

23rd National Children's Science Congress (NCSC-2015)

Focal theme: Understanding Weather and Climate

Weather is the instantaneous state of the atmosphere, or sequence of states of the atmosphere with time, which can be defined as the condition of the atmosphere at any given time and place. Climate, on other hand, is the average as well as variability of weather conditions prevailing in an area over a long period of time, known also as the Statistics of Weather.

Precipitation, temperature, humidity, atmospheric pressure, and wind are the important elements of weather and climate. It is the result of the interaction of four basic physical elements- the Sun, the Earth's atmosphere, the Earth itself, and natural landforms on the Earth's surface.

The geographical situation of any locality/area/region in relation to its latitudinal and longitudinal position, altitude, distribution of land and water, relative location from water bodies, surface cover (viz. vegetation/snow/rocks etc.) are some of the natural factors that influence the weather and climatic condition of that particular location.

Moreover, weather and climate are among the key factors that determine the nature, condition, and pattern of natural resources (e.g. water, soil, flora, and fauna). State of temperature, humidity, and precipitation in temporal context in a year determine season and climatic condition in long temporal context. These are responsible for determining the forms of water, soil-forming processes and creating support systems for floral growth; which again determine the faunal composition. These natural resource bases along with

weather and climate largely influence our way of life (viz. occupation, housing, food habits, dress make up, transportation, etc.). In totality, weather and climate are among the pillars of the economy and culture of that area. In this perspective, any significant change in weather and climatic condition creates serious impact not only on natural resources but also on the biosphere as a whole, including human life.

Scientists have studied global climate change patterns, apparent from mid to late 20th century onwards, attributed largely to increased levels of atmospheric carbon dioxide produced by uses of fossil fuels and other green house gases. Averaged over all land and ocean surfaces, temperature has increased by roughly 1.53°F (0.85°C) from 1880 to 2012, according to the Intergovernmental Panel on Climate Change (the IPCC's Climate Change 2013: The Physical Science Basis, Summary for Policymakers, Page 5). This climate change is considered as one of the most important global environmental challenges being faced by humanity today, with its implication on natural ecosystem, food production systems, fresh water supply, health, sea level rise and weather related calamities.

India's weather and climatic conditions are naturally controlled by her geographical location (i.e. its latitudinal and longitudinal extents) and the conditions along her boundaries. (Himalayan ranges from northwestern to northeastern corner in the northern side, existence of Indian Ocean and Arabian Sea as well as Bay of Bengal in southwest to southeast). The country also encompass the Western Ghats, which is one of the 34 Biodiversity hotspot of the world extending along the West coast of India from the Vindya Satpura ranges in the North to the Southern tip of the peninsula to a stretch of 1,600 km, receiving an average of nearly 6000 mm of rainfall every year.

The latitudinal and longitudinal extension within the country has greater implication on variation of solar days or sunshine hours from east to west, which is one of the fundamental factors regulating weather and climatic variations in the country. Further,

within the country, there are variations in distribution of land and water, altitudinal differences, vegetation type and coverage. All these together have given rise to six different climatic zones and twelve agro-climatic zones.

However, these climatic and agro-climatic zones are facing serious problems of various kinds due to the impact of climatic/ weather changes. In the last few decades, weather and climatic anomalies are taking place in all the agro-climatic regions of the country; the onset of monsoon over India is changing resulting in variations in the amount and distribution of rainfall.

In this context, there is a need to have proper understanding of weather and climate and its changes, mainly oriented towards different aspects, factors, and attributes of weather and climate along with their implications on the natural ecosystem and on the way of life of living beings. At the same time, focus on climate change aspects, including mitigation and adaptation is strongly recommended.

Sub-themes:

I: Weather around You

Weather is the immediate physical environmental spur and situation we face in our day-to-day life and it influences our decisions, like what to eat, what to wear, where to live, etc. However, rarely do we make a systematic effort to understand it better. Therefore, systematic approach for understanding weather of a locality/area will be the main concern of this sub-theme, which can help the children to make their decisions more precise and pragmatic, particularly adjusting with the weather conditions.

