



One-Day Workshop on 3-D Mapping as a Participatory Planning Tool
GILLBT Training Center, Tamale, Ghana
9 a.m. – 5 p.m.
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Prepared by: Romeo Banaynal, Ernest Dwamena, Nancy Keith

Introduction

Think Globally, Act Locally, a statement that argues that global environmental problems can turn into action only by considering the interplay of ecological, economic, and cultural differences locally. The entire landscape that supports mankind is made up of a mosaic of interacting ecosystems. To effectively manage an ecosystem, a general understanding of processes within it and how adjoining ecosystems relates with it becomes considerably important.

As Northern Ghana continues to address food insecurity, climate change and its perennial flooding, there is the need for planning at the Regional, District and Community level. It has become increasingly important to empower Districts and Local communities to turn Regional plans into action. The challenge here is how to effectively engage the professional and non-professional, and the literate and illiterate alike.

In this regard two Participatory 3D models were introduced to programme leaders of government offices, major international organizations, local NGO's and Districts Assembly officials as a tool to development planning that can be understood by all. The participants discovered its potentials and developed action plans to replicate the concept in all communities, districts and regions.

The first model covers the Northern half of Ghana at a scale of 1:250,000 suitable for regional planning (Figure 1). It measures 1.9 m x 1.5 m which represents 112,440 km² on the ground. It has a vertical exaggeration of 5x and contour interval of 50 m. The model features Northern region, Upper East region, Upper West regions and portions of Volta region and Brong Ahafo region.

The second model is for Central Gonja District at a scale of 1:50,000 suitable for district level planning (Figure 2). It measures 2.14 m x 3.29 m which represents 16,464 km² on the ground. It has a vertical exaggeration of 2x and contour interval of 25 m. The model features portions of nine other districts being Tamale Municipality, Yendi, East Gonja, West Gonja, Bole, Tolon Kumbugu, Savelegu Nanton, Kintampo North and Sawla-Tuna- Kalba.

Figure 1: 3D model of Northern Half of Ghana



Figure 2: 3D model of Central Gonja District



Activities

The workshop was opened by the Facilitator Ernest Dwamena, who, with fellow VSO Volunteer Romeo Banaynal, is currently working with the Northern Region Ministry of Agriculture and Food (MoFA). Banaynal and Dwamena were the two principal developers of the 3-D Maps. Participants were seated around two large, 3-dimensional maps of Northern Ghana and the Central Gonja District. The 30 participants represented public agencies and various non-governmental organizations working in the areas of Food Security, Climate Change or Emergency Preparedness and Disaster Management. Dwamena announced the goal of the day to be a full demonstration of the way the 3-D maps could provide an effective new tool that will enable municipal governments, agencies and communities to more effectively engage citizens in natural resources planning and disaster relief.

Reporters from Metro television and Diamond radio stations and Daily Graphic attended the workshop and interviewed participants and presenters throughout the day.

Mr. Joseph Yeng Faalong, the Northern Regional Director of Agriculture, welcomed participants and emphasized the importance of the workshop in launching of the Participatory Mapping Project that so well unites work on food security, climate change, and Emergency Preparedness and Disaster Management. He said that as people realize how effectively the 3-D maps can draw citizens into planning, many more will want to use it. He recognized the two VSO volunteers, Ernest Dwamena from Ghana and Romeo Banaynal from the Philippines, and the time and resources they put in over three months, collecting technical data and creating the actual topographical maps.

Mr. Faalong also read a letter from the Minister of Agriculture, observing that the Northern Region has good natural resources and real potential to improve livelihoods and this 3-D model will serve as a tool for cooperation that will benefit communities. Many tools have been used but the challenge has been to get public participation in planning. This map compresses many resources into a concise terrain model people can understand and learn from. The 3-D map can draw people into the decisions that affect their lives. It supports planning for collaborative risk management, and acknowledges traditional rights. We have seen a decline in extreme poverty and this map will be a powerful tool, for rich or poor, literate or illiterate, all communities will be able to use it.

The Workshop Agenda

- Participants familiarize themselves with the 3-D map and mark their area of geographical location and the particular interests they represent (Food Security, Climate Change, and Emergency Preparedness and Disaster Management).
- Presentation by 2 organizations to express how the 3D model relate with their work
- Detailed presentation and history of the 3-D Map concept
- Group discussions on causes and potential solutions to the challenges of obtaining food security in northern Ghana
- Group discussions to develop action plans for gaining wider use of the 3-D Maps

Localization and spread of programs on the 3D models

Mr. Dwamena introduced participants to the 3D map to locate their interests and spread of their programs (Figure 3). The participants immediately identified opportunities for development, collaboration and how they can make use of the 3D map.

