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Puducherry Projects

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PREFACE

Pondicherry Science Forum (PSF) have been organising the
Children’s Science Congress for the past 21 years in Puducherry Union
Territory and this year has been the 22nd Children’s Science Congress.
Initiated by the National Council for Science & Technology
Communication (NCSTC), Department of Science & Technology,
Government of India, PSF has been consistently improving the quality
and outreach of the programme. Out of the four enclaves of the Union
Territory we have good presence in three of the regions namely, Mahe,
Karaikkal and Puducherry. Yanam needs to be brought into the fold
and we hope in due course of time we would be able to reach out to
Yanam as well.

The peculiarity of Puducherry UT in terms of NCSC has been that
we deal with English, Tamil and Malayalam language projects. Also
these areas are geographically separate and far away as well. Still,
PSF has successfully carried out the programme this year also. Every
year, we have been improving our tally of projects and as well as we
have been giving additional attention to mentoring of the projects at
the district as well as state level.

In addition to the normal schedule of the NCSC, for the last three
years we had provided an additional opportunity for the students those
who had participated in the Childrens Science Congress by organising
Children’s Science Festival for five days in different regions of UT of
Puducherry. There is also another opportunity for the Government
school child scientists which is that If they are willing, they can work
further in the CSC project topics and participate in the Make Science
competition which is organised every year by the Pondicherry Science
Forum in collaboration with the University of Paris South 11, France

This year another memorable event for PSF is the making of
Activity Guide Book for the entire nation with the Topic Understanding
Weather and Climate. I congratulate Sri. T.P.Raghunath who is the current Chairman of the National Academic Core Committee for the years 2014 & 2015.

We are very grateful to NCSTC, Department of Science and Technology, Govt. of India for the support given to publish this book. I take this opportunity to place my gratitude to those who helped to organize the CSC in Puducherry in different capacities such as Guide Teachers, Resource Persons, Evaluators, and Organizers. As usual B. Ravichandrane and M. Sudurshan have edited this book this year also. Congratulations to them. I record my special thanks to Sri.E.Vallavan, former Director and, Sri.L.Kumar, Current Director of School Education and Sri. V.Ranganathan, Officer on Special Duty for their help in organizing Children’s Science Congress. We are also grateful to Presidency Hr. Sec. School, Reddiyarpalayam and DSE for having contributed halls for venues of CSC.

I convey my gratitude to the RVPSP, Dept. of Science and Technology, Govt. of India for their catalytic role and support given for publishing this book.

This year is a memorable one for Puducherry as one of the national level participants from Puducherry (A study on the effect of weather in plant growth in barren soil using different soil amendments: Team Leader: V. AMRITHAMONICA) was adjudged as one among the 20 Outstanding Projects and another Project (Impact of season on butterfly abundance and species diversity in five localities : Team Leader: APARNA MADHUSOODANAN) was adjudged as the Best Poster Presentation Project from Puducherry UT. Congratulations to both the teams and also their team members and Guide teachers.

A.Hemavathi
General Secretary
Pondicherry Science Forum

NATIONAL CHILDREN’S SCIENCE CONGRESS
Organised by
NCSTC Network

Catalysed and Supported by
Rashtriya Vigyan Evam Prodyogiki Sanchar Parishad
DST, Govt. of India

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THANKS TO THE EVALUATORS…..

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<td>Dr. S. Manikandan</td>
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<td>Dr. V. Sundaram</td>
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<td><strong>Mahe</strong></td>
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<td>Prof. C. Baskaran</td>
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<td>Prof. M. Bhaskaran</td>
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<td>Sri. A. V. Surendran</td>
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**State Level at Puducherry**

Dr. R. Gopal
Dr. R. Madivanane
Dr. V. Muthu Viveganandavel
Dr. K. Sambandan
Sri. A. Vinayathan
Prof. D. Satishkumar
Smt. P. Sobana

**INTRODUCTION**

The National Children’s Science Congress is organized since 1993 with the support of National Council of Science and Technology Communication (Rashtriya Vigyan Evam Prodyogiki Sanchar Parishad - RVPSP), Department of Science and Technology, Govt. of India.

Every year during the last five days (27-31 December) the National Children’s Science Congress (NCSC) is organized at any one of a town in India. Children of age group of 10 -17 do projects in groups under the guidance of an elder and submit in the District Congress and then State Congress if selected. Finally the team leaders of the selected projects from all the states come to NCSC. The Theme for 2014 and 2015 “Understanding Weather and Climate”. The 22nd National Children’s Science Congress for the year 2014 was held at SJB Institute of Technology, Kenjeri, Bengaluru, Karnataka.

**In Puducherry**

In the Union Territory of Puducherry the Children’s Science Congress Project is implemented by Pondicherry Science Forum, member organization of NCSTC network with the support of the State Training Centre, Directorate of School Education, Puducherry.

**State Level Workshop**

State level workshop was held on 7th & 8th June 2014 at PSF Office. 16 Persons participated in the workshop from three regions of Puducherry U.T.

**District Level Workshops, Puducherry**

The District Level Guide Teachers’ Training workshop was organized on 16th July, 2014 at STC Hall, DSE, Puducherry.
teachers participated in the training programme. The District Level CSC was organized on 28th October 2014 at Presidency Hr. Sec. School, Reddiyarpalayam, Puducherry. 98 projects were presented.

**Karaikal**

The District level Guide Teachers’ Training was organized on 18th July 2014 at Conference Hall, Office of the CEO, Karaikal. 28 Teachers participated in the training. The District level CSC was organized on 29th October 2014 at Conference Hall, of the CEO, Karaikal. 85 projects were presented.

**Mahe**

The District Level Guide Teachers’ training programme was organized on 1st August 2014 at Conference Hall, Office of the CEO, Mahe. 19 Teachers participated in the training. The District level CSC was organized on 31st October 2014 at Conference Hall, Office of the CEO, Mahe. 18 projects were presented.

**State Level Congress - 2014**

The State Level CSC was held on 18th and 19th November 2014 at Conference Hall, DSE, Puducherry. In the state congress totally 30 projects were presented. Among these 6 projects were selected for the National Level. The team leaders of the selected projects participated with two guide teachers in the National Level. In addition to National level, two students - one each from Junior level and Senior level participated in the Indian Science Congress, held at University of Mumbai, Mumbai, Maharashtra, from 3rd to 7th January 2015.
Selected participants for the 22nd National Children’s Science Congress - 2014 held at SJB Institute of Technology, Kengeri, Bengaluru, Karnataka during 27th – 31st December, 2014

**Child Scientists:**
1. AMRITHA MONICA. V - St. Joseph of Cluny Hr. Sec. School, Puducherry (National Award: One among the 20 Outstanding Projects at National Level).
2. APARNA MADHUSOODANAN - CE Bharathan Govt. Hr. Sec. School, Mahe (Won the National award : Best Poster Presentation from Puducherry UT)
3. AJAY KRISHNA. R - Petit Seminaire Hr.Sec. School, Puducherry
4. SUBITSHAA. S - St. Patrick Hr. Sec. School, Puducherry
5. ARAVIND.P - Regional Perfect Hr.Sec. School, Karaikal
6. RAKESH.C - Petit Seminaire Hr.Sec. School, Puducherry

**Escort Teachers:**
1. A.ATHIRA,TGT - St. Joseph of Cluny Hr. Sec. School, Puducherry
2. A.BALACHANDAR, Lecturer - Regional Perfect Hr.Sec. School, Karaikal

**Coordinators:**
1. B.RAVICHANDRANE, State Coordinator, NCSC, Puducherry
2. M.SUDURSHAN, State Academic Coordinator, NCSC, Puducherry
SELECTED PARTICIPANTS FOR THE 102ND INDIAN SCIENCE CONGRESS-2015 HELD AT UNIVERSITY OF MUMBAI, MUMBAI, MAHARASHTRA DURING 3RD TO 7TH JANUARY, 2015

CHILD SCIENTISTS:

1. A.VIGNESHKUMAR - Petit Seminaire Hr.Sec. School, Puducherry
2. R.MATHESHWAR - Regional Perfect Hr.Sec. School, Karaikal

ESCORT TEACHERS:

1. I.PETER GEORGE, TGT - Petit Seminaire Hr.Sec. School, Puducherry
2. B.RAVICHANDRANE, TGT, TKRSP Govt. Hr. Sec. School, Koravelimedu, Puducherry

INTRODUCTION:

Desertification is land degradation due to climatic variations and human activities. It leads to poor soil quality, reduced rooting depth and loss of nutrients. Being in a coastal area, Puducherry our study location is frequently affected by climatic variations and the barren lands in Puducherry have dry and porous soil poor in nutrients. Reforestation, provisioning of water, holding of soil and hyper-fertilizing the soil with organic manure can mitigate desertification. Besides supplying nutrients, manure condition the soil, retain moisture levels and reduce runoff of nitrates in the soil. So it was decided to do a project based on the subtheme: Weather and Agriculture.

In this study four common manures namely Vermi compost, Urban food waste compost, Coir pith compost and Farmyard manure (FYM) were used. We also evaluated a biochar based manure, Synthetic Terra Preta (STP). Terra preta is a very dark, fertile, anthropogenic soil found in Amazon basin with very high charcoal content formed by a mixture of biochar, bone and blood.
and manure, STP, a manure thought to replicate the original materials was produced by mixing biochar with fish waste and urban food waste compost.

**OBJECTIVES:**
1. To analyze the contents of a barren soil sample collected from Puducherry.
2. To assess the impact of different amendments in improving barren soil.
3. To study the effect of weather parameters (Temperature, humidity and rainfall) on the growth of plants in loamy and barren soil with different amendments.
4. To study the role of Synthetic Terra preta (biochar based manure) in improving the soil.

**METHODOLOGY:**
- **Preparation of Synthetic Terra Preta (STP):** 15 kg of Biochar, 200gm of *Pleurotus* fungus (for fast decomposition), 3 kg of fish waste and 15 kg of urban food waste compost were taken, laid in layers in a jute sac and left for decomposition for 30 days.
- Barren soil was collected from Ganapathichettykulam a rural area in Puducherry. Loamy soil, Vermi compost, Urban food waste compost, Coir pith compost and Farmyard manure (FYM) were procured from KVK, Puducherry.
- 1 ½ kg of soil was mixed with 1 ½ kg of soil amendment for each pot. Triplicates were taken for each amendment mixed with soil and control (18 for loamy soil and 18 for barren soil). The pots were arranged in an open area and exposed to local weather factors. Two brinjal saplings were planted for each pot (on 20.9.2014) and watered daily.
- Growth parameters like 1. Height of the stem (using measuring scale) and 2. No of leaves were noted from 21.9.2014 to 8.11.2014 on weekly intervals. Leaf area of the largest leaf in control soil and in each amendment was measured using graph sheet on the 8th week (8.11.2014).
- Weather parameters like temperature, humidity and rainfall from 21.9.2014 to 8.11.2014 were noted from “www.worldweatheronline.com”. The weekly maximum and minimum temperature and humidity and total rainfall preceding each date of measurement was calculated and used for analysis.
- After the mentor session on 29.11.2014 soil samples of control Barren soil and its various amendments were given for soil testing in KVK and their bulk density (bd) was measured and tabulated.

