

*Geographic Information System for Improving the
Policies That Reduce Child Poverty in Sudan
(Case Study of Alosylat Region –Shareg Alnil–Sudan)*

(A Pilot Project)

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Presentation Agenda

- ▶ Introduction
- ▶ Background
- ▶ The Pilot project Objectives
- ▶ Why We Create The project
- ▶ Methodology & Database
- ▶ The Results Reliability
- ▶ Results and Discussion
- ▶ Conclusion



Introduction

The information society

We as a global society, we have access to more information than our forefathers. and entered the term of age of Information knowledge.



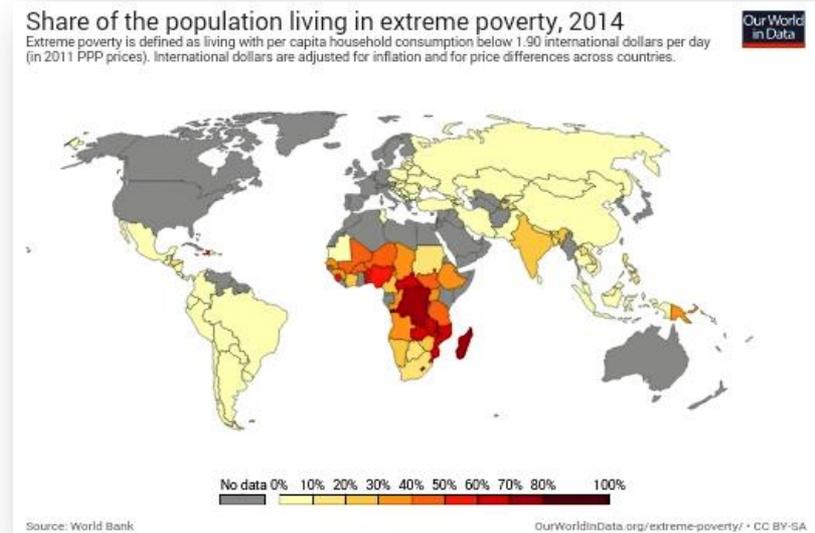
- ▶ The socio-economic impact of information
- ▶ The socio-economic impact of information is huge and sustainable development is unthinkable outside of a knowledge-based society.



Background

Poverty has a spatial aspects

Poverty coverage some places while difference from place to place, and it has correlated to local geographic factors (*Minot et al. 2006; Okwi et al. 2007*). The policy makers for children poverty reduction need information and tools to identify areas where the poor children live (*Henninger and Snel 2002*). GIS is a potential tool to analyze, overlay, buffer, query, and integrate physical social and environmental factors



- Sudan total population 42,113484
- 36.1% of population bellow the global poverty line (AFDB ,2018)
- 2,300,000 children in need (UNICEF ,2017)
- 1,100,000 children internally displaced UNICEF ,2017)
- 3.1 million out-of-school children in Sudan (UNICEF ,2017)

Background

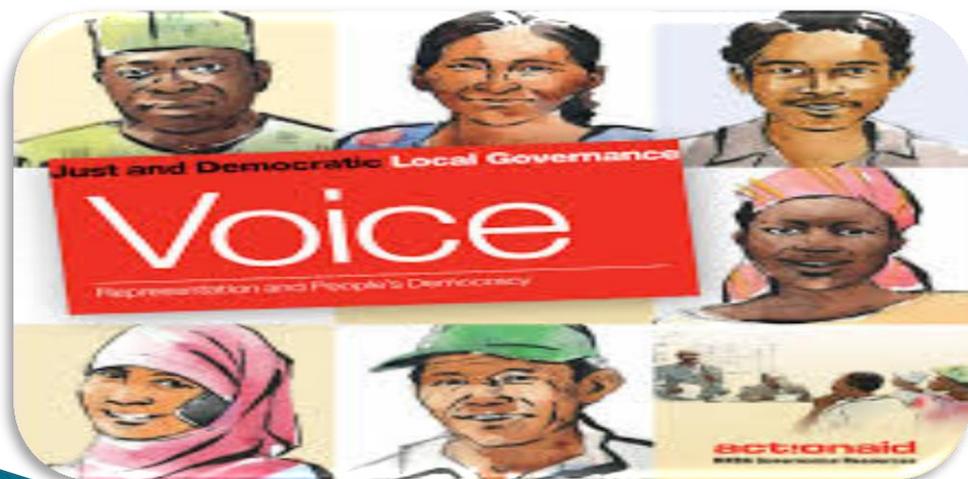
Estimated child population	20.44 million (50.9%)
Estimated child population under the age of five	5.95 million (14.8%)
Estimated female population of child bearing age	8.96 million (44.5%)
Under-five mortality rate	112 deaths/1,000 live births
Infant mortality rate	81 deaths/1,000 live births
Maternal mortality rate	1,107 deaths/100,000 live births
Children under-five moderately and severely underweight	31%
Exclusive breastfeeding rate (up to six months)	33.7%
Fully immunized children aged 12-23 months	41.4%
Women immunized against neo-natal tetanus	48.8%
Estimated prevalence of diarrhoeal disease amongst under-fives [†]	28.2%
Estimated prevalence of malaria amongst under-fives [†]	20.9%
Proportion of mothers accessing ante-natal care	69.6%
Proportion of births attended by qualified health personnel	49.2%
Proportion of births taking place at home	80.6%

In 2006 the first national data on critical child and maternal health and nutrition indicators for more than 20 years from Sudan Household Health Survey, (*UNICEF 2009*)

Background

knowledge of the local people

The best approach to a deeper understanding of the available resources and assets of the community is to include the knowledge of the local people to assess, analyze and plan



Background

The participatory GIS (P GIS)



Participatory Geographic Information System (PGIS) developed from the blending of Participatory Learning and Action (PLA) methods with Geographic Information PGIS combines a variety of geo-spatial information management tools and methods to represent peoples' spatial knowledge in either virtual or physical formats