Such systematic studies can be carried out through methodological approaches of observation, measurement of weather attributes (like temperature, daily sun shine hours, humidity, wind, precipitation, etc along with other elements like presence of gaseous components, suspended solid particles, etc), analysis of collected information and results of measurement followed by forecasting and interpretation of findings and correlating the same with decision making context and processes. In doing so, children can also design and develop their own tools and instruments for measurement and analysis. However, there are many sources where daily weather information are available (like website of Indian Meteorological Department, News Paper, TV /Radio weather bulletin, etc), one can go for comparison of the collected with available information from such sources; time period based trend analysis and its impact in local context, etc.

Instead of simple information collection from secondary sources, analysis of long-term trends or some experimental and field based measurement of components must also be there in such study. Such trend analysis will make children understand the difference between weather and climate.

II: Impact of Human Activities on Weather and Climate

Human population has been growing in geometrical proportion in the last two centuries. Growing population and increasing consumption of goods and services per head after the industrial revolution requires in increasing manner environmental resources (life support systems like air, water, and soil and other natural resources) for its survival and sustenance. The pressure on these has also influenced the weather conditions and climate locally and globally. The growth in agriculture, animal husbandry, fisheries, urbanization, transportation, deforestation, and industrialization caused changes in land use and biogeochemical cycles. Exploration and utilization of energy sources for the increasing demands of the growing society have pumped large quantities of green house gases into the atmosphere causing global warming.

At the first level, children need to understand what greenhouse gases are and how they allow the radiated heat of the sun to come through at high temperature, but do not let the return radiation from earth at lower temperature to pass through easily. And how this warm blanket around us keeps us comfortable at the current earth's temperature, instead of freezing to death at minus 15 degC average. There also needs to be understanding of the Carbon cycle, the manner in which Carbon Dioxide, the major GHG, cycles between the earth and the atmosphere.

At the second level they need to understand that the trend has become clear in recent years that climate – the long term weather pattern – is changing and changing so rapidly that life forms on earth, including humans face a huge challenge in adapting to this change. (The last time the earth heated up by 2 degC, coming up to the current level from the ice age, it took 18,000 years. It is now set to go up by another 2degC within a matter of 200 years.)

The third aspect to realise is that this rapid increase is caused entirely by human activity – the activity of digging up millions of years of sunlight energy buried deep in the bowels of earth in the form of carbonaceous fuels, coal and oil, burning them in increasing quantities each year and sending up carbon dioxide, ever since the industrial revolution. This changing lifestyle has also resulted in other GHGs too going up in increasing quantities.

Children need to be made aware of the results of this human induced climate change such as weather disasters, disease spread, heat stress, drought, water shortage, crop yield decline, sea level rise, large scale migration and such other.

Children are expected to observe and analyse the human activities which contribute to weather and climate changes in their locality and they can review the situation, scientifically /logically design and propose alternatives to improve the human life as well

as control /reduce the negative impacts of human activities on weather and climate. Children also need to look at the impacts of human induced climate change or weather and climate related disasters like drought, cloudburst, landslide , flood, thunderstorm, cyclone, etc, which in turn could be linked to disease spread, stress due to heat and cold waves water shortage, crop yield decline, crop loss, weather and climate induced migration/refugee situations etc.

III:Weather, Climate and Ecosystems

Weather and climate have various significant elements such as Rain, Temperature, Wind and Humidity that impact the occurrence, abundance, seasonality and behaviour of living organisms as well as quality of air, water and soil. They have direct or indirect effect on the various components of ecosystems. With the variation of temperature, humidity and precipitation the quality of water, soil forming process, floral growth, and faunal composition may undergo change.

India's weather and climatic conditions change from region to region due to their geographical locations and other conditions; hence the parameters of weather vary from place to place. Due to such variations, the distribution of life forms, soil quality and water quality also vary from place to place.

All weather and climatic parameters affect the ecosystem elements in various ways. In turn, biotic elements influence the development of microclimate of an ecosystem. Phenology of plants, occurrence, populations, and behaviour of various floral and faunal elements change according to weather and climate. Disasters such as floods, droughts, unprecedented rains, inconsistencies in seasonal temperature etc on various ecosystems are the consequences of climate variability at a macro level

Under this sub-theme, we need to understand and observe the changes in weather parameters as well as the changes in biotic and abiotic parameters around us. This will enable us to study the effect of weather/climate on ecosystems. Systematic observations, measurement, and analysis of weather parameters and the biotic and abiotic elements make us understand effect of these parameters on the functioning of ecosystem.