**RESULTS AND DISCUSSION:**
1. **Analysis of Barren Soil and its Soil Amendments:**

**TABLE 1:** Soil Test Report of Barren soil and its amendments and Bulk density.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Control Barren Soil</th>
<th>Vermi Compost</th>
<th>Urban Food Waste Compost</th>
<th>Farmyard Manure</th>
<th>Coirpith Compost</th>
<th>Synthetic Terra Preta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil pH</td>
<td>6.80</td>
<td>6.18</td>
<td>6.51</td>
<td>6.23</td>
<td>6.56</td>
<td>6.48</td>
</tr>
<tr>
<td>Soil EC dSm⁻¹</td>
<td>0.104</td>
<td>0.197</td>
<td>0.040</td>
<td>0.123</td>
<td>0.078</td>
<td>0.136</td>
</tr>
<tr>
<td>Nitrogen KgHa⁻¹</td>
<td>179.2</td>
<td>156.8</td>
<td>145.6</td>
<td>190.4</td>
<td>224</td>
<td>235.2</td>
</tr>
<tr>
<td>Phosphorous KgHa⁻¹</td>
<td>6.08</td>
<td>42.18</td>
<td>39.11</td>
<td>39.25</td>
<td>12.96</td>
<td>38.29</td>
</tr>
<tr>
<td>Potassium KgHa⁻¹</td>
<td>82</td>
<td>134</td>
<td>295</td>
<td>221</td>
<td>175</td>
<td>344</td>
</tr>
</tbody>
</table>
From the Soil test report, though the barren soil pH and salinity were normal, plant growth will not be supported due to low nutrient content (N,P,K) and low count of Bacillus. When manure was added significant improvement of available Nitrogen (STP, Coirpith compost, FYM), Potassium (STP, Urban food waste compost, FYM) and Phosphorus (Vermicompost, FYM, STP) levels were seen. The level of useful microbes improved with all the soil amendments. All the soil amendments reduced the bd of the barren soil significantly which helps in better root penetration.

2. **The impact of different amendments on plant growth in barren soil**

**TABLE 2:** Growth parameters in Barren soil.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total growth in Height (cm)</th>
<th>Total growth in Leaf Number</th>
<th>Leaf Area (sq.cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vermicompost</td>
<td>37.2</td>
<td>6.7</td>
<td>83.75</td>
</tr>
<tr>
<td>Urban Food Waste compost</td>
<td>19.7</td>
<td>3.3</td>
<td>61.25</td>
</tr>
<tr>
<td>Farmyard Manure</td>
<td>33.6</td>
<td>6.5</td>
<td>67.25</td>
</tr>
<tr>
<td>Coirpith compost</td>
<td>24.5</td>
<td>4.3</td>
<td>62.25</td>
</tr>
<tr>
<td>Control</td>
<td>8.9</td>
<td>2.6</td>
<td>48.5</td>
</tr>
<tr>
<td>Synthetic Terra preta</td>
<td>35.8</td>
<td>7.7</td>
<td>77.25</td>
</tr>
</tbody>
</table>

When different manure and composites were added improvement in plant growth of about 3 to 4 times the control was noted. Maximum improvement in plant growth was seen with STP, Vermi compost and FYM as they are rich in nutrients (N,P,K), soil microbes and can improve soil structure and water holding capacity. Urban food waste compost though it is rich in nutrients and humus needs a matrix, hence may not be very useful in barren soil with poor soil texture.

3. **Analysis of weather parameters**

**TABLE 3:** Weather Parameters from September 21 to November 8 of 2014.

<table>
<thead>
<tr>
<th>Weather Parameter</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (centigrade) Max/Min</td>
<td>37/26</td>
<td>36/26</td>
<td>37/23</td>
<td>36/26</td>
<td>33/25</td>
<td>33/24</td>
<td>36/22</td>
</tr>
<tr>
<td>Humidity (%) Max/Min</td>
<td>84/63</td>
<td>83/58</td>
<td>82/59</td>
<td>86/55</td>
<td>88/67</td>
<td>86/60</td>
<td>83/46</td>
</tr>
<tr>
<td>Total Rainfall (mm)</td>
<td>32</td>
<td>33</td>
<td>58</td>
<td>77</td>
<td>158</td>
<td>51</td>
<td>34</td>
</tr>
</tbody>
</table>

Between week 4 to week 6 due to the onset of monsoon the plants were exposed to high rainfall (a total of 286 mm), high humidity (max 88%) and lower temperature (max 33°C, min 24°C).

4. **Effect of weather parameters on the growth of plants in loamy and barren soils with different amendments**

When plant growth rate was analysed with weather, overall plant growth rate declined sharply at week 4 due to onset of high rainfall. STP and Vermi compost showed consistent improved growth rate even afterwards, possibly due to slow release of nutrients. Coir pith compost performed well during dry climate as
it has high water holding capacity five times its dry weight, while the same could have led to declining plant growth rates during high rainfall period. FYM performed well in the later wet part of the study which may be due to the sustained release of Nitrogen as it decomposes over a period of time which may not be directly related to the climatic change.

5. **Role of Synthetic Terra Preta**

The porous structure of biochar in STP reduces bd, improves moisture content and supports better retention and sustained release of nutrients. Hence, STP was able to perform efficiently in both the soils in varying weather conditions.

**CONCLUSION**

- Barren soil collected had poor nutrients and high bd, thus unfit for plant growth.
- To convert barren land into cultivable land Vermicompost, STP and FYM are recommended as they recharge the nutrients in plenty due to their inherent nature.
- STP and Vermicompost performed efficiently in varying weather conditions.

5. **FUTURE PLAN**

- Transfer the results to the farmers and local people in desertified areas.
- Validate the role of STP (biochar based manure) in larger studies.

**ACKNOWLEDGEMENTS**

We acknowledge Dr. Vijayakumar, Entomologist and the staff of Krishi Vigyan Kendra, Puducherry for valuable suggestions and support.

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**2. IMPACT OF SEASON ON BUTTERFLY ABUNDANCE AND SPECIES DIVERSITY IN FIVE LOCALITIES**

**APARNA MADHUSOODANAN,**

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Arundhati U. P.
Vaishnav Kumar
Rohan Rajeev
Guide Teacher: **Minija Janardhanan,** TGT

C. E. Bharathan Govt. Hr. Sec. School, Mahe

**INTRODUCTION:**

Butterflies are the most conspicuous, fascinating and colourful insects. Due to their attractiveness and omnipresence they have acquired a niche in the prose and poetry of various cultures. They are among the most easily observed insects and perhaps no other groups of insects in India has been studied and described in detail. The study of butterflies is the key to the study of nature, climate and our environment. The ideal animals suited to study the effect of seasonal change or climate change are animals dependent on external sources for heat. For this reason we have selected butterflies to know how variations in temperature, season and climate affect their population. Our study was started with a view to examine the dynamics of butterfly population, dominant species, species diversity, and their ecoclimate. A butterfly is a winged insect belonging to the Phylum Arthropoda. In the animal kingdom this phylum includes creatures which have jointed limbs and a hard exoskeleton. The phylum is divided into 5 major classes. Butterflies and moths belong to the class Insecta. Insects are further divided into 29 orders. A butterfly belongs to the order Lepidoptera which
means ‘scale wings’ (lepis-scale, pteron-wing). The wings of butterflies are covered with tiny scales. The body of Butterflies is divided into head, thorax and abdomen. Six legs and four wings are found on thorax. There are four stages in the life of a butterfly- Egg, Larva, Pupa and Adult.

Aim and Objectives:

The present analysis is intended to reveal the diversity and distribution of butterflies in nearby localities and their interactions with plants and their ecoclimate. The objectives include:

1. Regular observation of butterflies of different localities under study.
2. Documentation of dominant species with number and peak hours of its appearance.
3. Monitoring of temperature during peak hours.
4. Identification of species diversity in different localities.
5. Correlation of observed data with species diversity and distribution in relation to ecoclimate.

Materials and Methods:

Field study were conducted in different localities like Chalakkara, Chokli, Mukkali-Theruvath, Mukkali-rail side and Mahe daily in order to find out the butterfly population and species variation. More over the temperature of these localities was noted when the butterfly population is more and less. The data were tabulated and compared by taking the butterfly population in each locality in a week. 9 weeks study from August 22 to October 23 were tabulated (annexure 1).

Results and Discussion:

Butterflies are suitable for biodiversity studies, as the taxonomy, geographic distribution and status of many species are relatively well known. Further, butterflies are good biological indicators of habitat quality as well as general environmental health (Larsen 1988; Kocher and Sawchik et al. 2005), as many species are strictly seasonal and prefer only particular set of habitats (Kunte 1997). The present study was started with a view to examine the dynamics of butterfly population across present season and various habitats. Quantitative data on butterfly populations are gathered from various habitats and tabulated (annexure 1). The present analysis is intended to reveal the diversity and distribution in butterfly populations, and interactions with the plants on which they depend, and their ecoclimate.

Places selected for our present study were with moderate climate and annual average rain fall of 3400 mm. The temperature ranges from 23-30 °C, and 85% humidity. Mahe is an urban area with sparse vegetation and ground cover and moreover densely populated and there by polluted. All other areas are suburban and with moderate vegetation. Mukkali Railway region was deforested for construction and habitat is frequently disturbed due to train as well as passerby. Present study reports around 65 different kinds of butterflies. Among all Chalakkara and Mukkali theruvath are rich in number and diversity.

Most commonly observed species are Psyche, Common Emigrant, Common Grass Yellow, Common Indian Crow, Common Evening Brown and Common Mormon. These were observed in all areas under study. The frequency of occurrence is higher during sunny days and August-September. As the North East monsoon started by the end of September the frequency has been reduced considerably. The early return of monsoon caused the serious
damage to the population. From early monsoon the populations started building up and showed the first peak in late monsoon. This year the north east monsoon shower was earlier than expected which caused harm to the pupa and thereby the Butterfly population was reduced later. The unpredicted climatic changes affected the growth and flowering of the linked plant species too. The successful metamorphosis depends on the larval and adult food availability, and therefore was possibly a consequence of temperature changes and other microclimatic changes. This also may be another reason for the reduction in number. Butterflies in all habitats showed a highly seasonal trend.

**Psyche**

Among the species observed Psyche has wide distribution and more tolerant. This may be due smaller size and wealth of allied plant species.

**Common Emigrant**

This is one of the most frequently observed species with wide distribution. There is a steady increase in number with regards to the increase in atmospheric temperature and precipitation.

**Common Evening Brown**

The frequency is higher during August and September. A considerable fall in number during October may be due to intermittent rain and drop in temperature with cloudy sky.

**Common Indian Crow**

One of the most frequently spotted species in Western Ghat region. Ficus species are its larval host plant and same has wide distribution in tropical climate. The current study explains its sensitivity to rainy conditions.

**Common Grass Yellow**

This follows a distribution chart similar to Common emigrant. It shows its preferred season as August-September. Like other species it is also vulnerable to climatic variation.

**Common Mormon**

Even though common mormon are distributed in all areas under study, the number is less compared to other widely distributed species.