Background

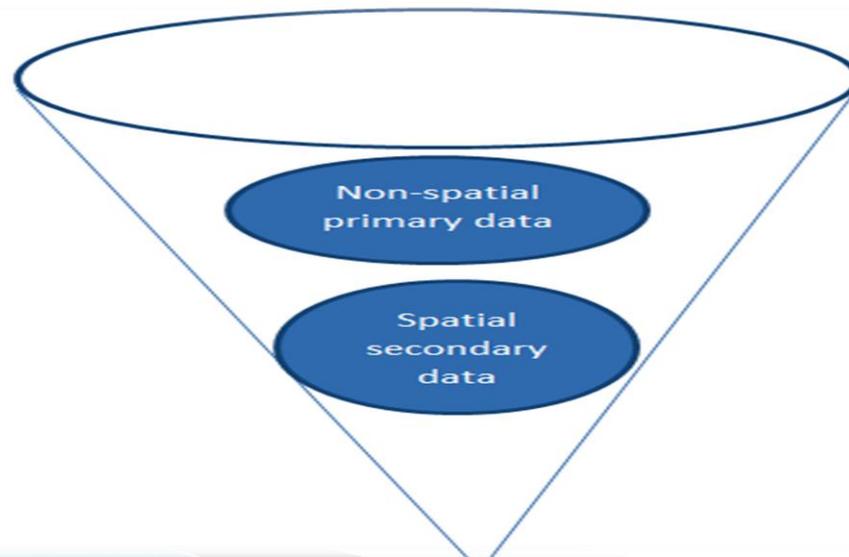
Why Child poverty important than adult poverty

Child poverty important than adult poverty because childhood is growth stage of physical intellectual and psychological of human, the vulnerability of children in this stage, discrimination probability within the household, and early age contribution to household and social development



The Pilot Project Objective

- ▶ **The basic objective of the project outcome** is improving the policies that reduce child poverty by using GIS as a geographic database, planning and monitoring tool (Case study of Alosylat region– Shareg Alnil– Sudan)
- ▶ The specific objectives of the project outputs are to:–
- ▶ Generate information about the children poverty situation based on current reality from local knowledge (participatory manner) using the qualitative research methodology to acquire non–spatial primary data
- ▶ Integrate non–spatial primary data with spatial secondary data to acquire spatial children poverty information using GIS (*Figure 1*)

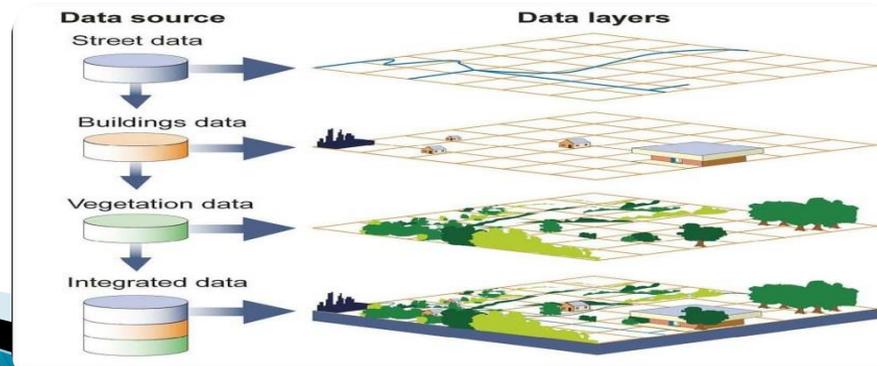


Why We Create The project

- ▶ Fighting poverty in childhood in Sudan at an early stage
- ▶ It is evident that in Sudan legislators/planners assumed that the policies created to reduce family poverty would also reduce childhood poverty, but that has not been the case. Therefore, in order to reduce childhood poverty, policy makers also need to effectuate policies that specify measures that will reduce poverty in children



- ▶ Lack of geospatial data in Sudan to show the places where poor and vulnerable children live in urban centre



Why We Create The project

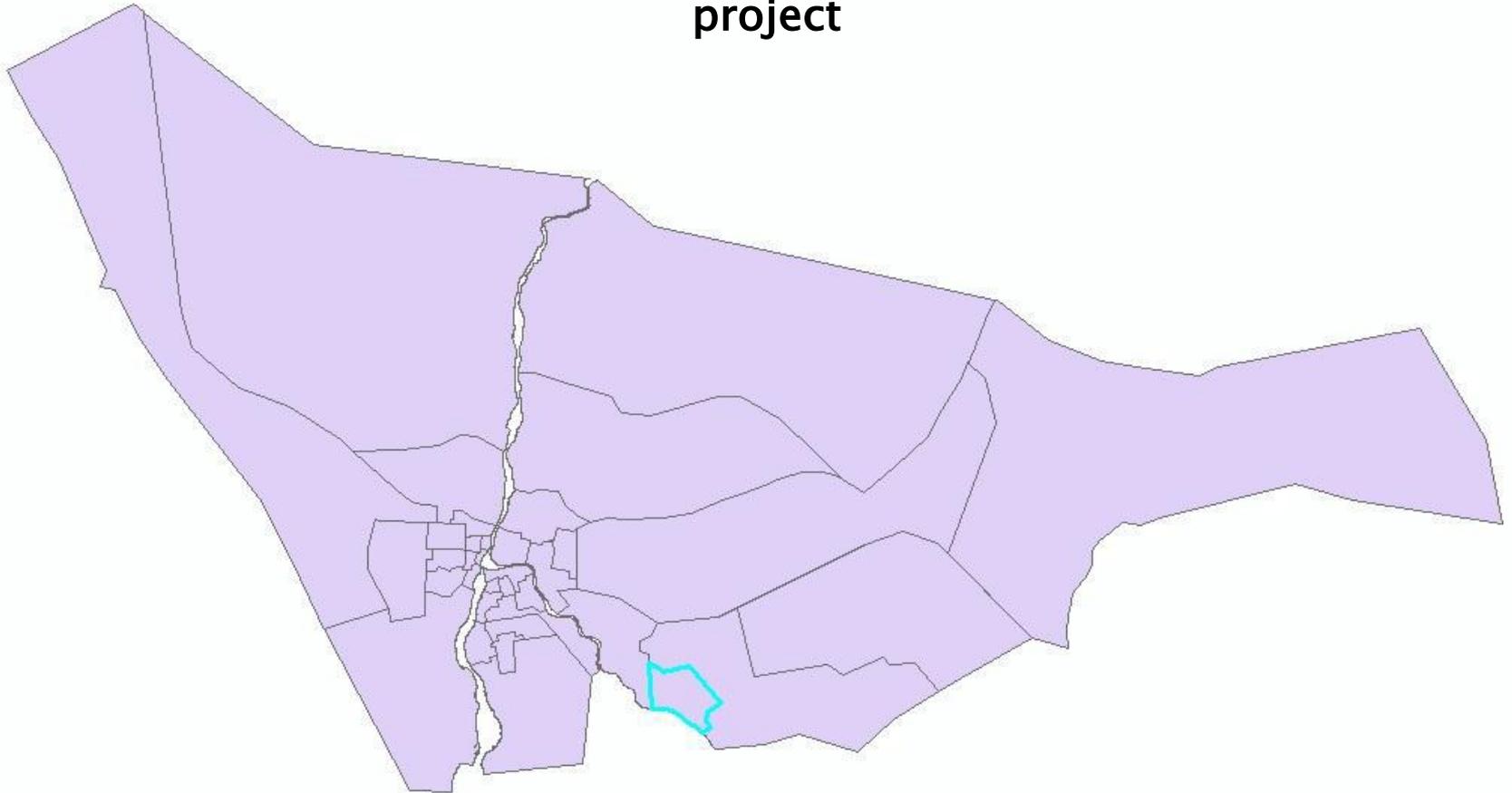
- ▶ Lack of participation in decision making by the community and stockholders as most of the Sudan policy is prepared in urban centre