There is a need to study basic elements of weather first, viz. temperature, air pressure, wind, humidity, and precipitation etc., before concentrating on the impact assessment or relationship observation with abiotic and biotic component.

The projects encompassing effect of weather parameters on abundance of flora and fauna and seasonality, movements, breeding, feeding and other behavior patterns falls under this subtheme, Behaviour of animals, seasonality of occurrence and flowering of plants, migration of animals, birds, fishes and insects etc are climate dependent.

Similarly, variable weather conditions can affect quality of air, water and soil which in turn affect biotic elements. Some of the changes such as pH, amount of dissolved salts, organic matter in soil and water etc. are measurable. Quality of air in terms of pollutants such as Carbon dioxide, methane, NOX content is measurable.

Simple experiments can be conducted on the effect of light period, light intensity, atmospheric temperature, humidity and soil moisture on growth of plants. Stomata count as surrogate for the production of Oxygen, Rate of Carbon sequestration in different urban and rural situations etc. also can be done by the children.

IV: Weather, Climate, Society and Culture

Weather and climate determine the physical environmental condition of an area through their impact on abiotic and biotic elements and that condition in turn influences human way of life in the forms of belief, livelihood, and social, institutional, as well as cultural practices. These together reflect the social and cultural system of a locality/area/region. The social and cultural systems have an adaptation mechanism to local weather and climatic situation through their practices fulfilling basic needs of food, shelter, and clothing through designed livelihood activities, food system, settlement and housing, management of natural resources etc. However, there are many practices associated with social and cultural system, which have negative impact on natural resources and in turn responsible for anomalies of weather and climate, such as human induced climate change. On the other hand there are many examples that human beings face up to extreme weather situations through their social and cultural practices based on Indigenous Knowledge and try to cope up with such weather conditions and disasters.

In broad perspective, this sub-theme will cover issues for systematic studies, like, local food practices, its seasonality and adjustments to weather situation, local calendar system and agricultural cycle and adjustments with weather, flood/draught adjustment approaches of different community/ locality, traditional knowledge on weather prediction, cultural practices, modern consumption practices and their impact on ecosystem and further impact on climate patterns etc. Studies taken up would try to establish the science behind these practices and the societal efforts to adapt to as well as to mitigate climate change. They will also include how disparities in income influence causative factors of climate change such as carbon footprint (or emission of greenhouse gases) and the adaptation and mitigation measures.

V: Weather, Climate and Agriculture

Agriculture is the backbone of our country. Weather and climatic condition determine all the aspects of agricultural practices, which is very much vivid in all agro- climatic regions of the country.

In present day context, agriculture is most vulnerable to weather and climate changes because of its seasonality and narrow range of weather conditions influencing crop and livestock production. Last several decades people across the globe witnessed above normal temperatures and more rapid warming that occurred during the last half of the 20th century. Climate change presents a profound challenge to food security vis-a-vis livelihood and development all around as well.

As an effect of climate change, heavy rainfall events increased resulting in floods, and more intense droughts occurred affecting agricultural and allied sectors (cropping cycle, population, and density of pollinators, flowering pattern, agricultural produce including animal production etc). On the contrary, modern agricultural practices (both above and below the ground) also play vital role in spurring climate change through release of green house gases, depletion of soil carbon, desertification, salinization etc. Under this sub-theme, children can observe changes in the weather regulating factors and their impact on agricultural system in their own area and find out some method/technique to mitigate. Moreover, there are many practices related with seed selection, irrigation, soil management etc., which help in adaptation process.

Children can also carry out studies in different aspects of agriculture, right from seed selection, land preparation to harvesting and processing etc. It may be on how weather conditions influence our agricultural practices; impact of changing conditions on agriculture; impact of agricultural practices on local weather conditions, how to overcome

the adverse climatic weather condition for agricultural practices. Age old practices in agriculture in different areas and how these are related to local weather conditions can also be studied.

Sub-theme – VI: Weather, Climate and Health

Weather and climate influence environmental and social determinants and also affect health of the living beings. Health - as defined by World Health Organization is a state of complete physical, mental, and social well being and not merely absence of disease. Health, whether of human or animal, mainly depends on safe drinking water, nutrition, sanitation or hygiene and the like.