**Conclusion:**

The temperature, rain and climate has a great influence on the distribution, species diversity and occurrence of butterflies in our locality. Species diversity is associated with host plants and a nectar plant which is directly depends on climate. Chalakkara and Mukkali theruvath region shows maximum species diversity and number of population. That region showed greater diversity of flora than other localities. The decrease in population in Mahe is due to urbanization and pollution. Rail side of Mukkali also shows a decrease as the presence of railway track and the pollution associated with it. The study within two months is not sufficient to interpret. So we are not concluding our work now. We have decided to continue our study up to next year. Then only we will get a clear idea about the relation between climate and butterfly distribution.
3. FORMATION OF HEAT ISLANDS AT
VAZHUDHAVUR SALAI AND LOCAL WEATHER
CHANGES DUE TO CENTRALIZED INCINERATION OF
MUNICIPAL WASTE AT KURUMAMPET,
PUDUCHERRY

VIGNESHKUMAR. A
Ajay Krishna. R
Aravind. G
Eshwar. K
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Guide Teacher: I. Peter George, TGT

Petit Seminaire Hr. Sec. School, Puducherry

INTRODUCTION:

Vazhudhavur salai in puducherry is one of the busiest road with hectic traffic. It stretches from Rajiv Gandhi square and leads to the historical village Vazhudhavur. Kurumampet is at the 6th kilometre from the Rajiv Gandhi square. It has become a pivotal road due to more educational institutions, industrial establishments and tourism activities. As a result the vehicular emission is comparatively higher than the parallel perambai road. The ply of institutional vehicles and the black soot emitted from the adulterated fuels of vikram tempos moderately increases the morning temperature of the road along with the usual traffic. The trucks carrying the municipal waste of the entire city makes its way on this road so there is a steep increase in the emission level between 10 to 2 pm. The use of light diesel trucks to carry the waste leads to maximum emission of carbon di oxide for a smaller payload. The slow pace of the diesel trucks retards the normal speed of the other vehicles too. It results in more burning of fossil fuels and more carbon di oxide emission. Therefore there is a direct relationship between the diesel burnt, CO2 release, air quality, concentration on particulate matter and creation of localized temperature hot spots in vazudhavur road.

AIM:

To estimate the emission and heating effect of diesel vehicles plying in the 6km stretch of vazudhavur salai and the role of garbage tractors as well as open incineration in the impact of heat islands.

OBJECTIVES:

▷ To estimate the average volume of emission in a month in the incineration of garbage and volume of emission by the trucks involved in the transportation and other diesel vehicles through Vazhudhavur salai.

▷ To assess the waste heat energy generated in the burning of garbage.

▷ To study and analyse the heat islands formation in Vazhudavur salai.

▷ To Study the impact of burning and its hostile environment in the nearby residential area.

▷ To understand the perceivable change in weather, difference in temperature between Vazhudhavur salai and Perambai road.

MATERIALS REQUIRED:-

Laboratory thermometer (nos 2), smart phone with temperature application
Methodology 1:

- The diesel vehicular population of Vazhudhavur salai was enumerated for one week from 6am to 8 pm. As the traffic density varies with respect of time and days, we adopted two hour enumeration for each day (i.e. 6-8am, 8-10... 6-8pm) to arrive a nearly accurate data of traffic situation. We collected the number of garbage trucks involved from oulgaret and, Puducherry municipality and as well as from the incineration site.

- The average speed of truck with payload and empty is calculated. Diesel consumption of a single truck was calculated as follows:

  \[ \text{Transported distance (Our project road) \times number of trips per day \times the number of trucks operated \times 30 days.} \]

  The above calculation provides the total fuel burnt in a month by the garbage trucks alone.

  \[ \text{Total emission of CO2 = Total diesel fuel burnt \times 2.6 kg / l.} \]

- The waste heat generated at the incineration site:

  - The average tonne of garbage arrived in the incineration site for a month and the total waste heat added to the atmosphere is estimated.

  The total volume of CO2 emission in the incineration and transportation is roughly calculated and the relative warming effect in the surrounding atmosphere is correlated.

Methodology 2:

- We used two lab thermometer to measure the temperature at a time for each set of spots (S1, S1) in Vazhudhavur salai and Perambai road. Similarly (S2,S2), (S3,S3), (S4, S4), (S5,S5) with specific time synchronization. All the observations were made during afternoon (1.30 – 2.30 P.M) in alternate days for the month of September 2014.

- Smart phone with temperature application was used to record the mid night temperature for the above pair of spots to enhance the visibility and convenience. The accuracy of the smart phone reading was verified with the lab thermometer.

  Temperature measuring parameters are,
  
  a) Open area without sunlight interception,
  b) Light intercepting shaded area by the road side tress, where there is evapotranspiration.

  5 profiles in each parameter in the month of September 2014 was recorded. The average value of 15 datas of the 15 observational days of each spot was considered as 1 profile. 5 profile was calculated for 5 spots. The monthly mean temperature was calculated from the average of the 5 profile. The similar observation was made for the parameter (b) that is shaded road surface with road side tress which intercepts the sunlight. This methodology helped us to get an insight on vulnerable heat spots at Vazhudhavur salai. The profiles of the 2 parameters were compared and mid day monthly mean temperature difference between the two roads and midnight mean temperature were compared to find the delta T effect, and also studied for the heat islands formation.

Observation:

The total number of diesel vehicle in Vazhudhavur salai supersedes many fold than the petrol vehicles and more burning of diesel fuel adds carbon di oxide and heat. To add fuel to the fire, the centralised dumping of garbage and its transportation through Vazhudhavur salai and subsequent burning generates high heat
capacities in the atmospheric surface. It acts as a giant reservoir of heat energy. The carbon dioxide and PM emitted from the burning of the garbage and diesel truck engine are the main culprits responsible for the heat islands in and around Vazhudhavur salai. The concrete buildings all around the road retains much heat and reflects long wave radiations in to the atmosphere. As a result the large day time temperature due to heating, generates convection winds in the road and a warm night time temperature was perceived. This indicates a smaller level heat islands formation in the Vazhudhavur salai.

**Conclusion:**

The observation shows that the midday mean temperature of the Vazhudhavur salai for the project period was 36.3°C. The midday mean temperature of Perambai remained as 31.4°C. There is a mean difference of 4.9°C. This is a significant value to attribute a smaller level of heat islands in Vazhudhavur salai. The mid night mean temperature variation was 3.5°C. we expect a higher impact during summer and winter.

**Mitigation:**

- To adopt reduce, recycle, reuse, recover energy models to handle the municipal waste.
- Non-incineration facility while produce power and steam from solid garbage waste from the municipal waste.
- Preventing centralized dumping of garbage, and its subsequent burning in the city suburbs.
- Using green roofs and cool roofs on the buildings on both sides of Vazhudhavur salai.
- Use of lighter colour surfaces on the road side buildings to reflect more sunlight and absorb less heat.
- Drying Crushing of the vegetative, organic waste and compressed to replace the fire wood in the brickkiln.
- Creating carbon dioxide mitigation ponds with the culture of azolla, salvinia, marsilia which act as a carbon di oxide sink.
- The burnt ashes can be used in the mitigation ponds as organic manure as well as in organic culture of spirulina.
- Carbon di oxide scrubber may be installed around the incineration site.
- To adopt Land filling method.
4. STUDY OF WASTE DISPOSAL/ LANDFILL, ITS EFFECT ON WEATHER AND CLIMATE AND ITS REMEDIAL MEASURE- PREPARATION OF LIGHT WEIGHT CONCRETE FROM NON-BIO-DEGRADABLE WASTE

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INTRODUCTION:

Land filling is the most commonly used method for waste disposal. It is an important source of pollution which can be displayed through analysis of data for climatic conditions of a place. The migration of harmful gas from the landfill body into the surrounding environment presents a serious environmental concern, which includes groundwater pollution, air pollution with impact on climate through methane emission and potential health hazards.

This project is a small study taken by us, to view these environmental concerns from land filling practices and their adverse affects on the environment. We have suggested a new technique to manage the waste - non –biodegradable plastics into useful light weight concrete.

OBJECTIVE:

- Study of the impact of landfill (Kurumbapet site) in terms of location, residents, analysis of the type of waste being dumped and quantification, emissions, environmental condition, health consequences, climate changes and analysis of water quality.

- To prepare light weight plastic concrete from waste plastics.

- To confirm the compressive strength of the plastic made concrete by compression test

- To confirm the specific gravity of coarse and fine plastic aggregates

- To suggest remedial measures to landfill.

- To meet the doctor and know about the health hazards caused due to landfill and climate changes.

- To create awareness among the public and children about –
  i) Hazardous nature of landfills
  ii) Make children understand the importance of climate change

METHODOLOGY:-1

Landfills: Solid wastes are traditionally described as residual products. The term Municipal Solid wastes refers to the solid wastes from houses, streets, public places, shops, offices, hospitals and industries dumped at one place called as landfills.

ANALYSIS OF LANDFILLS:

Step-1: We students visited the landfills site at KURUMBAPET, Puducherry and analysed the waste, identified the wastes and collected the plastic waste from the site.
Analysis and results:

- Methane and hydrogen are highly flammable and may lead to potential fire and explosion hazard. Largest contributor to CH₄ emission is the wastes.
- Landfills are estimated to produce 7.5% of CH₄ every year into the atmosphere.
- Leachate causes ground water pollution.

Environmental conditions near land fill:

- Bad odour: There was bad odour emanating at least for 5 km stretch
- No proper access road
- Poor air quality due to burning of wastes
- Changes in water quality

Health Hazards:

In the residential areas around the landfills, insect infestation namely housefly, mosquitoes, bugs, animals such as dog were found, which may lead to diseases like – Dysentery, Headache, Cold, fever, skin diseases.

Climate changes:

- Significant reduction in the average rainfall.
- Rains not as predictable as they were.
- Number of days with extreme high temperatures and days with extreme low temperatures are rising.
- More heat means losing more of our energy resources.

Analysis of water quality

Step-2: We collected four samples of water near the land fill site (within 1 km radius) and analysed the water for the following characteristics:

- Place of test: Water treatment plant Kursukuppam

From the landfill study we understood that waste (Plastic) reuse help us to manage the waste generated and the climate changes. So we converted the waste plastics into light weight concrete.

Methodology:-2

Preparation of light weight concrete from waste plastic.

Materials required:
- Cement - we used ordinary Portland cement for this project
- Fine aggregate - (plastic as fine aggregate)
- Coarse aggregate – (20 mm size plastic as coarse aggregate)
- Water - (for binding agent)


Procedure:

Step 1. Collection of waste plastic: We collected plastic wastes from Kurumbapet landfill, Puducherry and surrounding areas near our residents. We washed the collected plastics and allowed to dry.

Step 2. Preparation of aggregate: We took the dried plastics and cut them into small pieces and crushed into required size of coarse aggregate (from 20 mm to 4.75 mm sizes) and fine aggregate.

Step 3: Preparation of concrete cube in the ratio of 1:1 ½ :3 : We took 3 part of coarse aggregate (20 mm size plastic) that is
0.0030 cum (in 1.585 kgs) and took 1.5 part of fine aggregate (plastic fine aggregate) that is 0.0015 cum (in 0.696 kgs) and 1.5 kg of cement and mixed them uniformly with the water 0.75 litre by hand mixing. The mixed light weight concrete is poured into the concrete cube mould of size 15cm x 15cm x 15cm and compacted properly and allowed to dry.

Step 4: Curing: After 24 hours we de moulded the specimen light weight concrete and cured it with water for 28 days. So it is immersed in water.

**Methodology:**
1. Take a clean dry Pycnometer with its cap and weigh it (W₁ gm)
2. Take dry plastic granules in the Pycnometer and find the weight (W₂ gm)
3. Fill the Pycnometer with distilled water up to the hole conical cap and shake it well to remove the air, weigh the Pycnometer with plastic and water (W₃ gm)
4. Empty the Pycnometer and clean it. Fill with distilled water and find the weight (W₄ gm)
5. Record the values

**Result and analysis:**
Advantages of using lightweight concrete in prefabrication:
- The following advantages are concluded for using lightweight concrete in prefabrication in building:
- Reduce the dead weight of a facade from 5 tons to about 2.5 tons.
- Reduce crane age load allow handling, lifting flexibility with lighter weight.
- Good thermal and fire resistance, sound insulation than the traditional granite rock.
- Allow design and construction flexibility for larger prefabrication modules.
- Factory production of module enhances quality of product.
- Enhance speed of construction, minimize wet trade on site.
- Improve damping resistance of building.
- Can be used for building internal walls and compound walls to reduce the dead load.