Top Down



Methodology and Database

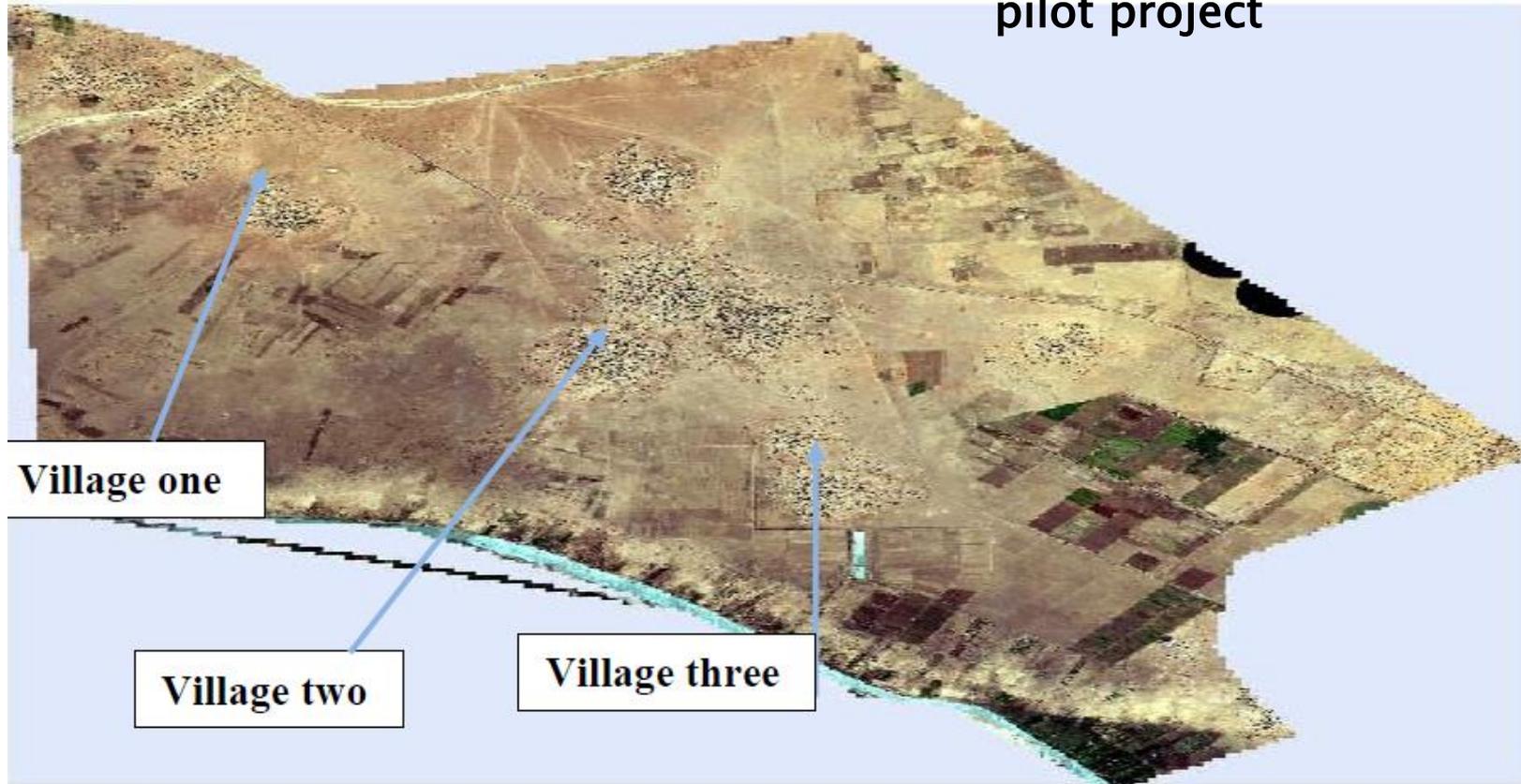
The Study area of the pilot project



Map of Khartoum State (Image from Sudan Ministry of Federal Health ,2004)

Database Methodology

The Study area of the pilot project



West	32.804784	East	32.939667
North	15.430915	South	15.298017

Map of Alosylat Region (Image Nokia Ovi Maps 2016)

Methodology and Database

Methodology

1. Collection of Data

A. Primary data

- ▶ Collection of primary data (non-special data) by using PRA, walking the field and using GPS

