Summer internship project report at SEWA

GIS: A NEW TECHNOLOGICAL SOLUTION FOR RURALS

Submitted to,
SEWA

Prepaid by,
Meghal Soni
Student
DA-IICT
Acknowledgement

It is our pleasure to acknowledge Dr. Ranendu Ghosh (DA-IICT, Gandhinagar) who gave us such a great opportunity and providing valuable suggestion to apply our best knowledge of GIS in Rural development in a practical way.

With great pleasure, we extend our deep sense of gratitude to Prashant Sir (SEWA, Ahmedabad), Smita mam (SEWA, Ahmedabad), Veena mam (SEWA, Ahmedabad), Chhaya mam (SEWA, Ahmedabad), for providing facilities and valuable suggestion throughout the project work.

Our deepest thanks to Mr. Kanubhai (Sukhi Mahila Sewa Mandal, Bodeli) for sharing his best knowledge and experience with us.
<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Title</th>
<th>Page no</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Executive summary</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GIS Overview</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Focused group discussion</td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Major problem Identified</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Data collection and GPS survey of the study area</td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td>Information Collected from Talati of Simaliya village</td>
<td></td>
</tr>
<tr>
<td>4.2</td>
<td>GPS survey of the study area</td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>Collection of differently located point of water sources.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cadastral map and database creation with GPS data integration in ArcGIS</td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>Creation of cadastral Map</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>Imposition of different shape file created with GPS device</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Analysis and suggestion</td>
<td></td>
</tr>
<tr>
<td>6.1</td>
<td>Suggestion of Check dam</td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>Desilting of existing Check dam</td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>Farm ponding and contour bunding</td>
<td></td>
</tr>
<tr>
<td>6.3.1</td>
<td>Farm ponding</td>
<td></td>
</tr>
<tr>
<td>6.3.2</td>
<td>Contour bunding</td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>Alternate cropping pattern</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Reference</td>
<td></td>
</tr>
</tbody>
</table>
Executive summary
GIS Overview

A geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts. A GIS helps answer questions and solve problems by looking at data in a way that is quickly understood and easily shared (Data & Data, n.d.)
Work done in Internship

We have done our internship project in following four parts

1. Focused group discussion
2. Data collection and GPS survey of the study area
3. Cadastral map and database creation with GPS data integration in Arc GIS
4. Analysis and suggestion
   a. Suggestion of Check dam
   b. Desilting of existing Check dam
   c. Farm ponding or contour bunding
   d. Alternate cropping pattern

1. **Focused group discussion**
   - We have visited five villages of Vadodara district and conducted focus group discussion in each village to identify problem faced by the villagers
     1. Simaliya
     2. Bodeli
     3. Muldhar
     4. Chachak
     5. Alikherwa
   - On priority basis we have selected simaliya village for detailed study.
   - We went to simaliya village with the locally known person in that village. Villagers gathered at somebody’s home for discussion.
   - We need to explain them first who we are? From where we are coming and for what purpose.
   - We have kind of focused group discussion with the villagers for almost one hour.
   - We were asking some kind of open ended question to the villagers to get information from them like
     - What is the population of their village?
     - What kind of crops farmers are growing in different season?
     - What is the cropping pattern?
     - What is the source they are using for the irrigation? And if there is not availability of water in particular season what else farmers do for irrigation?
Internship Report at SEWA

- What is the source for drinking? Is there source nearby their house or the villagers need to walk far away for the water.
- What are the problems they faces while doing agriculture practices like availability of certified seed and fertilizer at time of sowing at what price etc.

Major problem Identified

- The major problems expressed by the villagers of simaliya are as under.
  1. The water level in the open wells used for irrigation is reducing due to overdrawn.
  2. Due to sand mining in the river water level in the river goes down as result water level in nearby well to the river is also get reduced. As a result villagers don’t get enough water for irrigation and drinking from that well.
  3. Lack of availability of certified seed and fertilizer at time of sowing.

- For our internship project we have selected first two problems and try to resolve that problems up to some extent with GIS.

2. Data collection and GPS survey of the study area

Information Collected from Talati of Simaliya village

- We have conducted meeting with villagers and gathered some information about the village. For the clarification and to get some another information we went to talati of simaliya village and collected information about the simaliya village.

- Information Collected from Talati of Simaliya village on 28th May, 2012 as under.

  - Population Details
    - Men: 627
    - Women: 600
    - Total: 1227
    - House hold: 285
    - Farmer: 165
Area Details
- Agricultural area: 153.9703 hectar
- River area: 41.9864 hectar
- Public purpose area: 2.5698 hectar
- Pasture area: 5.5948 hectar
- Total area: 216.0735 hectar

Drinking Water and Irrigation Source Details
- Bore well: 5 [Irrigation]
- Well: 60 [Drinking + Irrigation]
- Hand Pumps: 5 [Drinking]
- Water Works: 1 [Gram Panchayat]

Soil Condition and Type: Black and Goradu
Forest Area : No Forest area
Major crop details
- Rabi: Maize
- Summer: Groundnut, Bajra
- Kharif: Cotton, paddy
- Other crop: Banana, Tur, Vegetables

Education Purpose
- Anganwadi: 1
- Primary School: 1 [1st to 5th standard]

We have also collected information about all survey no of the farms with its owner and area of that field for data integration.
GPS survey of the study area

Collection of differently located point of water sources.