Even though considerable amount of plastic wastes is converted into light weight concrete remedial measures for landfills is suggested below:-
- Improvement of access roads near landfills
- Constructing the basic infrastructure, fencing and weighbridge.
- Stop open burning inside landfills,
- Establishing surface drainage system for limiting the infiltration of the water through the landfill cover.
- Raising the awareness and competences of the employees.
- Ensure that no disposal of hazardous and medical waste takes place it is important that only municipal waste is disposed in landfills. Therefore waste should be sorted and site should be selected to avoid negative impacts on ground water resources.
- Increase the knowledge and awareness between residences for the importance of waste sorting.
- Encourage the private sector to invest in all forms of waste recycling and management projects.
- Establishing environmentally friendly landfills.
5. INFLUENCE OF WEATHER FACTORS ON THE INCIDENCE OF INSECT PESTS AND THEIR NATURAL ENEMIES IN BHENDI

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INTRODUCTION:

Okra (Abelmoschus esculentus(L.)Moench) is commonly known as bhendi is an important vegetable crop belonging to the family Malvaceae and the choicest vegetable grown extensively in the tropical, subtropical and warm area of the temperate zones of the world. It is a native of tropical Africa, and widely cultivated in India. It is cultivated throughout the year and it occupies 0.49 million hectares with an annual production of 5.80 million tones and productivity of 11.6 tones per hectare in India (Anon., 2011). It is the best source of iodine and calcium. Okra accounts for 60 per cent of export of fresh vegetables excluding potato, onion and garlic (Sharma and Arora, 1993). The continuous growth is congenial for the infestation of insect pests and it is one of the major limiting factors in the profitable cultivation of the crop (Ashok Kumar, et al., 2009). Many insect pests incidence were recorded from sowing upto harvest on bhendi plants in India and listed the most destructive insect pests as leafhopper, Amrasca biguttula biguttula (Ishida), aphid, Aphis gossypii (Glover), whiteflies, Bemisia tabaci (Gennadius), fruit borer, Helicoverpa armigera (Hubn.), spotted bollworm, Earias vittella (Fabricius) and Earias insulana (Boisd.) (Mandal, et al., 2006 and Mane, et al., 2010). The present study was undertaken to study the influence of weather factors on the incidence of the insect pests and their natural enemies in bhendi.

OBJECTIVES:

- To study the seasonal incidence of major pests in bhendi (okra)
- To study the biology of useful insect in different season
- To study the survival of beneficial insects on bhend.

MATERIALS REQUIRED:

- Agriculture land
- Bhendi (okra) seeds, variety Arka Anamika
- Irrigation facilities
- Insect cages
- Laboratory
- Insects

Methodology:

The population of the insect pests and their natural enemies were collected at weekly intervals on ten randomly selected plants per plot as below and continued throughout the crop growth period. All the observation are replicated three times. Arthropod fauna in all the treatments were collected in the early hours of the day in the main field (6-8 hrs) at weekly intervals by using different methods of collection viz., insitu and net sweeping as below.
1. NET SWEEPING METHOD

Above ground arthropod pests and predator species were trapped in sweep nets and were monitored and five sweepings per plot were done. The data was used to calculate the inventory of arthropod fauna community.

2. IN SITU COUNT

Observations on the insitu population of insects, pests and natural enemies were recorded at weekly intervals on ten randomly selected plants and continued throughout the crop growth period. The data were evaluated to formulate an inventory of arthropod fauna. All the observation are replicated three times.

3. PRESERVATION OF ARTHROPOD

The collected insects were killed in a potassium cyanide killing bottle and these specimens were sorted, pinned, labeled and mounted in wooden boxes. The arthropods collected by various methods were brought to the laboratory and killed by placing a small cotton swab dipped in ethyl acetate or chloroform inside the polythene bags. The specimens were then preserved in 70 per cent ethyl alcohol in glass vials individually.

4. IDENTIFICATION OF THE ARTHROPOD

The collected insects were sorted, identified by using the experts in the field.

5. RELATIVE ABUNDANCE

It measures the percentage of individuals over all the species. It was measured by the formula,

\[ R = \frac{a}{N} \times 100 \]

Where \( R \) = Relative abundance, \( a \) = Total population of a particular species/taxon, \( N \) = Total population of all the species/taxon.

The natural enemies were released periodically at weekly intervals and observations on the incidence of the insect pests were recorded. All the observation are replicated three times.

PESTS OF BHENDI DURING AUGUST TO OCTOBER 2014

<table>
<thead>
<tr>
<th>Months</th>
<th>Major Pests</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUGUST</td>
<td>Aphids, Thrips, Leafhoppers, whiteflies, Mites,</td>
</tr>
<tr>
<td></td>
<td>Coccinellids, Spiders</td>
</tr>
<tr>
<td>SEPTEMBER</td>
<td>Shoot and fruit borer, Coccinellids, Spiders</td>
</tr>
<tr>
<td>OCTOBER</td>
<td>Shoot and fruit borer, Coccinellids, Spiders</td>
</tr>
</tbody>
</table>

**RESULTS:**

Arthropods are important component of ecosystems occupying vital position of in food webs, dynamics of population and communities. Play various roles in ecosystems acting as herbivores, predators, decomposers, parasitoids and pollinators. Farmers have been mostly relying on chemical pesticides for the management of pests, however, their indiscriminate use has led to several problems including destruction of beneficial insects like pollination, parasites and predators. Farmers continue to resort to insecticidal use to check the pest incidence in their field without being aware of either the natural bio control taking place or impact of this agrochemical the non target organism.

From the present study, it was observed that, the relative abundance of the insect pests ranged from 1.50 to 36.00 per cent and natural enemies like Coccinellids, spiders ranged from 8.13 to 8.74 per cent under different temperature. The results on the correlation coefficient of weather parameters of weekly and monthly average against the incidence of the insect pests and their natural enemies showed a good and statistically significant \( R^2 \) value of...
0.807 and 0.943 respectively. It was found that, among the weather parameters a positive correlation was observed with the morning relative humidity, bright sunshine hours and a negative correlation with the weather parameters viz., maximum and minimum temperature, evening relative humidity and rainfall.

Hence, the safe use of insecticides by the farmers will encourage the natural enemies and their potential to check the various pest of bhendi.

**CONCLUSION:**

It was now established that arthropods fauna namely natural enemies found to occur in all weather conditions and can effectively suppress the pest populations throughout the crop growth period. It is also evident that relatively abundant species rich ecosystems are more stable than species poor ecosystems. If the relationship between biodiversity and stability holds, then it is in the interest of the long term viability of a region to encourage diverse human and natural ecosystem.

It was concluded that, a richness of natural enemies and a complex of arthropod fauna was found to be present under all weather conditions which would enable to achieve a natural control of the insect pests of bhendi without any harmful effect on the environment. The former can be advised to go for safe use of insecticides in order encourage the richness of natural enemies complex to achieve a natural control without any disturbing the environment.

6. IMPACT OF TEMPERATURE, RAINFALL, SALINITY, PH AND DISSOLVED OXYGEN ON FISHERY RESOURCES OF PUDUCHERRY MANGROVES

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**INTRODUCTION:**

Weather is an 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 is the average as well as variability of weather conditions prevailing in an area over a long period of time. Weather and climate are important physical environmental factors which influences the various ecosystems. Weather and Climate variability have various significant parameters such as Rain, Temperature, Wind and Humidity that inflict impact on the abiotic and biotic nature on earth. These parameters have effect on the occurrence, abundance, seasonality and behaviour of living organisms as well as quality of air, water and soil. It has direct or indirect effect on the various ecosystems. When some of these ecosystems are available everywhere in India some will be restricted to very specialized locations such as mangroves, estuaries and lagoons etc.
Mangrove forests are one among the world’s most productive ecosystem, they were often referred to as ‘tidal forest’, ‘coastal forest’ or ‘oceanic rain forest’. The mangrove ecosystems support genetically diverse groups of terrestrial and aquatic organisms. These forest ecosystems also support marine fisheries and protect the coastal zone, thus helping the coastal environment and economy. These ecosystems play important roles as sheltering, feeding, nursery and spawning grounds for finfish and shellfish.

In Puducherry, mangrove vegetation were present in Ariyankuppam, Thengaithittu and Muruganpakkam Villages about 120 hectares. True mangrove species like *Avicennia marina* and *Brugueria cylendrica* are present in Ariyankuppam and Thengaithittu villages around the edges of thengaithittu estuary and Ariyankuppam River. Along with this, other species like *Rhizophora mucronata* and *Rhizophora apiculata* were also present in small patches in Muruganpakam village.

**Aims and Objectives:**

1. To study physico-chemical parameters of mangrove water.
2. To highlight the present status of mangrove and fishery resources of this ecosystem.
3. To study the factors influencing fish population in mangroves.
4. To study the role of mangroves in natural calamities like tsunami, flood etc.
5. To create awareness to Public, NGO and Government about uses of mangroves.

**Methodology:**

**Experimentation**

- From July to October water samples were collected monthly once from Mangrove areas of Puducherry at morning hours between 8 to 10 Am for Atmospheric temperature, Water temperature, Salinity, pH, Dissolved Oxygen.
- Atmospheric and Water temperature was recorded using Mercury thermometer, Salinity by hand refractometer, pH by pH meter and dissolved oxygen by Strickland and Parson (1982). Rainfall data were obtained from meteorological regional centre, Chennai.

**Survey**

- Mangroves were identified with Ecology dept Pondicherry University and Fishes were collected from fishermen and identified with FAO sheets and expertise in this field in CAS marine biology, Annamalai university.
- Relative abundance of the species were calculated using the formula

\[
\text{Relative Abundance} = \frac{\text{Number of Individual of a Species}}{\text{Number of all individual of all Species}} \times 100
\]

**Observation:**

The mangroves in Puducherry were present in three villages namely Thengaithittu, Ariyankuppam and Muruganpakkam. Overall four species of mangroves were identified in these villages namely *Avicennia marina*, *Bruguiera cylindrica*, *Rhizophora apiculata* and *R. mucronata*. *Avicennia marina* and *Bruguiera cylindrica* are true mangrove species. *Rhizophora apiculata* and *R.
mucronata were planted under social forestry scheme during 1986 by Government of Puducherry. Water analysis was carried out in morning hours. From the results atmospheric temperature ranges from 35 to 28.5 °C and water temperature ranges from 30 to 29.5 °C. Rainfall ranges from 10 to 180 mm, Salinity value ranges from 32.5 ppt to 23.5 ppt, pH value ranges from 8.2 to 6.9 and finally dissolved oxygen ranges from 4.4 to 4.6 mg/l. Fishery resources were collected from fishermen contains 24 fishes, 6 crabs and 4 prawns were identified during the study period.

Fish species recorded between 24 to 12 species, crabs between 5 to 6 species and finally prawns in ranges from 3 to 4 species respectively. Generally a lot of fish species collected during summer periods and crabs and prawns were abundant during monsoon periods. Gill nets, cast net, catamaran and fibre glass reinforced plastic boats were in operation.

A lot of juveniles and sub adults were dominant in every catch in these mangrove areas. Fishermen deploying crabs rings made of steel and fibre to capture mud crab Scylla serrata and cast net operation for capturing Penaeus monodon are the target species in rainy seasons.

RESULTS AND CONCLUSION:

Temperature

The mangrove area water samples shows seasonal variations in all parameters. Atmospheric temperature value were high in July month 35°C and low during October month 28.5°C and water temperature were also high during July and low in October periods may be due to influence of North-East monsoon prevails in study area. Temperature of natural inland waters in the tropics generally varies between 25°C to 35°C is in accordance with our results.