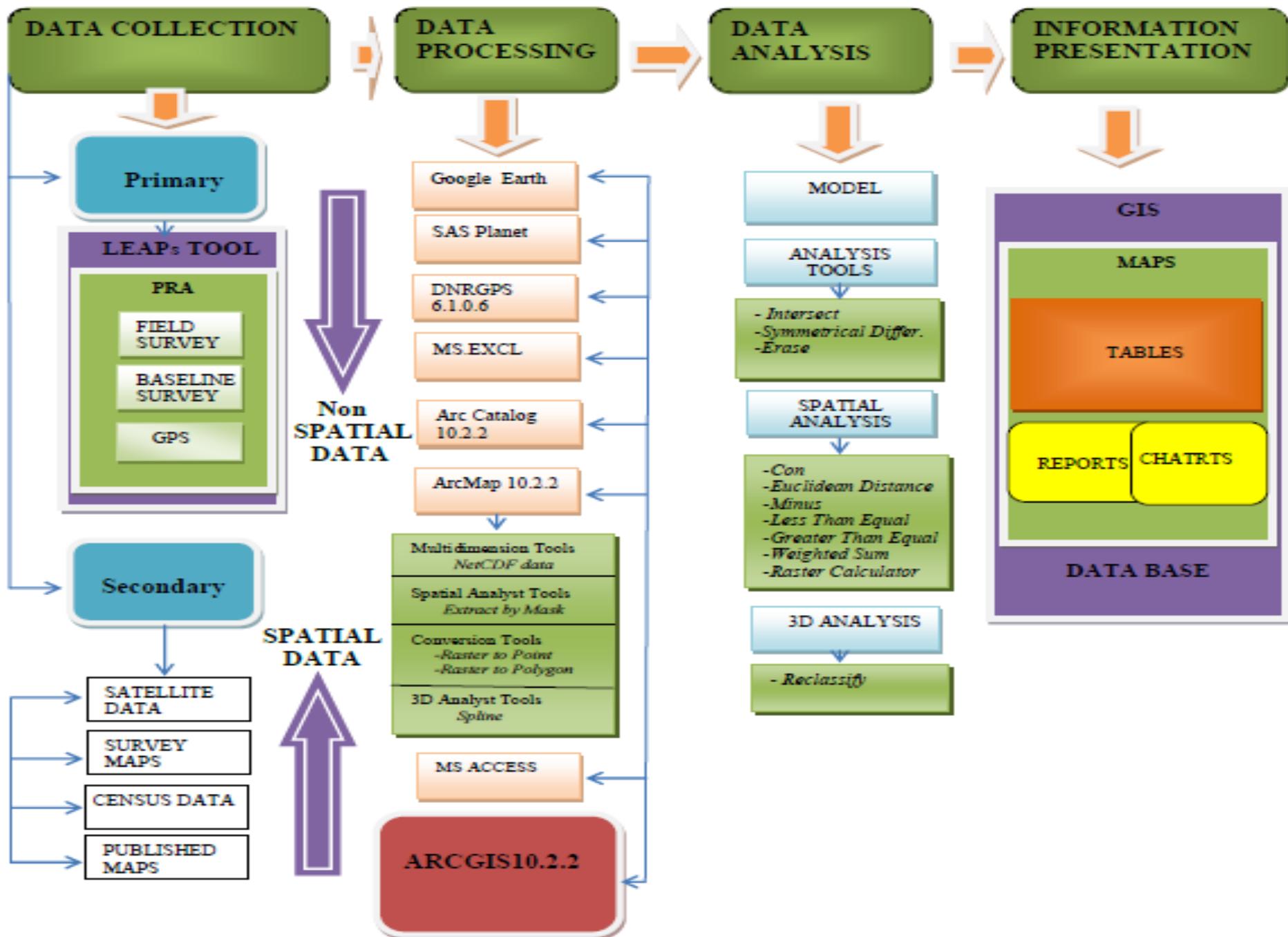
B. Secondary data

- ▶ Collection of secondary data (special data) by Satellite data generated by Google Earth, free datasets portals and DG sat free

Methodology and Database

- ▶ **2. Processing of data**
- ▶ Used a variety of software programs I.e. Google Earth, Microsoft Excel, Arc Map Microsoft Access, ArcMAP 10.2.2, ARC Catalog 10.2.2, and SASPlanet
- ▶ Mapped people's spatial knowledge of area to create layer maps that were supplemented by geo spatial or map based...

- ▶ **3. Analyzation of data**
- ▶ The ArcGIS 10.2.2 analysis tool used for data analysis
- ▶ **4. Presentation information**
- ▶ ArcGIS 10.2.2 presented the spatial knowledge of the people in the form of layers maps



The Results Reliability



- ▶ The child poverty reason is common to poverty experienced by parents (*Batana et al, 2014*)
- ▶ Poverty indicators are:
 - ▶ # Lack of Education Service
 - ▶ # Lack of Health Service
 - ▶ # Low of income and natural resources



Presentation of Results Achieved and Discussion

▶ **Social Map**

▶ **What is a social map?**

- ▶ “A social map is a map that is drawn by the residents and which shows the social structures and institution found in an area . It helps us learn about social and economic difference between house”