- After collecting information from talati about the source of the irrigation and drinking water supply we went to simaliya village with Trimble juno sb handheld GPS device for collecting differently located open wells, bores and hand pumps of whole simaliya village.
- While collecting the point we need to walk through field by field and find the water source. Sometime we also need to talk with the farmer working in their field about that where we can find the well and bore etc
- We have also collected 15-20 point from different location for Georeferencing purpose. Collected point should be such that can be clearly seen in the field and also in the map.
- We have also collected data about the kind of soil in the village and what is current cropping pattern so that we can suggest the alternate land use to the farmers if required.
3. Cadastral map and database creation with GPS data integration in Arc GIS

Creation of cadastral Map

- We need to create cadastral map for working in Arc GIS. Cadastral map helps in providing a ready means of precise description and identification of particular pieces of land and it acts as a continuous record of rights in land. We got the jpg image of the simaliya village and make it georeference with adding control point collected in the field with the help of Arc GIS.

- We have made cadastral map from georeference jpg image of simaliya with polygon features in Arc GIS.

- We have also created database for identification of each polygon in the cadastral map like survey no, ownership, area etc.

- We have integrated data collection files of soil type and current cropping pattern with cadastral map and create two another maps for soil type and current cropping pattern analysis.

- Cadastral map of Simaliya Village.
Imposition of different shape file created with GPS device.

- After creation of cadastral map we have imposed shape file of different point, line, area features collected with Trimble Juno sb handheld GPS device in Arc GIS.
- We have imposed shape file of point feature collected of different open wells, bores and hand pumps with Trimble Juno sb handheld GPS device on the cadastral map of simaliya. This will helps in understanding water source available to particular farmers.
- Cadastral map with different water source.
4. Analysis and suggestion
   
a) Suggestion of Check dam
   
   ❖ As per our field observation we have seen that there are some Check dams which are already exists in the downstream part of the kotar. This Check dams are of machinery structure.
   
   ❖ **In upstream part where force of the water is less** than downstream, there we can create series of earthen Check dams so that water runoff around that area can be decreased and water level gets increased around that area. Slope around that area is to the upstream shown in figure.
   
   ❖ Location of existing Check dam and suggested earthen Check dam has shown in the image below.

   ![Diagram](image.jpg)

   ❖ Line shows in the figure are suggested earthen Check dam

   ❖ Locations of suggested earthen check dams are as under. This Check dams are at 50 meters of distance.
     
     ❖ Between survey no 98/2 and 56
     ❖ Between survey no 98/1 and 107
     ❖ Between survey no 102 and 106
     ❖ Between survey no 102 and 105/2

   These check dams will helps in recharging area approximately up to 100 meters and the wells of survey no 102 and 106 and bore in 98/1 and increase water level in the surrounding area.
b) Desilting of existing Check dam

Existing Check dam b/w Survey no 63-64

Existing Check dam b/w Survey no 67-92

Existing Check dam b/w Survey no 62-66

Existing Check dam b/w Survey no 67-97
We can desilt in the existing check dams up to perennial material came. We can increase the depth of the ground near to the Check dam in upstream side by removing soil in that part so that there would be more area for water storage and more area will recharge. It will increase the area of water storage.

c) **Pond structure making and Farm ponding and contour bunding**

**Pond structure**

- As per our field observation we have seen that pond already exist in survey no 83 which is under government property. It helps surrounding field for irrigating their field in the monsoon season. When this pond full of water farmer used to irrigate their field with machine and motor. But there is still people fill water scarcity in summer season.
- There is another pond in upper part of the village in survey no 76, but it is somebody’s personal property.
- We have also observed that survey no 79 is also under government property and it is currently fallow. So we can do such type of structure there. It will helps in irrigating other field also. It government property so there might be no objection from other peoples.
Contour bunding and farm ponding

- As per our field observations and discussion with local peoples about the slope of the soil and water runoff side, we find that slope is down to the Chachak village side near to railway line.
- Then we have made 50 meters of buffer around the wells near the railway line with Arc GIS shown in image below.

- Our prime goal is to recharge the wells, for that we can create contour bunding kind of structure around the well on the field boundary. That will not only store the water but also prevent soil erosion.
- As sown in figure we can create counter bund around the field boundary of following survey no 43/1, 43/2, 43/3, 45, 119/1, 119/2, 119/3, 46/3, 118/1, 117/2, 114, 118/2 Contour bunding around this field will be helpful in recharging water sources shown in figure above.
d) Alternate cropping pattern

- For agriculture practices improvement we have created current land use map and soil type maps, on basis of that maps we want to suggest the farmer alternate land use pattern. We have also considered agro climatic condition of that area [Middle Gujarat agro climatic zone].

- Soil of simaliya is lack in potassium [according to soil report given to us]

[Not completed]

Reference