Rainfall

Rain is liquid water in the form of droplets that have condensed from atmospheric water vapour and then precipitated that is become heavy enough to fall under gravity. Rain is a major component of the water cycle and is responsible for depositing most of the fresh water on the earth. Rainfall is the most important cyclic phenomenon in tropical countries as it brings important changes in the hydrographical characteristics of the marine and estuarine environments. In the present study, the peak values of rainfall were recorded during the monsoon month of October. The rainfall in India is largely influenced by two monsoons viz., southwest monsoon on the west coast, northern and north eastern India and by the north east monsoon on the southeast coast. July, August and September were practically rainless.

Salinity

Salinity has been regarded as one of the most important variables influencing the utilization of organisms in estuaries and mangroves. Salinity were also high during July months because of more influence of sea water and absence of rainfall during summer periods and low values during monsoon periods due to influence of fresh water flow from adjacent river and rainfall.

pH

Master variable in water is known as pH since many properties, processes and reaction are pH dependent. Because of buffering capacity in the sea water, generally the pH ranges from 7.8 to 8.3 in estuaries and mangroves. pH value were high during summer and low during monsoon. The low pH observed during the monsoon season may also be due to the influence of rainwater, low temperature and organic matter decomposition. The recorded high summer pH might be due to the influence of seawater penetration and high
biological activity and due to the occurrence of high photosynthetic activity.

**Dissolved Oxygen**

Dissolved oxygen is an important constituent of water bodies and its concentration in water is an indicator of prevailing water quality and ability of water body to support a well-balanced aquatic life. In the present study Dissolved oxygen were high during October months and low during pre monsoon. Higher values of dissolved oxygen in wet season then in dry season in this study coincides with the findings in river Oshun that dissolved oxygen is usually higher in wet seasons in tropics. A possible reason for this high values recorded during wet season is due to turbidity nature of water caused by North-East monsoon prevails in the study area (Oct-Dec) and low value in dry season due to inflow from run-offs and decomposition of organic matter in water bodies.

**Fishery Resources**

In the present study overall 24 species of fishes, 4 species of prawns and 6 species of crabs were identified in mangrove areas of Puducherry region. Lot of juvenile species were greatly encountered during the study period. Because these mangroves serve as a place for nurseries and sub adults for shelter, reproduction and food. Leaf litter fallen from mangroves serve as a food for lot of prawns and crabs.

**Relative Abundance and Factors influencing Species Richness**

Only 24 species were present in Puducherry mangrove area. In Pitchavaram and Vellar mangroves in Tamil Nadu more than 200 species has been reported by numerous scientist. Where as in puducherry only less number of fishery resources were identified because less number of mangroves. Also this ecosystem in dangerous situation because day to day activities of peoples living in this area have giving tremendous problem to this ecosystem, by cutting the trees for timber, dumping domestic and industrial waste in this area create more problems to this existing fishery resources that was evidenced by recording low dissolved oxygen values in this study area. During Tsunami in 2004 this area especially in Thengaithittu and Ariyankuppam coastal area peoples were greatly protected by this natural barrier from huge waves thereby saving their livelihood, where as the other coastal areas like Murthikuppam and Panithittu etc were greatly destroyed during Tsunami incident in late 2004. After this incident only a lot of peoples know the value of mangrove forest as natural barriers in protecting from natural calamities.
7. STUDY OF WEATHER RELATED DISEASE IN SOME HAMLETS OF VARIOUS COMMUNES OF PUDUCHERRY

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Prarthana Magon
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Abstract
Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time. Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions. Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate tectonics, and volcanic eruptions. Certain human activities have also been identified as significant causes of recent climate change, often referred to as “global warming”.

Weather and climate influence environmental and social determinants and also affects health of the living beings. Health is the level of functional or metabolic efficiency of a living organism. In humans, it is the general condition of a person’s mind and body, usually meaning to be free from illness, injury or pain. Weather and climate, thus, have direct and indirect relationship on human and animal health.

This project intends to study whether the changes in the weather pattern and climate may (or) may not be the reason for the spread of different diseases like bronchial asthma, URI, cold, pneumonia, leptospirosis, diarrhoea, asthma, malaria etc…

We assessed from the survey, that the changes in environmental temperature, air, and humidity and rainfall patterns are increasing the sensitive of the vector. Different climate conditions create favorable conditions for the transmission of vector-borne diseases and enteric diseases.

8. IMPACT OF CARBON DIOXIDE IN GLOBAL WARMING

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Abstract
The trapping of energy from the sun by green house gases in the atmosphere leading to rise in earth’s temperature is known as green house effect. The green house gases such as CO2, NO, CH4, CFC etc absorb and reflect infra red waves radiated in temperature as in a green house. Our project stresses on the fact to understand what green house gases are and the fields where the global warming effects.

In our project we have measured the temperature in different environment and we have done a small experiment to prove that carbon di oxide is the major cause for the rise in temperature. In our first step we have continuously measured the temperature in industrial area, green area, heavy vehicle area and in a normal place. The result is graphically represented. From the result the temperature was high in an industrial area and least in a greenish area.

In the second step we filled different types of gas ie., CO2 from vehicle smoke, CH4gas, H2 gas, water vapour in CO2 and N2 gas in balloons. We inserted a thermometer in each balloon and observed the rise in temperature. The comparison was made with the atmospheric temperature. The result was represented graphically. In addition we have taken some commonly used and burnt objects and noticed the rise in temperature in camphor, crackers, kerosene stove and burning of tyre.

We conclude our project by saying that the time has come to wake up and try to stop the cause of global warming. We can try to drive less (automobile) and drive smart (bicycles). Researches have to be done to convert impure CO2 left from the industries.
9. FINDING THE IMPORTANCE OF RAINWATER FOR THE GROWTH OF PLANTS

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K. Anandaraj
I. Pravingandhi
Guide Teacher: G. Alagiri TGT

Fathima Hr. Sec. School, Puducherry

Abstract

Both plants and animals depend upon rainwater for their living. Rainwater is the main source of drinking water for human beings. We see large number of plants grow faster in rainy season. Observing this growth we decided to find the Importance of rainwater for the growth of plants. We decided to start our project inside our school campus. We started the project on 22.08.2014 in our school. Our main aim is to find the importance of rainwater for the growth of plants and to analyse the composition of tap water, mineral water and rain water.

From this experiment we obtained the result as follows. Under rainwater irrigation the height of the plants the length and breadth of leaves in the plants were more. They were little less under tap water irrigation. Then under mineral water irrigation they had the least growth in all three varieties of plants. From this experiment we also found that number of leaves were more under rain water irrigation. Analysis of the three types of water shows the presence of nitrogen is more in Rain water which is in negligible quantity in other water. In the second month, the plants under rain water irrigation started to produce flowers earlier than the plants under other irrigation. They also developed fruits earlier from the flowers. Our experimental results also prove that all different varieties of plants grow fastly under rainwater irrigation.

From this experiment and data collection we come to the conclusion that rainwater is nutrient content water which is essential for the growth of plants. We also come to know the importance of rainwater harvesting and the importance of rainwater for the growth of plants. We conclude that the tap water and mineral water which is mixed with fertilizer can give fast growth to the plants. In the absence of rain, we can irrigate the plants with fertilizer mixed water. If the project is carried out by students in every school, they can come to understand the importance of rainwater. In each house, people can provide rainwater storage tank. The stored water can be used for irrigating the plants grown in their garden. This rainwater irrigation will certainly increase the growth of plants and increase the yield.

NCSC State Level Evaluator Dr. R. Madivanane,
Prof. D. Satishkumar, Dr. K. Sambandam and Smt. P. Sobana
10. COMPARATIVE STUDY OF SYSTEM OF RICE INTENSIFICATION

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Kaudul Aalam. F
Sriram. G.N
Azmal Deen. M
Nagendran. M

SRVS National Hr. Sec. School, Karaikal

Abstract

System of Rice Intensification is a method of cultivation that arose in Madagascar in 1980's and 1990's. SRI is claimed to be more productive. Sowing the pre-germinated seeds weighing of 90-100 gm/m uniformly and cover them with dry soil to a thickness of 5 mm. Then continue the process until it’s complete. Watering the nursery and protect it and maintain the water level in all around the seedling mat. Then lift the seedling mat and transport it to the main field. Transplanting must be done without delay i.e. 15-30 minutes.

Rice paddies are irrigated intermittently rather than continuously flooded. Then irrigate the land only to moist the soil in the early period of 10 days. After that restore the irrigation to depth of 2.5 cm after the development of hairline cracks, level the water to depth of 5cm. Then use the rotary weeder into a land in all direction to aerate the soil at 10 days interval from 15 days. The manual weeding is also essential to remove the weeds closer to rice root zone.

From our observation, we observed that SRI would require less amount of water and reduced labour workers; it saves our time and makes use of fewer amounts of fertilizers and manures. It takes four months for harvest. This study has shown that SRI is capable of producing considerably higher rice yields, with saving on water usage, reduced production costs, as well as increased net income (by over 141%) compared with current farmer practice. The improvement in net earnings from SRI practices was a combination of reduced seed rate, less water and less labour. The improvement is expected to grow higher when farmers start paying for water since cost on water will be much lower for SRI practice. There has been a demonstration effect, and many interested farmers have learned the practices from initial SRI farmers and have in turn also taught others. This has succeeded because of the way SRI was introduced into the community through experimental trials, demonstrations on farmers’ fields, involvement of the Ministry/Scheme management, distribution of training materials and farmer data sheets for record-keeping, support through field assistants, and use of the media. The sharing of information is very open, through many channels, and farmers feel involved. SRI can provide food security for India and it should therefore receive more attention regarding research projects and recognition.
11. ANALYSIS OF MILK DENSITY OF COWS AND COST ANALYSIS IN DIFFERENT WEATHER CONDITIONS OF VARIOUS REGIONS OF KARAikal

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J.Suba Lakhmi
A.Priyanka Gandhi
R.Hari Amirtha
Guide Teacher:
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SRVS National Hr. Sec. School, Karaikal

Abstract
Weather and climate directly limits the growth, lactation and reproduction of cattle. Factors that lower milk yield, fertility and growth are also influenced by climactic conditions. This project aims at studying the changes that occur in the ratio of the capital and the output (profit or loss) involved in the rearing of the cattle and the product obtained through various seasons. It is processed that the density of milk has been declining over the years and this certainly will play havoc the health factor of the human beings.

Common methods used to study the temperature of the milk, weight, density of the milk by using lactometer, fat of milk using the butyrometer, CLR(Corrected Lactometer Reading), SNF(Solids Not Fat) and cost of milk by using the specific formula.

Milk density, fat content and temperature were varies in the monthly intervals in the various study localities. Temperature varies in the study sites play a important role in the density of milk. It can be concluded that weather plays a vital role in the variation caused in the density of milk. The yield of milk decreases over the months and is inversely proportional to the fat content present in the milk. This makes it evident that the cost of the milk (Profit obtained). It also decreases as the quantity of the yield goes down.

12. STUDY OF SACRED GROVES AROUND KARAYAMBUTHUR AND ITS INTER RELATIONSHIPS WITH THE ECO SYSTEM

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A. Vidhyapathy
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Abstract
Karayambuthur is a village of Pondicherry located near Nettapakam to its North, Cuddalore to its South, Bahoor to its East and Panrutti to its West. It is a village of major of agricultural land and surrounded by evergreen and deciduous forests, it also have a big lake near by it which is a major water supply of that region. Most of its area is still having forest patches around it and is also preserved by local people as sacred groves. Some of them are of age old traditional link and history. Our project is to study about the Climatic conditions of scared groves and its variance with other regions and about the present condition of scared groves and its inter relationships with the ecosystem.