▶ **What is the role of Arc GIS in integrating social information?**

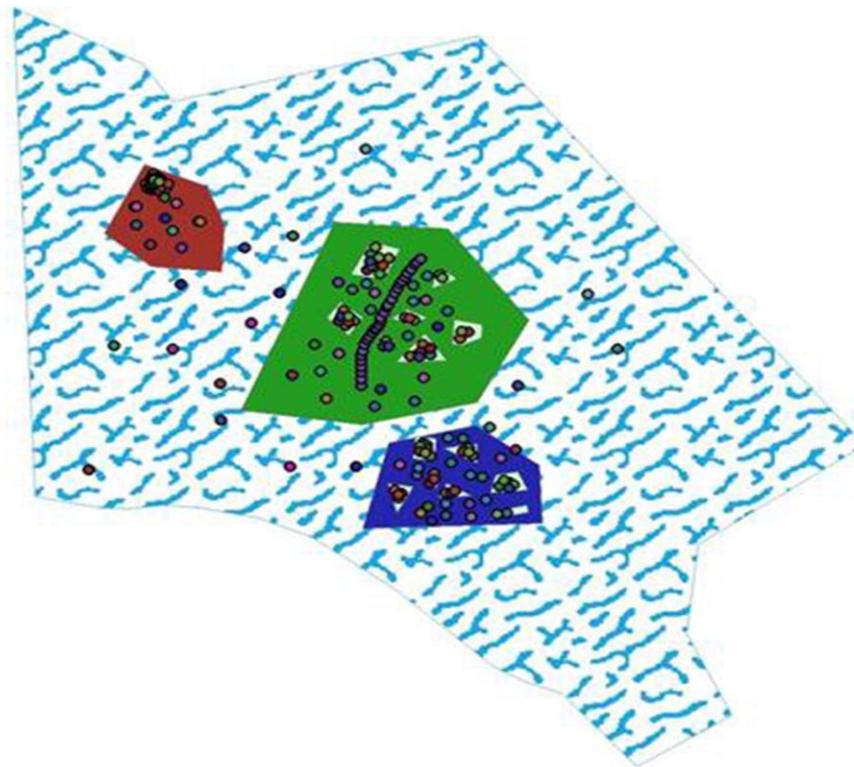
- ▶ The GIS integrated all the social map information [the number of families and households, population, poor data, housing particulars, livestock, infrastructure, pensioners and institutional aspects] for the three villages and stored it to one geo database system in layers as show in the below Map

▶ **What the specific potential uses of Social Map by planner are?**

- ▶ The Policymakers need to know what is the children poverty situation for the three villages given the characteristics associated with childhood poverty in social maps information [poor data, housing particulars, education and health institutions, livestock, infrastructure, pensioners and institutional aspects] before he initiates priority planning or managing activities for children poverty reduction. Use the integrated information of the characteristics associated with childhood poverty in social map and quarrying in this geodatabase system enables the Policymakers \planner to identify which village has the most extensive rate of childhood poverty and to visualize the children poor houses on a georeferencing map

Presentation of the Results and Discussion

The Social Map



Legend

Homes

Villages

Village Name

- Algwaz
- Alhoyla
- Alhsnab

Rigions

Region_name

- Alosyat

Legend

Social_map

Objectds

- Families
- Households
- Below Poverty Line (BPL)
- Bus Facility
- Bus shelter
- Cable connection
- Cement Roads
- Child Labor
- Church
- Community Halls
- Cooperatives
- Galose Houses
- Hand Pumps
- Hospitals
- Houses with cable connection
- Huts
- Masjid
- Migration
- Muslah Houses
- Office
- Old age
- Orphans
- Others
- POOR
- Physically Challenged Persons
- Poorest Of the Poor (POP)
- Post Office
- Private Taps
- Private Toilets
- Public Distribution system (PDS)
- Public Taps
- Public Toilets
- School Building
- Single Women
- Subscriber Trunk Dialing (STDs)
- Telephone Facility
- Toab Houses
- Veterinary Clinic
- Water Tank
- Wells
- Widows
- Working NGOs
- Youth Clubs

Presentation of Results and Discussion

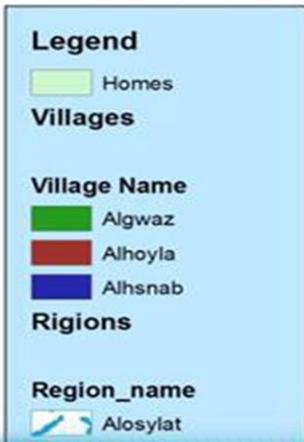
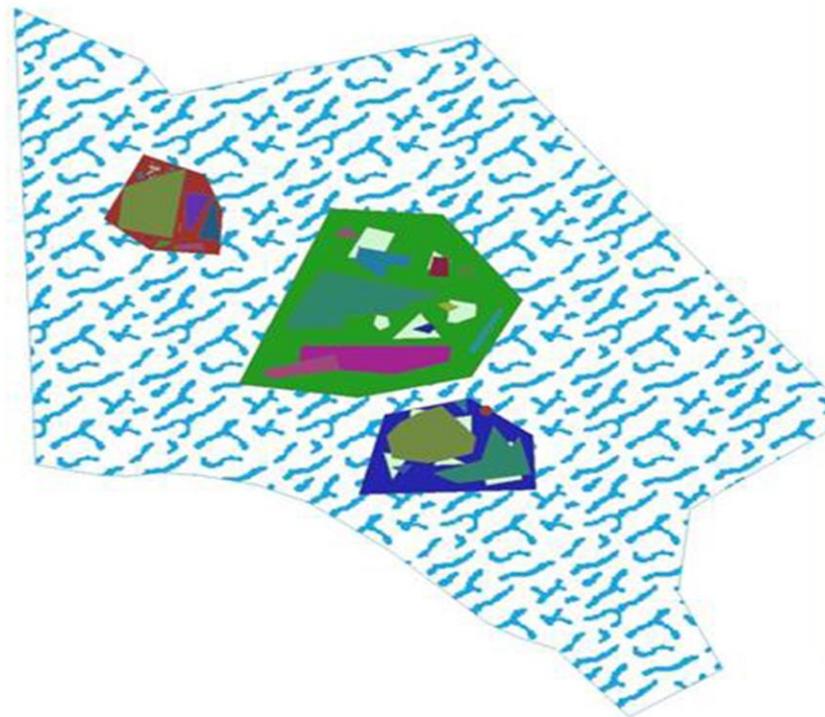
- ▶ **Resources Map**
 - ▶ **What is a resource map?**
 - ▶ The resource map is a tool that helps us to learn about a community and its resource base. The primary concern is not to develop an accurate map but to get useful information about the local perception of resources

 - ▶ **What is the role of the GIS in integrating information to create a resource map?**
 - ▶ The GIS integrated all local knowledge of natural resource information [such as the total type of land (in acres), important crops with the number of acres, type of the soil and natural resources for the three villages] and stored it to one geodatabase system and layers, as shown in the below Map

