

Food security is both directly and indirectly linked with climate change. Any alteration in the climatic parameters such as temperature and humidity which govern crop growth will have a direct impact on quantity of food produced. Indirect linkage pertains to catastrophic events such as flood and drought which are projected to multiply as a consequence of climate change leading to huge crop loss and leaving large patches of arable land unfit for cultivation and hence threatening food security. The net impact of food security will depend on the exposure to global environmental change and the capacity to cope with and recover from global environmental change. On a global level, increasingly unpredictable weather patterns will lead to fall in agricultural production and higher food prices, leading to food insecurity.

Assist farmers in coping with current climatic risks by providing value-added weather services to farmers. Farmers can adapt to climate changes to some degree by shifting planting dates, choosing varieties with different growth duration, or changing crop rotations. An Early warning system should be put in place to monitor changes in pest and disease outbreaks. The overall pest control strategy should be based on integrated pest management because it takes care of multiple pests in a given climatic scenario. Participatory and formal plant breeding to develop climate-resilient crop varieties that can tolerate higher temperatures, drought and salinity. Developing short-duration crop varieties that can mature before the peak heat phase set in. Selecting genotype in crops that have a higher per day yield potential to counter yield loss from heat-induced reduction in growing periods. Preventive measures for drought that include on-farm reservoirs in medium lands, growing of pulses and oilseeds instead of rice in uplands, ridges and furrow system in cotton crops, growing of intercrops in place of pure crops in uplands, land grading and leveling, stabilization of field bunds by stone and grasses, graded line bunds, contour trenching for runoff collection, conservation furrows, mulching and more application of Farm yard manure. Efficient water use such as frequent but shallow irrigation, drip and sprinkler irrigation for high value crops, irrigation at critical stages. Efficient fertilizer use such as optimum fertilizer dose, split application of nitrogenous and potassium fertilizers, deep placement, use of neem, karanja products and other such nitrification inhibitors, liming of acid soils, use of micronutrients such as zinc and boron, use of sulphur in oilseed crops, integrated nutrient management. Seasonal weather forecasts could be used as a supportive measure to optimize planting and irrigation patterns. Provide greater coverage of weather linked agriculture insurance. Intensify the food production system by improving the technology and input delivery system. Adopt resource conservation technologies such as no tillage, laser land leveling, direct seeding of rice and crop diversification which will help in reducing in the global warming potential. Crop diversification can be done by growing non-paddy crops in rain fed uplands to perform better under prolonged soil moisture stress in kharif. Develop a long-term land use plan for ensuring food security and climatic resilience.

Climate change, the outcome of the “Global Warming” has now started showing its impacts worldwide. Climate is the primary determinant of agricultural productivity which

directly impact on food production across the globe. Agriculture sector is the most sensitive sector to the climate changes because the climate of a region/country determines the nature and characteristics of vegetation and crops. Increase in the mean seasonal temperature can reduce the duration of many crops and hence reduce final yield. Food production systems are extremely sensitive to climate changes like changes in temperature and precipitation, which may lead to outbreaks of pests and diseases thereby reducing harvest ultimately affecting the food security of the country. The net impact of food security will depend on the exposure to global environmental change and the capacity to cope with and recover from global environmental change. Coping with the impact of climate change on agriculture will require careful management of resources like soil, water and biodiversity. To cope with the impact of climate change on agriculture and food production, India will need to act at the global, regional, national and local levels.

Future climate change is likely to adversely affect agriculture, livelihood, food security and water resource. Reduced yields of crops due to warm days and nights. Decreased grain yield of rice due to accelerated senescence and higher chaffyness. Less elongation of rice grain and lower quality of rice due to warm nights during post flowering period . Direct sown rice a more risk due to extended summer and less rainfall in June.