The temperature is measured by using Six’s thermometer (Maximum Minimum thermometer. We used this type of thermometer because to take maximum and minimum temperature at the same time of the day it will give both maximum and minimum temperature for 24 Hours.
The scared groves have microclimates different from the places apart from it. The maximum and minimum temperature is taken for two months from September 2014 to October 2014. The trees and plants present there helps it to maintain the temperature low comparatively than the apart places from it were the Maximum temperature is of about 32°C and Minimum temperature is of about 28°C and the places apart from it have 38°C and Minimum of about 35°C.

The finding reflects the temperature change inside the scared groves than the other regions of the village. There is a cool climate felt inside the scared groves because of its virginity is seen up to some extent.

13. STUDY OF SKIN DISEASES IN THE PAST THREE YEARS RELATING TO CHANGING WEATHER, CLIMATE, ETC.,

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P. Uvasri
S. Keerthi Kumari
A. Niranjani
V. Ashvini
Guide Teacher: G. Jayalakshmi, TGT

Sri Sankara Vidhyalaya Hr. Sec. School, Puducherry

Abstract

The project deals with the study of various skin diseases, both in summer and winter in the past three years, their respective symptoms and the pattern of occurrence of these diseases. The project is to create awareness among the people about the occurrence of skin diseases and to infer that the changing climate in the past three years has a direct impact on the cause of the skin diseases. Skin diseases were studied under two categories as those that occur in summer and those in winter. This project includes a comparative study of the temperature and humidity chart of the past three years and the no. of and patients affected by the skin diseases in the respective years based upon the data collected at the hospitals. The project has been approached both in the perspective of Allopathic and Ayurvedic system of medicines. We suggest some among the natural medicines that could be easily obtain from the nature and our surroundings.

Efforts have been to completely understand the nuances of the
skin diseases, which would eventually lead to their eradication. Live recording of the patients in the hospital has been conducted. The number of patients affected by the listed diseases at the IMCH was obtained for the month of October 2014. The general ways to keep away from skin diseases due to climatic factors and the data about the diseases with the temperature chart, it was clear that our locality (puducherry) has been experiencing a moderate climate in the past three years and that the raise and dip in the temperature had a strong impact on the skin, which was evidence by the data about the no. of patients.

It was evident that the emerging of UV rays from the sun, is a major cause of diseases in summer and on the other hand, the prevalence of unhygienic conditions due to the damp weather is a cause for the winter skin diseases. The more extreme the weather is, the more intense the skin diseases will be.

14. DYNAMICS OF THE TROPICAL CYCLONES

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Abstract

A natural disaster is a major adverse event resulting from natural processes of the Earth; examples include floods, volcanic eruptions, earthquakes, tsunamis, and other geologic processes. A natural disaster can cause loss of life and property, the severity of which depends on the affected population’s resilience, or ability to recover. In 2012, there were 905 natural catastrophes worldwide, 93% of which were weather-related disasters. In the present study we have discussed various aspects of tropical cyclone in general, and tropical cyclone “Thane” in particular.

As the global temperature increases, the water holding capacity of air increases and so the atmospheric moisture increases and results in the formation of cyclones. Depending on its location and strength, a tropical cyclone is called in different names such as hurricane, typhoon, tropical storm, cyclonic storm, tropical depression, or simply cyclone. Tropical cyclones typically form over large bodies of relatively warm water. They derive their energy from the evaporation of water from the ocean surface, which
ultimately re-condenses into clouds and rain when moist air rises and cools to saturation. The strong rotating winds of a tropical cyclone are a result of the (partial) conservation of angular momentum imparted by the Earth’s rotation as air flows inwards toward the axis of rotation (Coriolis force). As a result, they rarely form within 5° of the equator. The diameter of tropical cyclone ranges between 400 km to 1000 km. Tropical Cyclones are dangerous because they produce destructive winds, heavy rainfall with flooding and damaging storm surges that can cause inundation of low-lying coastal areas. Cyclones have wind speed in excess of 90 km/h around their centre and, in the most severe cyclones, speed can exceed 280 km/h. Heavy rainfall associated with the passage of a tropical cyclone can also produce extensive flooding.

In India tropical cyclone is forming every year. The India Meteorological department giving forecast and warning to fisherman and peoples living coastal and low lying areas through newspapers, electronic media etc., In our present work we have studied the cyclone formation, various stages of cyclones observational techniques and prediction of cyclone movement etc., A case study of Very Severe Cyclonic Storm crossed near Cuddalore on 30th December 2011 morning, caused damages to life and property in coastal areas, especially in Puducherry, Cuddalore and Villupuram districts in the Tamilnadu/Puducherry subdivision was undertaken. From our studies we concluded that the major destruction by “Thane” was basically due to wind not by rain or flood. The second destructing factor was due to storm surge. However the first factor was difficult to control but the second destructing factor could be controlled in natural way by Mangrove forest. Let us live and let live the mangrove forest. Don’t cut it for the sake of firewood. So let us grow mangrove trees and minimize the cause of cyclones and save the mother earth.

15. MAPPING OF WEATHER RELATED DISEASE PATTERN IN KARAIKAL

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Abstract

Weather and climate affect the social and environmental determinates of health particularly food sufficiency, safe drinking water, clean air and secure shelter. Weather variations heavily impact the health of people and climate change has an amplifying effect. Climate change affects disease dynamics directly and indirectly. It is expected that, due to weather patterns, disease alter their range, intensity and timing. Our aims are to identify disease occurrence in our locality form secondary sources, to collect the monthly and yearly weather data (temperature, rainfall) of minimum three years period and to draw disease mapping based on the weather pattern in Karaikal.

The periodic collection of the secondary data on various diseases prevalent in the study area collected from different levels such as primary health centers or government hospital, private medical centers and also from the local pharmacies for past 3 years. Collect the weather data of study area from local weather station or
other authenticated data sources for last 3 years. Interpretation of the season-wise weather parameters with disease occurrence and to find out significant association between weather changes and cluster of diseases. Based on the results, recommendations are drawn for local prevalent diseases which include prevention, preparedness and medications. Results of the present study shows that year of 2012, 2013 and 2014 the months of November, January and September respectively had the major spreading of the dengue disease. From the overall list of diseases in the district, dengue is being as the major spreading in Karaikal region. From this, we came to know that due to climatic and weather changes influence the prevalence of the diseases in the region. The maximum cause in 2012 was because of thanae cyclone in Karaikal. That is only because of heavy rainfall and sudden change in climate conditions had been the major reason for the spread of dengue.

NCSC State Level Evaluator Mr. A. Vinayathan, Dr. Muthu Viveganandavel and Dr. R. Gopal

16. STUDY OF SETTING UP OF LOW COST WEATHER STATION AND COMPARISON WITH THE WEATHER STATION OF OUR AREA

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Rouban Shaen Lee. A
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Abstract

Weather is the state of the atmosphere, to the degree that it is hot or cold, wet or dry, calm or stormy, clear or cloudy. Weather, seen from an anthropological perspective, is something all humans in the world constantly experience through their senses, at least while being outside. There are socially and scientifically constructed understandings of what weather is, what makes it change, what effects it has on humans in different situations etc. Therefore weather is something people often communicate about, whereas climate is the term for the statistics of atmospheric conditions over longer periods of time. Meteorological instruments are the equipment used to sample the state of the atmosphere at a given time. Each science has its own unique sets of laboratory equipment. The main aim of our projects are to compare the reading of homemade rain gauge with weather station rain gauge, to check the atmospheric pressure by using homemade Barometer and to check the wind direction by using homemade wind vane.

The reading of homemade rain gauge and weather station rain gauge are nearly same as observed and the home made barometer and wind vane can also be used to measure pressure and direction of the atmosphere. So we conclude that the intensity of the rain can be measured in a small scale with low cost equipments.
17. INFLUENCE OF VEGETATION COVER ON MICRO CLIMATE

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Benazir Begam. A
Santhiya. E
Mahalakshmi. R
Gayathri. G
Guide Teacher: S.Selvanayagi,
Lecturer

Kannagi Govt. Girl’s. Hr. Sec .School, Villianur, Puducherry

Abstract

The microclimate in simple term refers to the modified climate of a small area. Even a small yard or garden has variances in air, light, soil, water known as microclimate. The microclimate is modified by vegetation in the land use pattern. Tree, green vegetation restricts incoming radiation and has a cooling impacts on the microclimate. Vegetation cover greatly modifies the soil environment in long run which is the vital component of the microclimate. One corner that is dry as a desert with full of angry ants and cracked clay that you can’t break with the sharpest shovel. A cool damp area between wall and hedge doesn’t allow to grow much of anything except mosquitoes.

Microclimate is very important to consider when planning vegetable garden. Cold, Heat tolerance, Disease, and pests and over all plant health can be impacted by even small variation in climate creating microclimate. A basic understanding of microclimate will help the students to conceive the possible impact of land use change.

Six numbers of Potted plants with champanki plants were taken. Two small houses measuring 2’x1’ using cardboard were made. Place one model house in the middle of six earthen pots and the other house is placed in the open area. By using the mean value of evaporation of water the effect of microclimate was observed. It is recorded that 6914.28 cu .cm of water was evaporated in a period 30 days in the area where potted plants were kept around the cardboard house, H1 Where as 7542.85 cu.cm was evaporated in open area cardboard house, H2. It is further observed that 628.65cu. cm of water evaporation was prevented in a period 30 days, where plants were kept around the cardboard house. Therefore it is concluded that the water evaporation is being delayed by the microclimate that is provided by vegetation.
18. IMPACT OF PLANT COVER AND HUMAN INTERFERENCE ON MICROCLIMATE

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Amrutha Ashok
Dharshana Purushu
Miswana sen
Keerthana P

Guide Teacher: Girija Pilavullathil, Lecturer
JN Govt. Hr. Sec. School, Mahe

Abstract

Our project gives an idea of micro climate, how it is different from the climate of a region, how it is modified by plant cover and what is the impact of human interference on it. The project work was divided into four components.

The first one was direct study of microclimate in two closely situated places in our school. The temperature of air, water and land in these two places were directly measured using thermometers at 1 pm and the data was compared. Our second method was Field study ie, monitoring the microclimate of different land use systems. For this we have selected four different land use systems in the surrounding locality. They were a) Vegetable garden b) Barren land c) shady place under soya bean plant beside a pond d) Concrete roofed hall. The temperature of air, water and soil of these places were measured using thermometers three times a day in weekly intervals for four weeks. For measuring the temperature of water, equal amount of water was taken in four equal sized paint buckets and each of them was placed in each of the said land use systems. A thermometer was kept in each bucket with its bulb immersed in water and the temperature was noted. For taking the temperature of soil, a small hole was created in the soil and the bulb of the thermometer was inserted into it. Air temperature was noted by hanging the thermometer in the air with its bulb kept away from direct sunlight.

Our next aim was to find the impact of plant cover on microclimate through experiments. For this, five earthen pots were taken, filled with soil and gram seeds were sown in each. Two model houses were made with cardboard/ply wood and placed one in the middle of the pots and other in the open place. A Thermometer was kept inside the roof top of each model house and the temperature was noted at 3 pm once in two weeks for two months. A steel plate with a tumbler full of water was kept in front of each model house and the time taken for water to evaporate fully was noted. This experiment was repeated and the result was recorded. Our fourth aim was to study the impact of microclimate in temples on seed germination. Based on our project work we came into some conclusions and did some follow-up activities to show importance of protecting the microclimate.
19. INTEGRATION OF CAMPUS ORGANIC WASTE MANAGEMENT WITH ROOF TOP GARDEN AT THE SCHOOL CAMPUS TO OFFSET URBAN HEAT ISLAND EFFECT, PUDUCHERRY

S. SHANMUGA PRIYA  
R. Bhuvaneswari  
S. Janani  
A. Shakena Fathima,  
M. Sindhu

Guide Teacher: B. Mohamed Farook, TGT

Savarayalu Nayagar Govt. Girls High School, Puducherry

Abstract

Globally the climate change is greatly affecting the environment by disturbing and altering the existing ecosystems. To mitigate this situation, across the country every educational campus is adopting green initiatives over the past two decades. We at our school developed a model, by joining hands with the researchers from the Department of Ecology and Environmental Sciences, Pondicherry University. In the 1st phase, the Savarayalu Nayagar Government Girls High School campus had achieved 20% in the conversion of the campus food waste into compost, resulting in 100% organically grown vegetables and herbs.