 - ▶ **What the specific potential uses of Resources Map by planner are?**
 - ▶ The Policymakers \planner can use the geo-database quarry to analyze, create a symbolic map and to visualize the distribution of resources by type (land by type of soil, irrigation sources, crops grown, and type of forest produce available etc.) in all the three villages before initiating the preparation of children poverty reduction policy
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Presentation of the Results and Discussion

The resource map

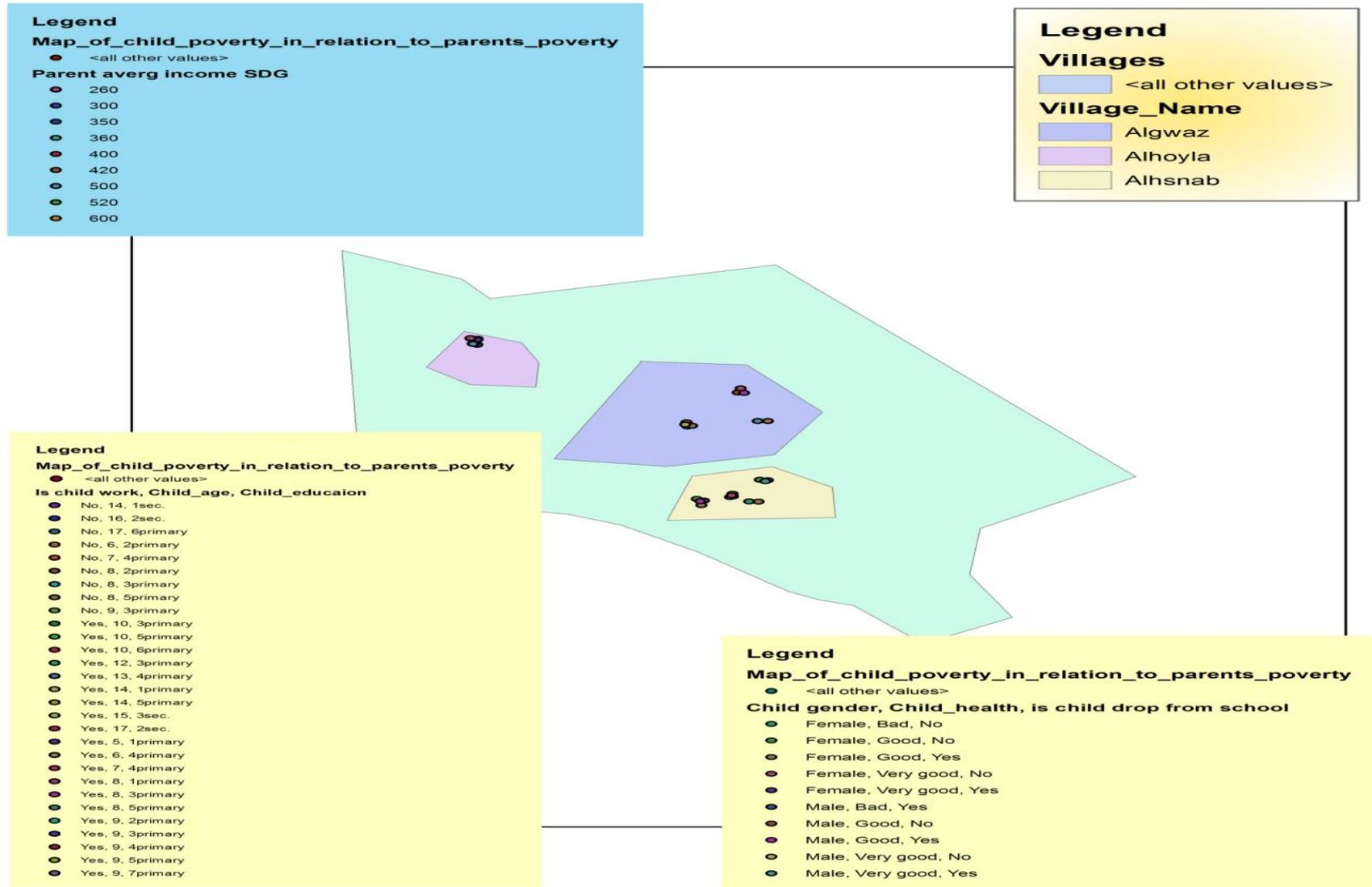


Presentation of the Results and Discussion

- ▶ **Map of child poverty in relation to parents poverty**
- ▶ **What is a Map of child poverty ?**
- ▶ The child poverty reason is common to poverty experienced by parents (Batana et al,2014).The policymakers need to know the degree of childhood poverty in relation to parents' poverty in every village before he initiates priority policy for children poverty reduction
- ▶ **What is the role of the ArcGIS in integrating information to create a child poverty map?**
- ▶ The GIS integrated all local knowledge of child poverty in relation to parents poverty information and stored it to one geodatabase system and layers, as shown in the below Map
- ▶ **What the specific potential uses of child poverty map by planner are?**
- ▶ Use the integrated information of the Map below of child poverty in relation to parents' poverty and quarrying in this geodatabase system enables the policy makers to identify which village houses have the most extensive rate of child poverty in relation to parents and to visualize them on a georeferencing map

Presentation of the Results and Discussion

child poverty map



Presentation of the Results and Discussion

- ▶ Education analysis map
- ▶ **What is Education analysis map ?**
Access to a quality education is a critical basis for a child to be able to succeed in their lives socially and economically. (Batana et al,2014).The education analysis portrays the education profile of the village
- ▶ **What is the role of the ArcGIS in integrating information to create an education analysis map?**
- ▶ Using GIS which integrated all the education analysis for the three villages and stored it to one geodatabase system and layers as shown in the Map below
- ▶ **What the specific potential uses of education analysis map by planner are?**
- ▶ Help policy decision-making users who use the system to quarry, analyze, and visualize objects on the geo-referencing (GPS) map for the three villages together and It will enable the policy makers to understand the quality education of the villages before creating children poverty reduction policy