Likewise, any variation in weather or climatic conditions adversely affects the health of living beings. Outcome of these changes - heat or cold waves, drought or flood, storms etc., new bacterial and viral spread due to increasing temperature - takes its toll on health, manifested by occurrence of diseases, or even sometimes an outbreak of epidemics.

In the light of the fact that weather and climate have potential impact on the health of human beings and animals, child scientists can undertake studies to understand the causative factors, the concerns arising and the corrective measures to be adopted to lessen the adversity. Ailments like water / air / vector borne diseases (diarrhoea, malaria..), infections (bacterial or viral...) and infestations (parasitic..), zoonosis, reemergence of certain diseases and others which are influenced by the variability of weather and climate are some of the areas for the child scientists to ponder upon and take up project works.

SUB THEMES – PROJECT IDEAS

I. Understanding Weather around you.

1. To study and analyze urban heat islands in your locality

2. Studies on micro-climatic variations in different eco systems in your study area.
3. Analysis of monsoon rainfall of past and present period for your locality.
4. Studies in wave erosion consequences in beaches of your locality (for coastal regions)
5. Setting of low cost weather station and analysis of data generated and comparison with weather station data for your area.
6. Studies on wind speed and direction in various sites of your locality in relation to weather data.
7. Establishment of micro-meteorological stations with local, low cost, available assets to observe and study the weather of a particular catchment area/locality and compare the data with secondary data from weather stations.
8. Study of landslides – mapping vulnerable points, reasons thereof for, study of exotic and indigenous plant species on landslides and correlating the various factors leading to landslides
9. Study of cloud bursts in terms of intensity, impact and coping mechanisms in a select area.
10. Study of cyclones and its impact – prevalence, frequency, and weather preceding and after the incidents.
11. When do you find whirl wind? Study its frequency, intensity and impacts.
12. Study of the impact of hail storms (as happened in 2014 in Maharashtra).
13. Study of weather pattern and shifting monsoons and other phenomenon with consultations with elderly people and correlation with historical data as well as measurement current weather parameters.
14. To study the variations of local weather conditions influenced by topographical features.

15. Study of the relationship between different types of weather and precipitation.
16. Analysis of rainfall trends (if possible probability of occurrence)
17. Moisture availability in a locality in different seasons
18. Study on diurnal of temperature variation under different land-uses
19. Study of temperature variations in an aquatic system
20. Study on characteristics of land and sea breeze and its impact on erosion of sand in Coastal area.
21. Comparative study on atmospheric, soil and water temperature in a locality.

II. Impact of Human activities.

1. Studies on heat production by air condition systems in any study area and analyzing alternatives.
2. Estimation of temperature in industrial / mining areas and its impact.
3. Monitoring air and water pollution in your locality.
4. Comparison of nature of houses (in terms of materials used, ventilation etc.) their design in terms of heat absorption and other weather parameters.
5. Study the impact of developmental activities on the micro climate/weather of your locality and compare the data with nearby areas not affected by the developmental activity.
6. Study the impact of vehicular pollution on micro climate at tourist destinations with reference to pre-tourist seasons, tourist season and post tourist season.
7. To study the carrying capacity of micro water sheds / local entrepreneurs in assisting pilgrims/tourists on religious routes and study seasonal variations, damages to eco systems, pollution etc.

8. Study the solid waste random disposal /landfill and its effect on nearby water resources and remedial measures.
9. Study the change in land use and land cover in your areas and its impact on climatic conditions.
10. Effect of coral and sand mining from sea shores and its changing impact with changing weather.
11. Study the impact of over exploitation of sand mining on various environmental parameters like water table, temperature of water in water bodies, change in quality of water, (physical, chemical, biological parameters) and larger impact on cropping/agriculture, livelihoods.
12. Impact of changing weather, climate on the mangrove forests, density, eco system as a whole.
13. Impact of glass claddings in modern buildings – study of micro climate inside versus ordinary buildings.
14. Impact of charcoal making (Prosopisjuliflora) on wild life.
15. Study the impact of multi-storied buildings on the local wind velocity and sunlight intensity, temperature, humidity etc.
16. Study on desertification and salinization of land/soil
17. Comparative study on soil health in jhum cultivated and normal land

III. WEATHER, CLIMATE AND ECO SYSTEMS

1. Studies on micro arthropods /flora and fauna profiles and its seasonal variations in your study area.
2. Animal behavior as weather indicators – Collection of traditional experience and scientific validation.