As a result, 20% of the generated organic waste from the school is prevented from entering the municipal landfill site, resulting in the reduction of the land fill gas (CO2, Methane, etc) production. Roof top green cover provide oxygen, remove pollutants from the air, and add carbon to the soil. Water that infiltrates into the potted/layered soil results in evaporation from vegetation and soil, and keeps the air cool. Through shading and evapo-transpiration, roof top garden surfaces stay cooler than conventional rooftops. The urban heat island effect has also been linked to changes in regional weather events. To prepare the present generation and also as a mitigative measure this integrated campus organic waste management with roof top garden for “Terrestrial Carbon Sequestration” is evolved and practiced, based on the research studies done globally in various educational campuses.
20. A STUDY ABOUT THE GREEN HOUSE EFFECT ON THE GROWTH AND YIELD OF CHILLY PLANTS

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A.P. Nivethitha
N. Thamayanthi
P. Janani
Guide Teacher: Nithya Sagayarat, TGT

St. Joseph of Cluny Hr. Sec. School, Puducherry

Abstract

The aim of our project is to observe the green house effect on the growth of chilly plants and to compare it with those growing in the normal surroundings. The green house effect was provided by using transparent polythene sheets. The temperature difference was 0.5 °c in the noon time when there was maximum sun light. By using the seeds from the same red chilly, we brought up tiny plants. After they grew to a desirable height, we chose four plants from them and transplanted them in four identical pots. After filling them with the same amount (4 Kg in each pot) of the same soil, the plants were watered equally. After 5 days of transplantation, two plants were covered with transparent polythene sheets. The covered plants were marked as B1 & B2 and uncovered plants were marked as A1 & A2 on the pot. The growth was observed once in a week by measuring the height and counting the number of leaves. It was also recorded in a tabular column for data analysis.

There was a considerable difference between the two sets. On the third week, there was a difference of 10cm in average height.

After a month the covered plants grew to an average height of 60 cm when compared to the height of 40 cm only in the others. The leaves were also comparatively larger. After 5 weeks, two plants A2 & B2 were attacked by the same disease and the leaves at their tip started withering. There was no considerable increase in the growth of both. After the monsoon there was improvement in both. Flowering started only in uncovered plant in the 9th week. Flowers appeared in the covered plants in the 11th week only, but the number was almost double. No chillies came in any plant so far. Flowering is not faster due to green house effect. Even though it was late, the numbers of flowers were more. Hence the yield may also be more since no chillies appeared so far, the yield could not be compared.
21. MAKING PAVING STONE USING PLASTIC WASTE

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Latchiyaa Mathiazhagi.S.A
V.E. Suvetha
M. Sivapriya
Guide Teacher: D. Beaulah
Dorothy Ranjeetam, TGT

St. Patrick Hr. Sec. School, Puducherry - 5

Abstract

Making paving stones from plastic waste gives value by turning waste into a resource. Recycled plastic paving stones offer a viable option that has both economic and environmental advantages. In India over 30 million tons of plastics were generated in year, and it is increasing exponentially. As we all know that the plastics are non-biodegradable, plastic bags in the long run will create an air-tight barrier in the earth thereby preventing absorption of rain water and lowering groundwater levels which could dry up (linked to global warming).

For the home owner, recycled plastic paving stones offer several benefits. The stones are durable they will not split, break, or deteriorate, making them virtually indestructible. Using plastic paving stones gives you the satisfaction of knowing that you are supporting plastic recycling. You are also benefiting the environment by choosing an earth-friendly option.

Preparation of Paving stones from plastic waste, impact load calculation, comparison of Physical properties are some of our findings. We can also make some colourful flower pots, table tops. Roads can be laid by mixing bitumen with plastic waste. Concrete mixture can be formed by using plastic waste.

22. ANALYSIS OF SOIL FAUNA IN DIFFERENT MICRO-Ecosystem AS Influenced BY WEATHER AND MICRO-CLIMATE

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Hepsiba. M
Abirami .M
Ranjani .S
Guide Teacher: M.Tamilmani, Lecturer

Regional Perfect Hr. Sec. School, Karaikal

Abstract

Soil is believed to be a dynamic system containing dynamic population of organisms. Cultivated soil has more population than barren land. Invertebrates like earthworms, snails and slugs have great influence on the structure and performance of plant community. Weather has a profound effect on the growth and population of these organisms. During drought the organisms undertake vertical movements deeper into the soil or redistribute to moist patches. They can also enter into inactive stages. Heavy rain leads to water logged conditions that cause mortality among spring tails. It is predicted that the above said eco system services will definitely be affected on account of the density and population of these soil organisms.

Our project aims at studying the soil organisms like earthworms, beetles, insects and woodlice present in the soil from both high and low vegetative areas at our locality. Soil sample for finding soil fauna is taken from the root zone of the plants. Soil is collected
from three different locations and is mixed together for each sample. The sample is collected for analysis and is moved to the place of study in zip lock bag. Similarly three such samples are collected for both high and low vegetative area.

The overall view of this study reveals that more biotic components are seen in the soil of high vegetation. Earthworms responsible for soil fertility, mites, centipedes that serves for decomposition and water accumulation are seen in high proportion in high vegetative area. It is concluded that more soil organisms are observed in green areas. For now arises a question how does this project relates to weather and climate. Here is the answer, the high proportion of soil organisms in green areas are due to the moderate micro climate provided to the soil by the plants and trees of those areas. Thus, even a barren land can be made fertile and green by frequent water supply and providing suitable conditions for the growth of soil organisms which feed on waste organic materials degrade them and make nutrients available for plant growth. Therefore one should not do activities that alter the abiotic factors which in turn affects the ecosystem.

23. POTABILITY STUDIES OF GROUND WATER SAMPLES IN KARAIKAL DISTRICT

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S. Sendhan
S. Nitheesh baradwaj
S. Yoga sakthi
S. Kiranmayi
Guide Teacher: Mrs. P. Sundaravalli, PGT
Bright Academy, Karaikal

Abstract

Water is the basic need for every living being on earth for the growth and survival. It is the most abundant and useful compound of the nature. In most of the villages, common sources of water especially ponds and wells are frequently used by both human and animals. Ground water is important and its quality plays a significant role in the health condition of all living beings. If such water is not pure it cannot be used without analysis or monitoring. Water pollution not only affects water quality but also threatens human health, economical development and social prosperity. In our present study, investigations are carried out to assess the potability of drinking groundwater and comparison of water quality parameters with standard values.

Karaikal is a small coastal enclave of territory of Puducherry. Karaikal region is made up of Karaikal municipality and six communes. Ten places of Karaikal District are selected as our area of study. Ten ground water samples were collected in and around
5km of Karaikal on the month of September 2014. Among the sampling sites most of the places are coastal and rural. The people in all the places consume bore well water (ground water). Physico-chemical parameters such as temperature, colour, odour, taste, pH, conductivity, Total solids (TS), Total hardness (TH), nitrate (No3) and chloride (Cl) were carried out to assess the drinking water quality.

Safe potable water is absolutely essential for healthy living; adequate supply of fresh and safe drinking water is a basic need to every human being on the earth. For the parameters pH, Total Solids, chloride, Total hardness and nitrate, the values obtained for all the samples are within the standard values given by ISI. Conductivity of all the samples is higher than the standard. So we should take special care like, use of reverse osmosis system (RO) before using the ground water (Bore well) for consumption.

24. TEMPERATURE VARIATION DUE TO THE KNOCKED OUT OF KNOWN HILLS IN MAHE REGION

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Punnya jeevan
Aashish Vishnu
Adheena Mohan
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Abstract

In olden days Mahe region has many hills which are not demolished but in the past 10 years many of these hills were demolished for the construction of buildings. This result in temperature variations near to these demolished hill. We studied the temperature variations in these hills. There is 10°c variation in temperature in existing hills and demolishing hills. The temperature of existing hill is Chembra hill is 28°c where as the temperature of Cheri hill is 38°c. Demolishing of hills play an important role in the temperature of that area. Mostly the surroundings of hills were experiencing higher temperature and many problems such as water scarcity, soil erosion etc. but there was no such problems in the surroundings of existing hills. So as students and native of Mahe we request the public not to demolish the hills. For this we made pluck cards and pamphlets as awareness programme.

By doing this project we analyzed about the temperature difference in the hilly areas in Mahe region. We measured the temperature of these hilly areas within time 12:00 to 12:30. For measuring the temperature we used laboratory thermometer. We
dip the thermometer in water for about 3 minutes and find out the reading. By the comparative study of the temperature difference in these hills we conclude that the temperature is much higher (nearly about 10°C) in demolished hills than existing hills. The presence of plants in demolished hills is lesser and the surrounding peoples were facing problems such as soil erosion, water scarcity etc.

By going through this project we understood that demolishing of hills causes temperature variation nearly 10°C in that area. Due to this human invasion, we are also losing our biodiversity in that area. Not only this cause temperature variation it causes soil erosion and water scarcity. Our survey report says that, the people near the demolished hills are facing many problems, which is the after effect of demolishing of hills. A students and as natives of that area, we give awareness to this people living near the existing hills, by issuing the notice and by placing the placards.

25. IMPACT OF WEATHER ON SKIN DISEASES

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Mirambika. D.P
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Abstract

Global warming is the increase in the average temperature of the earth’s near-surface air and oceans in recent decades and its projected continuation. Skin is the most exposed organ to environment and hence skin diseases are inclined to have a high sensitivity to climate. Warm and humid environment encourages the colonization of the skin by bacteria and fungi. Cold temperatures are also associated with particular skin diseases. Common skin diseases which have an association with weather are:

(a) Miliaria
(b) Tinea pedis
(c) Impetigo
(d) Folliculitis
(e) Tinea capitis
(f) Candidiasis
(g) Tinea versicolor
(h) Cold urticaria

(i) Frost bite.

Information about these diseases was collected from hospital records as well as by interviewing patients. The information was collected by a team of five students from the four dermatology clinics in August and September 2014. The number of patients with different skin diseases was compared between the two months and recorded. After completing the study, we found that a change in weather condition can affect the pattern of skin diseases in the community. Various skin diseases are caused by changes in weather conditions. Some of them like prickly heat and folliculitis are more common in summer whereas tinea pedis and candidiasis are associated with moist/rainy climates. Extreme cold temperatures can cause frostbite. Babies, Young children and elderly are more prone to weather related skin diseases. Prompt identification and treatment can result in early cure. Simple Preventive strategies help in reducing the incidence of these diseases in the population.

26. STUDY OF AQUAPONICS AND AGRICULTURE IN AN AREA

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S. Visva
Guide Teacher: G.Subashri, P.S.T

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Abstract

Aquaponics may be regarded as the integration of two relatively well established production technologies. Recirculating aquaculture systems in which fish tank effluent is treated and cleaned before being returned to the fish tank and hydroponic (or soil-less) nutrient solution based horticulture systems. Bringing the two together allows for the plants to utilize the waste nutrients produced by the fish. In principle it is very similar to a freshwater aquarium in which both plants and fish are grown. Aquaponic systems come in a wide variety of forms, ranging from a simple fish tank set below a gravel filled vegetable bed (which also serves as a simple biofilter), with water from the fish tank pumped up and through the grow bed to highly sophisticated systems incorporating multiple fish tanks, solid waste removal systems, aerobic and anaerobic biofilters, Intensive aeration systems for both plants and fish, and sophisticated water quality monitoring and backup (i.e. fail-safe) systems.