A range of adoption measures are available to reduce vulnerability to climate change by enhancing adaptive capacity and increasing resilience. Some of such suggested measures are as follows. Crop diversification : Growing non-paddy crops in rainfed uplands to perform better under prolonged soil moisture stress in kharif. New crop varieties : HYVs and hybrids of vegetables tolerant / resistant to alternating temperature regimes and warm winters, improved rice varieties resistant to flashflood in low lands, salinity tolerant rice varieties in coastal areas. New rice culture: Cultivation techniques such as SRI method of rice cultivation during summer and in well drained medium lands during kharif under assured water supply. Wet method of direct sowing. Preference to rice transplanting: Going for the transplanting of rice instead of dry method of direct sowing for more assured yield. Altered sowing time: Dry sowing of rice only after sufficient monsoon rainfall recharging soil profile. Efficient fertilizer use: Optimum fertilizer dose, balanced fertilization, split application of nitrogenous and potassium fertilizers, deep placement. use of neem, karanja products and other such nitrification inhibitors, liming of acid soils, use of micronutrients such as zinc and boron, use of sulphur in oilseed crops, integrated nutrient management. Efficient water use: Frequent but shallow irrigation, drip and sprinkler irrigation for high value crops, irrigation at critical stages. Integrated pest management: Measures to control increased incidence of polyphagous insects like swarming caterpillars and accelerated life cycles of stem borer in rice. Drought and flood management: Preventive measures for drought that include on-farm reservoirs in medium lands, growing of pulses and oilseeds instead of rice in uplands, ridges and furrow system in cotton, growing of intercrops in place of pure crops in uplands, land grading and leveling, stabilization of field bunds by stone and grasses, graded line bunds, contour trenching for runoff collection, conservation furrows, mulching and more application of FYM. Land management: Contour ploughing, contour planting, terracing, close spacing crops, and other recommended practices of soil conservation in sloppy lands to minimize soil erosion. Catchments management: An

increased risk of water shortages at times will require greater consideration to be given to the need for better catchments management planning and technical interventions on the watersheds. A large number of technologies developed for sustainable agriculture have strong mitigation potential. The practices having mitigation potential can collectively make a significant contribution to increasing soil carbon sinks, reducing green house gases emissions, and by contributing biomass feedstock for energy use.

Lastly, Akshaya Kumar Sethy, Associate Director of Research and Nodal Officer, GKMS,RRTTS, OUAT, G.Udayagiri, Kandhamal gave vote of thanks to all participants for success of the meeting.

Farmers Awareness Programme under GKMS ON 27/03/2015 AMFU, RRTTS, OUAT ,G.Udayagiri, Kandhamal, Odisha-762100 Held At Vill. GUTUGUDA , G.UDAYAGIRI, KANDHAMAL, ODISHA

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12.Ananada Pradhan S/o Krusindhu Pradhan Vill.Gutuguda

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16.Monojo Pradhan S/o Prafulla Pradhan Vill.Gutuguda

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27.Surendra Pradhan S/o Krupa Pradhan Vill.Gutuguda

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29.Dhanajaya Pradhan S/o Sakara Pradhan Vill.Gutuguda

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31.Laxmena digala	S/o Samarsing Digal	Vill.Gutuguda
32.Harishndra Pradhan	S/o Satada Pradhan	Vill.Gutuguda
33.Delendra Pradhan	S/o Brugi Pradhan	Vill Gutuguda
34.Susanta Pradhan	S/o Musur Pradhan	Vill.Gutuguda
35..Rajalean Pradhan	S/o Pasi Pradhan	Vill.Gutuguda
36.Krushana ch.Pradhan	S/o Dhanesear Pradhan	Vill.Gutuguda
37.Gopinath Pradhan	S/o Balaram Pradhan	Vill Gutuguda
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39.Sunalku Pradhan	S/o Bhakta charan Pradhan	Vill Gutuguda
40.Aditya Pradhan	S/o Hare Krusna Pradhan	Vill Gutuguda
41.Yutibiri Pradhan	S/o Danara Pradhan	Vill Gutuguda
42.Gagan Digal	S/o Bijura Digal	Vill.Gutuguda
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44.Arun Pradhan	S/o Andeswr Pradhan	Vill.Gutuguda
45.Rajendra Pradhan	S/o Bakara Pradhan	Vill.Gutuguda
46.Numima Pradhan	W/o Balaram Pradhan	Vill.Gutuguda
47. Kanchan Pradhan	W/o Arun Pradhan	Vill.Gutuguda
48.Rinima Pradhan	W/o Kesab Pradhan	Vill.Gutuguda
49.Mamata Pradhan	W/o Rabindra Pradhan	Vill.Gutuguda
50.Ramadevi Pradhan	W/o Dipak Pradhan	Vill.Gutuguda
51.Rayali Pradhan	W/o Krushna ch. Pradhan	Vill.Gutuguda
52.Mamdakini Pradhan	W/o Patibisi Pradhan	Vill.Gutuguda
53.Srenalata Pradhan	W/o Damodar Pradhan	Vill.Gutuguda
54.Sarogini Pradhan	W/o Kapilash Pradhan	Vill.Gutuguda