3. Study of the growth rate of invasive (example Parthenium) species and its seasonal variations in your area and studying their adaptation capacities for adverse weather conditions in comparison to major crops.
4. Study of group migration of animals/birds/fish/plants and correlating the same with observed weather change / extreme weather events.
5. Study of Pond/Lake eco systems – temperature, water levels with reference to rain fall, study of life forms during various seasons (fish, frog, fresh water snakes, birds, aquatic plants, quality of water across seasons / varying temperatures / varying turbidity, etc.
6. Study of sacred groves – seasonal variations of life forms biomass, micro climate studies, interrelationships within the eco system, etc.
7. Study of coastal eco systems – Change of tides, High Tide Line, Low tide line over the years and its impact on coastal eco system, life forms, habitats etc.(Can be carried out as a combination of measuring tides – measured over two to three months - and also oral interviews with elderly fishermen in the area)
8. Study the impact of temperature variation on floral diversity and behavior of plants in an area.
9. Study of phonological changes in a rich biodiversity area with respect to changing weather/season.
10. To study the role of lichens with respect to climate change/weather and biodiversity in a select area.
11. Study of flora and fauna of a wetland in your locality and study seasonal changes if possible.
12. Study of aquatic and terrestrial ecosystems in terms of physical, chemical and biological parameters with respect to seasonal changes.
13. Study of shells and shell fragments from sea beaches and study seasonal variations in their diversity.

14. Study of fish catch in a coastal area and study the seasonal variations, quantum of catch and economic implications with respect to changing weather, seasons. (also oral interviews with elderly fishermen in the area)
15. Study of corals in terms of bleaching etc. with respect to changing weather, seasons.
16. Study of primary productivity in a pond ecosystem.
17. Study of carbon sequestration in pond/lake eco systems by studying bottom sediments.
18. Study of carbon sequestration in forest/grasslandsoil.
19. Study/measurement of canopy cover in different seasons of a forest (alternatively dense vegetation, sacred groves, large trees, school campus, parks etc.)
20. Study of a tree as an eco system more specifically a habitat – seasonal changes and changing diversity in niche specialization.
21. Study of sediment transport in a drainage channel/catchment by stakes-high measurement over seasons. (Eutrophication)
22. Impact of climatic variations of agro-forestry in an area.
23. Impact of rainfall variability on production of crops of an area.
24. Study of insect diversity of a grassland eco system (alternatively in wet land / dry land etc.)
25. Estimation of biomass in a grass species over the seasons.
26. Study of cow dung droppings and its disintegration as an indicator of soil microbial health.
27. Estimation of micro fauna of a desert eco system.
28. Study of bird migration due to weather / climate shift.
29. Study of changing housing patterns on sparrow population in a city.

30. Study of wetlands reclamation and its impact on micro climates, birds and other life forms – seasonal studies.
31. Study the impact of salty rains on the loss of grasslands in Banni region in Gujarat,- impact of weather and climate.
32. Study the impact of changing weather and climate on the eastern Himalayan glaciers
33. Study of local streams and seasonal variations and its impact on local agricultural practices. (Flow rates can be studied as small experiments)
34. Study on impact analysis of deforestation on soil and nutrient loss due to heavy rainfall and runoff in a simulated situation.
35. Study on earthworm, wasp, ant and other insects under changing environment due to change in climate and weather.
36. Litter disintegration studies in monocrop and multicrop soils
37. Impact of agricultural practices on soil faunal density and diversity
38. Soil faunal migrations in water logged paddy fields.... (premonsson - monsoon - post monsoon)
39. Crustacean larvae in estuaries.... (premonsson - monsoon - post monsoon)
40. Human adaptation in various ecosystems to food and livelihood....

IV. Society and Culture.

1. Studies on traditional knowledge and weather forecasting in your study area.
2. Scientific analysis of festivals in terms of weather in your locality and neighborhood and comparison.
3. Study of seasonal food practices and its availability in terms of weather in your locality
4. Study of weather related folklore and proverbs of your state/area.