Aquaponic systems are dominated by vegetable production in terms of area and quantity of product. This is biologically determined...
by the quantity of plant production required to absorb the waste nutrients generated by fish. In some of the more commercial systems, the fish are simply regarded as a source of high quality organic nutrients, rather than as marketable product in their own right. The technology is also of particular interest to aquaculture scientists as a possible tool for the reduction/remediation of nutrient waste from intensive aquaculture production. This technology represents a small managed “ecosystem” comprising a highly productive balance of fish, bacteria and plants.

The fish species grown in the fish tank was a species of prominent in water. The plants in the growth were a mixture of different plants. The values pH of the water is measured by using pH meter. They kept through in a closed tank. From the results in this study it seems that aquaponics system is more favourable method for the production of plants and vegetables.

27. MULCHING THAT PRESERVE SOIL MOISTURE

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A. Malaviga
A. Santhiya
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Abstract

Climate and Weather are two prime factor to save our earth soil. When changes occurs in natural resources it reflects on Weather and climate. So, we focused on the sub theme climate, weather and agriculture. As our students are coming from Rural areas in and around Bahour they noticed the cut trees with leaves and heaps of compost over cultivated land. There came an idea to start the project title as “Mulching that Preserve Soil Moisture”. We took the treatment one as coconut coir and the other dry leaves, the third one is control which is without any mulching. From September to October we have done our project taking 9 pots filed with garden soil mixed with compost. In each pot we seeded 2 bhindi seeds, watered with 500ml daily. We spread coconut coir and dry leaves in respective treatment. From September 14 onwards each day we calculated Atmospheric and mulching temperature. (at 3 days interval) we have tabulated our result and drew graph. We came to understand from this experiment that temperature (Soil) in mulching pot is less than atmospheric temperature. Also when we compared with two types of Mulching, dry leaf mulching has less amount of
temperature than coconut coir. We also calculated the moisture retaining capacity of each treatments with the help of following formula.

\[
\text{Wet wt. of soil - dry wt. of the soil} \times 100 \\
\text{Dry wt. of soil}
\]

We compared the treatment moisture retaining capacity, which is higher in dry leaves than the coir. From our project we came to a conclusion that dry leaves holds more moisture, and also sustain low temperature. Plants in dry leaf mulch shows more growth and yield than other two. So, we should not waste fallen leaves in and around our school and home.

28. INFLUENCE OF SUNLIGHT ON THE GROWTH OF SUNFLOWER CROP IN DIFFERENT SOILS

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Abstract

Crop growth depends on the ability of leaves to capture and use solar radiation, carbon-di-oxide, water, and Nutrients. The solar radiation provides the energy to derive carbon-di-oxide assimilation and water transpiration process. Changes in climate especially increased atmospheric carbon-di-oxide, temperature, precipitation associated with changes in N2 Deposition, Ozone levels, UV-B Radiation etc., are having great impacts on agricultural production. In this project the impact of growth of sunflower crop raised on different types of soils was studied since it have a relationship between above ground biomass and green leaf index. Plant growth of all crops was determined on the shade dried plant sample till the sample attained its constant weight. This was inferred from the measurement of green leaf.

Clay soil samples were collected from villianur village from the nearby cultivated field. Sandy soil and Red soil, were also taken from cultivable field nearby area. The Three treatments were clay soil, sandy soil, and red soil. Five replications were maintained for each treatments. Sunflower seeds were soaked overnight and sown
in fifteen mud pots. Eight seeds were sown in each pot on the same
day and the pots were watered daily both in the morning and
evening. All the 15 mud pots were kept under sunlight. On the
fourth day germination were observed in all the mud pots. The
height of the plant, number of leaves and growth of the plant were
observed from each experimental pot at weekly intervals.

After 15 day keeping six healthy plants in each pot, the rest of
the plants were removed from each pot without any damage the
other plants. Thinning operation was once again was carried on the
30th day also after germination by keeping five healthy plants in
each pot in order to give a fair and good growth for the rest of the
plant. On the 45th day all the plants were removed after watering
without any damage to the plants. The number of leaves and leaf
surface area for one selected leaf at random from each plant, and
the length of the root and shoot were calculated. Biomass of each
plant was determined as it attained constant weight by shade drying.

PROJECT IDEAS : 2015 - 2016

Sub Theme 1. 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 on characteristics of land and sea breeze and its impact onerosion of
   sandin Coastal 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. Comparative study on atmospheric, soil and water temperature in a locality.
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
Sub Theme 2. Impact of Human activities

1. Studies on heat production by air condition systems in any study area and analyzing alternatives.
2. Monitoring air and water pollution in your locality.
3. Comparison of nature of houses (in terms of materials used, ventilation etc.) their design in terms of heat absorption and other weather parameters.
4. 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.
5. Study the solid waste random disposal /landfill and its effect on nearby water resources and remedial measures.
6. Study the change in land use and land cover in your areas and its impact on climatic conditions.
7. Effect of coral and sand mining from sea shores and its changing impact with changing weather.
8. 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.
9. Impact of changing weather, climate on the mangrove forests, density, eco system as a whole.
10. Study the impact of multi-storied buildings on the local wind velocity and sunlight intensity, temperature, humidity etc.
11. Study on desertification and salinization of land/soil

Sub Theme 3. Weather, Climate and Ecosystems

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 group migration of animals/birds/fish/plants and correlating the same with observed weather change / extreme weather events.
4. 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.
5. Study of sacred groves – seasonal variations of life forms biomass, micro climate studies, interrelationships within the eco system, etc.
6. 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)
7. Study the impact of temperature variation on floral diversity and behavior of plants in an area.
8. Study of phonological changes in a rich biodiversity area with respect to changing weather/season.
9. To study the role of lichens with respect to climate change/weather and biodiversity in a select area.
10. Study of flora and fauna of a wetland in your locality and study seasonal changes if possible.
11. Study of aquatic and terrestrial ecosystems in terms of physical, chemical and biological parameters with respect to seasonal changes.
12. Study of shells and shell fragments from sea beaches and study seasonal variations in their diversity.
13. 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)
14. Study of corals in terms of bleaching etc. with respect to changing weather, seasons.
15. Study of primary productivity in a pond ecosystem.
17. Study of carbon sequestration in forest/grassland/soil.
18. Study/measurement of canopy cover in different seasons of a forest (alternatively dense vegetation, sacred groves, large trees, school campus, parks etc.)
19. Study of a tree as an eco system more specifically a habitat – seasonal changes and changing diversity in niche specialization
20. Study of sediment transport in a drainage channel/catchment by stakes-High measurement over seasons. (Eutrophication)
21. Study of insect diversity of a grassland eco system (alternatively in wet land / dry land etc.)
22. Estimation of biomass in a grass species over the seasons.
25. Study of bird migration due to weather / climate shift.
26. Study of changing housing patterns on sparrow population in a city.
27. Study of wetlands reclamation and its impact on micro climates, birds and other life forms – seasonal studies.
28. Study the impact of changing weather and climate on the eastern Himalayan glaciers
29. Study of local streams and seasonal variations and its impact on local agricultural practices. (Flow rates can be studied as small experiments)
30. Study on earthworm, wasp, ant and other insects under changing environment due to change in climate and weather.
31. Litter disintegration studies in monocrop and multicrop soils
32. Impact of agricultural practices on soil faunal density and diversity
33. Soil faunal migrations in water logged paddy fields…. (premonsson - monsoon - post monsoon)
34. Crustacean larvae in estuaries…. (premonsson - monsoon - post monsoon)
35. Human adaptation in various ecosystems to food and livelihood…. 

**Sub Theme 4. 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 neighbourhood 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 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.

**Sub Theme 5. 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, cowdung cakes soil layer etc which is a practice of soil preparation during March throughout Konkan area of Maharashtra before sowing rice.

15. Study the performance of different varieties of different crops which are adapted to extreme weather conditions like drought or water logging, increased temperature etc.

16. 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.

17. To measure impact of sunlight on the growth of crops in different types of soil.

18. Study of traditional agricultural practices of past and present practices in terms of changing weather.

19. Analysis of seasonal /perennial crops production in various weather conditions.

20. Analysis of milk density in different weather conditions in your locality.

21. Assessment of food habits of traditional people in view of possible supplement to food security

22. Study of the impacts of weather and climate change on traditional agricultural practices.

23. Study of salt farms in coastal areas of Kutch in different seasons.

24. 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.

25. Study of performance of hybrid livestock versus traditional livestock in terms of input costs versus output.

26. Study of effect of heavy rainfall on different crop stages and its effect on production.

27. Study of the effect of dry spells on different crop stages and ultimate effect on production.

28. Study of soil parameters (physical, chemical and biological) in changing weather extremes and its correlation with plant production, crop yields etc.

29. Study of seasonal milk production of various breeds of livestock in the same region – inputs costs versus milk output.

30. 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.

31. Effect of changing weather and climate on crop diseases, pest occurrence, emergence of old diseases/ pests, whether minor pests emerging as major pests etc.

32. Study of different weeds with reference to changing weather on occurrence, growth, flowering and reproduction (overall life cycle)

33. Studies on effect of weather and climate on different crops/grain storage techniques/practices.

34. Study of modern agricultural practices which contribute for increasing levels of GHGs – eg. Deepploughing, using high inputs like chemical fertilizers, pesticides, weedicides, farm machinery etc.

35. 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.

36. Study of sericulture in changing weather/climatic conditions.

37. Study of changing weather and climatic conditions on floriculture.

38. Comparative study of System of rice intensification (SRI) of paddy cultivation with conventional paddy cultivation with respect to less water intensive method.

39. Study of the practice of burning the stock of sugar cane on the next crop in Puducherry.

40. Study the impact of biochar on crop growth and soil parameters.

41. Study of short term vegetable cultivation versus long term crops as a strategy to cope with changing weather/ climate. (green vegetable cultivation).

42. Residual moisture based farming – Suitability for post monsoon crop.

43. Analysis of yield and quality of spices due to weather/climate change in hilly regions with special relevance to onset of South west monsoon.

44. Comparison of seasonal crop calendars and their variation within an agro-climatic zone – regional variations and differences and their rationale.

45. Comparative study on crop performance through hydroponics and normal crop production system.

46. Study on yield advantage of mono cropping and mixed cropping

47. Harvesting of rain water and its re-use
Sub Theme 6. 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. 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.

5. Participatory Village level mapping of your locality with reference to landscape, natural resources, health and sanitation facilities, vulnerable localities for epidemics and making a people plan for interventional strategies with pre and post intervention impact studies.

6. Study of pattern of common diseases in the general population in relation to changing local weather conditions including seasonality, frequency etc.

7. Study of various skin diseases in the last three years in your locality related to changing weather, climate etc.

8. 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.

9. Study the impact of weather and climate on food, fruits, vegetables, fish etc. and their durability during various seasons/weather.

10. 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.

11. To study the impact of humid weather on skin related diseases/infections.

12. Prevalence of nature of disease in domestic animals as an effect of weather and climate.
The text appears to be in a non-Latin script, possibly a script from a language like Sylheti or Assamese. The content seems to be a list of items, possibly instructions or notes, followed by some contact information at the bottom. Due to the nature of the script, it is challenging to provide a natural English translation. However, for completeness, here is a transcription of the visible text:

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