Presentation of the Results and Discussion

Education analysis map

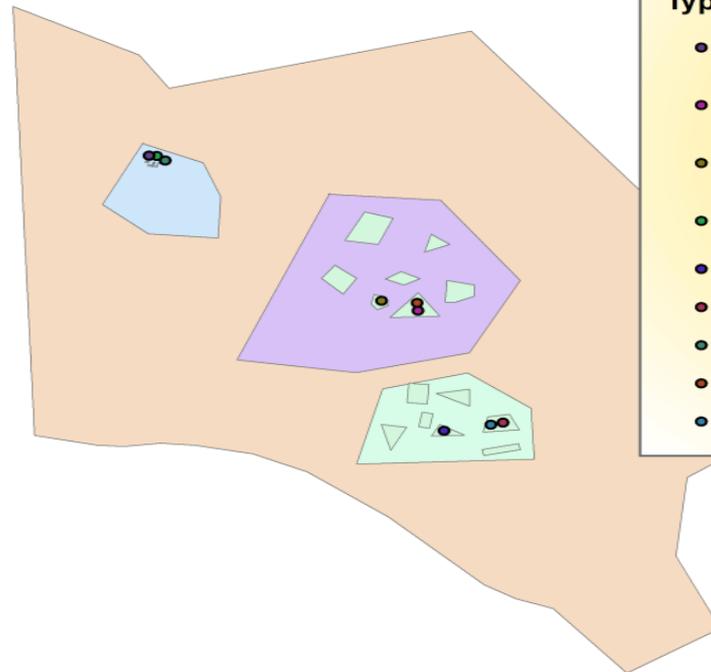


Presentation of the Results and Discussion

- ▶ **Children Vulnerability Analysis**
- ▶ **What is vulnerability analysis?**
- ▶ The vulnerability analysis depicts a profile of the vulnerable children in the village. It aims to depict the risks and dangers faced by children
- ▶ **What is the role of the GIS in integrating information to create a vulnerability analysis map?**
- ▶ GIS integrated all of the vulnerable children information(Child labor, orphan, disable, divorce parents drinking alcohol...)for the three villages and stored it into one geodatabase system and layers as show map bellow
- ▶ **What the specific potential uses of vulnerability analysis by planner are?**
- ▶ The policymakers need to know where is vulnerable children location , the geodatabase enables him to quarry, analyze vulnerable children geospatial information and visualize it on a georeferencing map to create risk reduction and management policies for children poverty reduction