5. Analysis of school attendance in relation to weather / weather extremes and correlating to socio-economic background of absentees in the last 5 years.
6. Study of various types of firewood used and amount of soot production (studies related to quantification of the same) in your area.
7. Study of folk taxonomy and traditional knowledge of a particular area and linking them to traditional medicine / cultural values, practices etc.
8. Study of climate change/weather extremes and adaptation practices of the people and their culture in high altitude areas.
9. Study the merit of traditional houses in terms of weather parameters.
10. Effect of cultural / religious activities/functions on eco system in your locality.
11. Comparison of fishing activities, food, transportation during monsoon and other seasons in Lakshadweep region.
12. Traditional methods of predicting rains like movement of ants, height of crow's nest from ground.
13. Comparison of crop calendars of present and past and study the impacts on food habits and culture.
14. Identification, documentation, and validation of indicator plants related to soil moisture status, ground water availability, etc.
15. Study on indigenous methods of rainwater harvesting.

V. Agriculture.

1. Using sun's heat to dehydrate vegetables to prolong their shelf life and get a better price.
2. Study on the effect of different sowing dates on the growth, flowering and yield of paddy (or of any other crop)

3. Impact of pollution on plant and soil health
4. Study of climate, weather versus vegetation changes in an area.
5. Organic versus in-organic agriculture – Comparative Studies related to performance in adverse weather and climatic conditions.
6. Study of traditional water harvesting and irrigation techniques and their relevance in changing weather and climatic conditions.
7. Impact of micro climate on various parameters of a crop including yield, total biomass production etc.
8. Effect of late monsoon on cropping pattern in your locality.
9. Change in irrigation pattern due to change in climatic conditions.
10. Impact of rainfall and temperature on horticulture and agricultural crops with special reference to Apple scab disease.
11. Analysis of parameters of weather conditions on controlled and open agriculture.
12. Measuring the water holding capacities of terraces in hills/micro water sheds and relating this to growth of vegetation/crops on different terraces.
13. Study the effect of strong winds on banana plantations, and the reducing the impact (quantification of reduction) by tying leaves of banana plants in the Narmada belt in Central Gujarat.
14. Study the effect of “rab” method – burning dried leaves, twigs, bark, cow dung cakes soil layer etc which is a practice of soil preparation during March throughout Konkan area of Maharashtra before sowing rice.
15. Study effect of changing weather on flowering pattern and fruit production in Alphonso mango which is a cash crop in Konkan region of Maharashtra.

16. Study the performance of different varieties of different crops which are adapted to extreme weather conditions like drought or water logging, increased temperature etc.
17. Comparative study of mixed cropping systems with that of mono culture in terms of total yield, total biomass yield, soil fertility etc. before and after cropping.
18. Study of mixed grains agriculture in Kutch region of Gujarat (Mixed grains are Isabgol, Jeera, Til, Jowar, Moong and Bajra which are sowed together. As the weather changes, different crops grow at different times depending on the gestation period of them. Effect of weather and climate on yield can be studied. This kind of method is called "sukhikheti" which does not need irrigation and tilling carried out by camels).
19. To measure impact of sunlight on the growth of crops in different types of soil.
20. Study the impact of changing weather and climatic conditions on Makhana/Sugarcane cultivation in North Bihar and UP.
21. Study of traditional agricultural practices of past and present practices in terms of changing weather.
22. Analysis of seasonal /perennial crops production in various weather conditions.
23. Analysis of milk density in different weather conditions in your locality.
24. Assessment of food habits of traditional people in view of possible supplement to food security
25. Study of the impacts of weather and climate change on traditional agricultural practices.
26. Study of salt farms in coastal areas of Kutch in different seasons.
27. Study of soil moisture retention and comparing them under mulching, drip irrigation etc.
28. Study of cropping pattern of a particular region as influenced by different seasons in the year (why a particular crop is grown in a particular season only?), effect of weather parameters on various crop stages.