55.Indrani Pradhan	W/o Rajendra Pradhan	Vill.Gutuguda
56.Gurubari Pradhan	W/o Rajani Pradhan	Vill.Gutuguda
57.Somita Nayak	W/o Setan ku Nayak	Vill.Gutuguda
58.Alandvi Pradhan	W/o Benaka Pradhan	Vill.Gutuguda
59.Jikari Pradhan	W/o Banada Pradhan	Vill.Gutuguda
60.Chandama Pradhan	W/o Rinku Pradhan	Vill.Gutuguda
61.Manjuta Pradhan	W/o Ajit Pradhan	Vill Gutuguda
62.Sunanda Pradhan	W/O Anandeswar Pradhan	Vill Gutuguda
63.Mammati Digal	W/O Late Gaban Digal	Vill- Gutuguda
64.Amina Pradhan	C/O Kamaleswar Pradha	Vill- Gutuguda
65.Rasina Pradhan	D/O Rajaban Pradhan	Vill- Gutuguda
66.Mamini Pradhan	W/O Radhakanta Pradhan	Vill- Gutuguda
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70.Bidhi Pradhan	W/o Banchanidhi Pradhan	Vill –Gutuguda
71.Krishani Pradhan	W/O Bhakta Charan Pradhan	Vill.Gutuguda
72.Nibedita Pradhan	c/o Akash Pradhan	Vill.Gutuguda
73.Rinki Pradhan	c/o- Akashya Pradhan	Vill.Gutuguda
74.Chandrabati Pradhan	c/o Dhruba Charan Pradhan	Vill- Gutuguda
75.Karama Pradhan	c/o Santunu Pradhan	Vill-Gutuguda
76.Rajani Pradhan	W/O Debendra Pradhan	Vill-Gutuguda
77.Tanuja Pradhan	W/O- Hemanshu Pradhan	Vill-Gutuguda
78.Ambica Pradhan	W/O Narendra Pradhan	Vill-Gutuguda
79.Mamata Pradhan	W/O Binod Pradhan	Vill-Gutuguda

80.Rukuni Pradhan	W/O- Susil Pradhan	Vill-Gutuguda
81.Bipra Chandra Pradhan	S/o – Laxman Pradhan	Vill-Gutuguda
82.Akshaya Pradhan	S/O –Ballaram Pradhan	Vill-Gutuguda
83.Nirmal Chandra Pradhan	S/O Sunder Pradhan	Vill-Gutuguda
84.Rajesh Pradhan	S/O N.Pradhan	Vill-Gutuguda
85.Gobinda Chandra Pradhan	S/o-Surendra Pradhan	Vill-Gutuguda
86.Singiria Pradhan	S/O- Deo Pradhan	Vill- Gutuguda
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88.Kanturi Pradhan	S/o –Rinji Pradhan	Vill- Gutuguda
89.Sunju Raj	S/O- Rinji Pradhan	Vill. Gutuguda
90.Ranjan Pradhan	S/O- Madhan Pradhan	Vill.Gutuguda
91.Prakash Pradhan	S/O- Mansan Pradhan	Vill-Gutuguda
92.Damo Pradhan	S/o- Yudhistir Pradhan	Vill- Gutuguda
93.Kabiraj Pradhan	S/o- Yudhistir Pradhan	Vill- Gutuguda
94.Bikram Pradhan	s/o- Baka Pradhan	Vill- Gutuguda
95.Sunil Pradhan	S/o- Parameswar Pradhan	Vill- Gutuguda
96.Budhadev Pradhan	S/O- Sudha Pradhan	Vill- Gutuguda
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99.Druba Charan Pradhan	S/O-Kusubar Pradhan	Vill.Gutuguda
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