Presentation of the Results and Discussion

Vulnerability children map

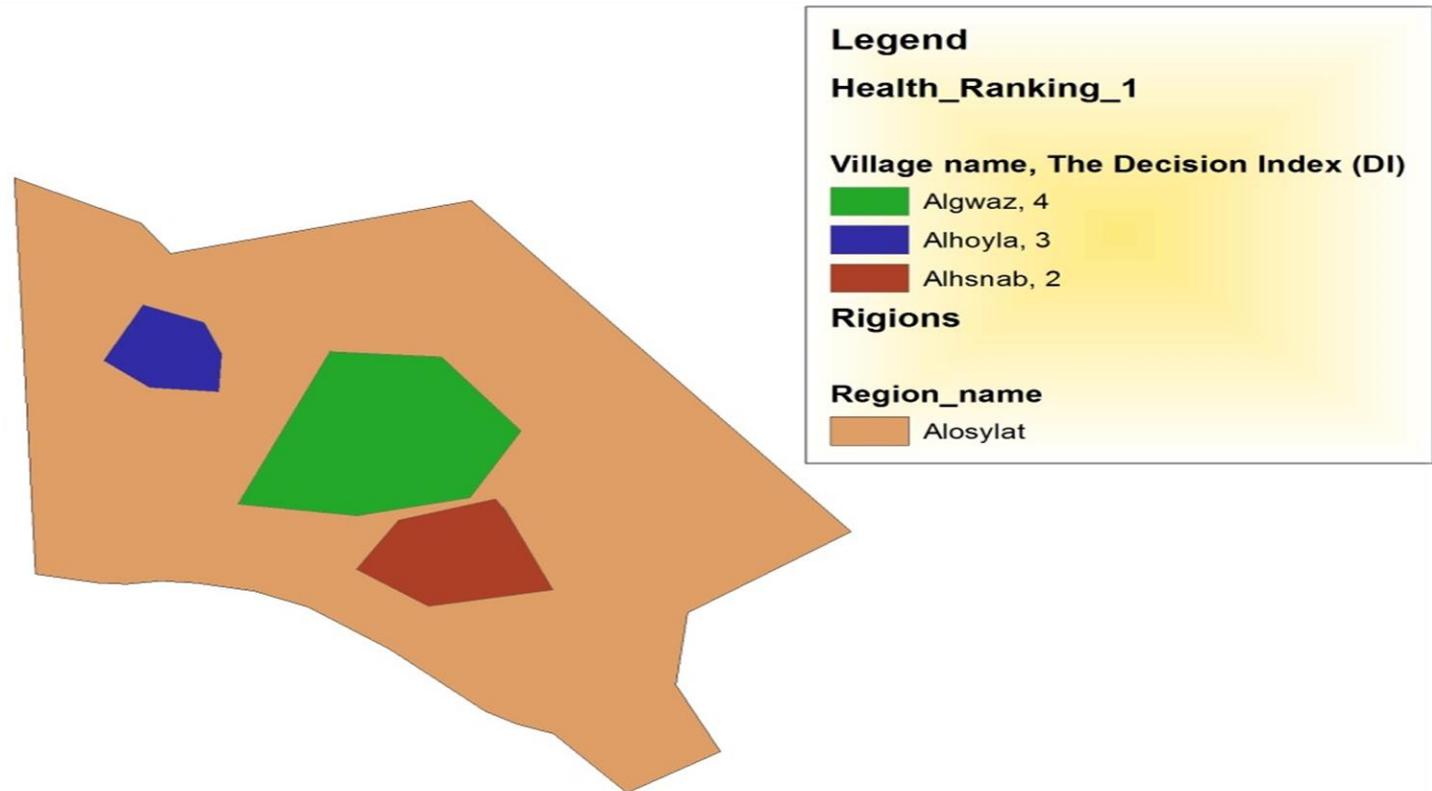


Presentation of the Results and Discussion

- ▶ **Education and Health Ranking Analysis map**
- ▶ According to UNICEF (2009), nearly 5 % of primary students have to travel more than 3 kilometers to attend the nearest school, and primary health care coverage is estimated at 40% in Sudan northern states
- ▶ The education and health-ranking tool help to a rank status of availability of education and health services in any village/location. Using GIS, which will integrate all the Education and Health Ranking information maps for the three villages and stored it to one geodatabase system and layers as shown in the Maps below , It will help policy and decision-making who use the system to quarry, analyze, and visualize objects on the geo-referencing (GPS) map for the three villages together so establishing school,college ,and healthcare centers in the health and education bottom ranking villages take priority over high or medium ranking villages to save money and efforts in policy
- ▶ ***Example:***
- ▶ On map of Health Ranking Analysis, the factors give the Decision Index No. 3 for Alhoyla villages (Blue color), 4 for Algwaz village (Green color) and 2 for Alhsnab village (Brown color). This signifies that the Algwaz Village is in the top ranking and Alhsnab Village is in the bottom ranking in health.
- ▶ On education ranking Map shows 4 for Alhoyla villages (Green color), 4 for Algwaz Village (Green color), and 3 for Alhsnab Village (Blue color). This indicates that the Alhoyla and Algwaz villages are in the top ranking, and the Alhsnab Village is in the bottom ranking in Education

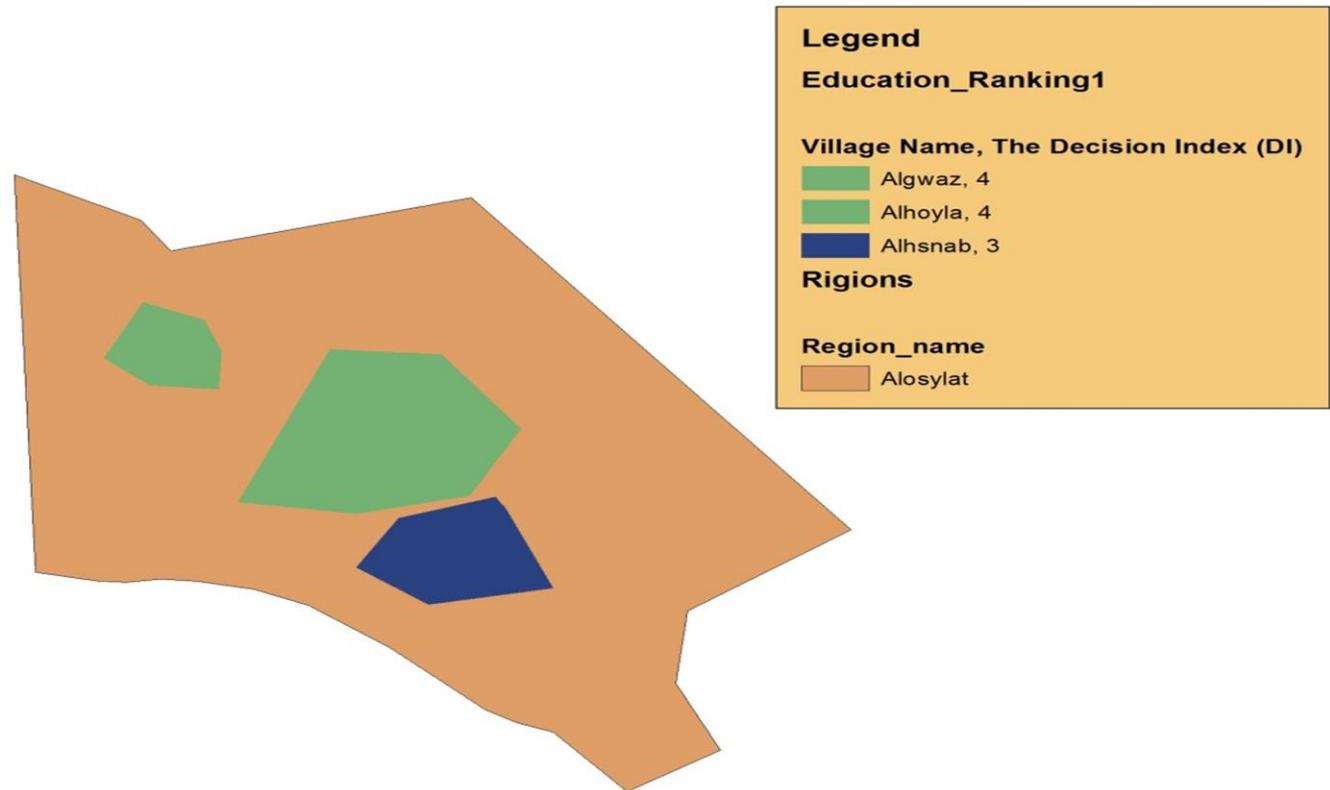
Presentation of the Results and Discussion

Health Ranking map



Presentation of the Results and Discussion

Education Ranking map



Conclusion and Future Work

- ▶ The findings of this pilot project will benefit poverty children because participatory GIS plays a vital role in the success of the policy. This process can be used in addition to village and micro level policy as well as policy at the regional and national levels in Sudan. The greater demand for Electronic Governance (E-Governance) in Sudan justifies the need for project of GIS for childhood poverty. Policymakers that apply the recommended approach derived from the results of this project will be able to improve their policy for poverty children reduction.
- ▶ This study will help other ArcGIS users to use the same approach to cover additional regions in Sudan. (The system has the potential to store unlimited villages numbers).
- ▶ The same project may be used to establish a web-GIS.
- ▶ It's recommended that future work to use the same approach for additional villages and micro level planning systems as well as national and regional planning in Sudan.
- ▶ Since this study had only focused on integrating some of the child poverty indicators with (PGIS), it's recommended that future work is carried out on other child poverty indicators (Conflict, Access to water, Deprivation Analysis, Nutrition, Sanitation, Shelter, SAFE).
- ▶ It's recommended that future work to use the same study with web-(GIS) to establish a Geospatial child poverty Village Information System in Sudan.

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▶ Questions



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