29. Study of performance of hybrid livestock versus traditional livestock in terms of input costs versus output.
30. Study of effect of heavy rainfall on different crop stages and its effect on production.
31. Study of the effect of dry spells on different crop stages and ultimate effect on production.
32. Study of soil parameters (physical, chemical and biological) in changing weather extremes and its correlation with plant production, crop yields etc.
33. Study of seasonal milk production of various breeds of livestock in the same region – inputs costs versus milk output.
34. Study of different agricultural practices in relation to weather and climate (tillage, land preparation, sowing, transplanting, weeding, harvesting and post harvest in relation to local calendar systems.
35. Study of recommended practices (Agricultural University, KVK etc.) like ideal dates of sowing, distance of planting, pest/disease calendar etc. and documenting actual practices in field and their rationale with reference to changing weather/climate.
36. Effect of changing weather and climate on crop diseases, pest occurrence, emergence of old diseases/pests, whether minor pests emerging as major pests etc.
37. Study of different weeds with reference to changing weather on occurrence, growth, flowering and reproduction (overall life cycle)
38. Studies on effect of weather and climate on different crops/grain storage techniques/practices.
39. Study of modern agricultural practices which contribute for increasing levels of GHGs – eg. Deep ploughing, using high inputs like chemical fertilizers, pesticides, weedicides, farm machinery etc.

40. Study of innovative crop practices adapting to changing weather, climate and identifying components which are critical for improved performance in adverse weather and climatic conditions.
41. Study of sericulture in changing weather/climatic conditions.
42. Study of changing weather and climatic conditions on floriculture.
43. Comparative study of System of rice intensification (SRI) of paddy cultivation with conventional paddy cultivation with respect to less water intensive method.
44. Study of impact of weather and climate change in the traditional paddy cum fish culture in the Zino valley of Arunachal Pradesh.
45. Study of Jhum cultivation and its impacts on change of weather and climate of your locality.
46. Study of the practice of burning the stock of sugar cane on the next crop in Tamilnadu.
47. Study the impact of biochar on crop growth and soil parameters.
48. Study of short term vegetable cultivation versus long term crops as a strategy to cope with changing weather/ climate. (green vegetable cultivation).
49. Residual moisture based farming – Suitability for post monsoon crop.
50. Analysis of yield and quality of spices due to weather/climate change in hilly regions with special relevance to onset of South west monsoon.
51. Comparison of seasonal crop calendars and their variation within an agro-climatic zone – regional variations and differences and their rationale.
52. Comparative study on crop performance through hydroponics and normal crop production system.
53. Study on yield advantage of mono cropping and mixed cropping
54. Harvesting of rain water and its re-use

VI. Health

1. Study of weather related diseases in your locality – incidence, spread, treatment, expenditure, loss of livelihoods and correlation to socio-economic conditions of those affected.
2. Mapping of tropical diseases in terms of weather and finding out the vulnerability in terms of geography (landscape), social, economic and cultural factors of those who are more prone to the diseases.
3. Hospital based studies related to weather and climate and correlating with field level studies.
4. Analysis of agricultural / horticultural/ ornamental/cash crops in terms of weather extremes/climate change.
5. Mapping of vector borne diseases in your locality with special reference to re-emergence of certain diseases, mapping more vulnerable areas and linking them to health, sanitation etc.
6. Study the emerging diseases in higher Himalayan regions and correlate the same to temperature, rainfall and other weather parameters, climate change.
7. Participatory Village level mapping of your locality with reference to landscape, naturalresources, health and sanitation facilities, vulnerable localities for epidemics and making a people plan for interventional strategies with pre and post intervention impact studies.
8. Study / documentation of working policy planning of various line departments with respect to onset of monsoon, weather extremes, disease incidence and strategies for coping with epidemics and finding out the efficacy of such plans and suggesting changes/modifications in a scientific manner.
9. Study of pattern of common diseases in the general population in relation to changing local weather conditions including seasonality, frequency etc.

10. Study of various skin diseases in the last three years in your locality related to changing weather, climate etc.
11. Study the quality of air in various environs – crowded, slums, textile industries, fly ash handling areas, bricks and cement industry etc. and study the seasonal variations.
12. Study the impact of weather and climate on food, fruits, vegetables, fish etc. and their durability during various seasons/weather.
13. To study the impact of changing weather / climate on industrial areas (thermal plants, stone crushing industry, textile, steel, glass industries etc.) on health and livelihood losses.
14. To study the impact of humid weather on skin related diseases/infections.
15. Prevalence of nature of disease in domestic animals as an effect of weather and climate.