Figure 3: Location of interests and spread of programmes





Presentation by National Disaster Management Organization, by Mr Iddi:

They documented floods in northern Ghana in 2007, the worst year in recent times. Floods came with no warning and 224,000 people were displaced along with destruction of many crops. In 2008, there was more coordination among partners and agencies and region-wide, this significantly reduced the people displaced. Today, collaboration continues to reduce flood damages to farmlands and displacement of people. The 3-D Map plays a part in building community awareness, identifying safe grounds for farming and housing and improving planning and coordination. Many problems come from the poor road network and the map will help plan to improve the roads during the flooding period.

Presentation by the Ministry of Food and Agriculture, by Festus Langkuu.

The presentation showed the districts in the northern region, population statistics, available land for production and the amount actually in production – just 16%. MoFA's policy objectives are food security, sustainable management of land and environment, improved institutional cooperation, increased application of science and technology in agric, and increased competitiveness of Ghanaian agric products and penetration into new markets. He listed MoFA's programs that work on those objectives and the challenges identified: floods, drought, unfertile soils and erratic rainfall patterns.

For MoFA, the benefits of the 3-D Map include being able to show and advise farmers where to plant based on fertility patterns and to clearly identify good places for specific

crops such as valleys that can hold water for rice production, areas for dams and irrigation dugouts. MoFA wil be better able to understand and advise new projects and guide investment so that communities can benefit according to their needs.

Mid-morning break.

The Participants took a group photo with the models



Presentation on the 3-D Map and Land Use Planning by Romeo Banaynal.

He demonstrated the difference in impact and readability between two-dimensional and 3-D maps with 3-D enabling the length/width/height character of the land to be clear. He discussed the use of 3-D maps in military operations for detailed logistics and also described the way industrial agriculture operations and large real estate development projects use 3-D maps. The maps make it easier for people to visualize their own place and interests and the maps become participatory when people put their local knowledge of the landscape on the bare model. That is the beginning of their sense of ownership of the map and the land it represents.

For sustainable land use planning, Banaynal described the need to involve all stakeholders and the way the 3-D model can facilitate collaboration because all parties can see the bigger picture landscape beyond familiar and individual boundaries. Gathering all parties around the map - climatologists, community organizers, farmers, government agencies -enhances interdisciplinary cooperation and that is essential for sustainable decisions. Using the models among all stakeholders fuels self-esteem and raises local awareness. The map is a medium for communication and can overcome constraints on public participation. He described the way that farmers feel happy that they can see their farms. (One workshop participant said that putting her identification on the map made her feel good to identify her work and her location.)

He described the challenges in land use planning: Many people don't understand two-dimensional maps. Using photos he demonstrated how a 3-D model can take people to a place that is difficult to get to in person. Architects and businessmen use 3-D but food security, climate change and disaster management need 3-D more than the businessman. It gathers people to share information. Northern Ghana is so big and often inaccessible, but the 3-D map can take us there. The map helps clearly identify boundaries on land, not just landmarks that can disappear. Further, by getting community people to help make the map of their own region, they begin to own it. Identifying their own ground, people using these maps have started to assert their rights. He added that Ghana has a huge need for a national land/soil capability survey and that could be an excellent theme on a 3-D Map.

Facilitator Ernest Dwamena: The vast landscape is a niche with humans as inhabitants. To sustain it, we have to understand it. In Burkina Fasso, for example they know these things at the community level and they are building little earth dams and are able to save the water they need to grow crops. He introduced the next phase of the workshop - small group discussions focusing on the threats to food security that are common in northern Ghana and contribute to high levels of poverty.

Small Group Discussions

Participants divided randomly into groups that combined participants from each interest to discuss the causes of problems in food security and to recommend ways that the 3-D Maps could be part of solving those problems.

GROUP ONE:

Food insecurity defined as the lack of reliable availability of adequate nutrition for people.

Causes:

Poor food handling and preserving practices, lack of equipment and facilities for storage, traditional small-scale farming practices, lack of knowledge of what foods are nutritious and how to prepare them, modern foods attract young people that aren't nutritious, national policies: food policies do not meet the needs of people, rainfall distribution - only 1 season in the north without irrigation. Low productivity also results from poor logistics and equipment, lack of extension officers - not enough to reach the farmers, lack of marketing and lack of ability to meet international standards for export. Further problems are poor coordination among agric interventions by government and NGOs, farmers don't have leverage in the pricing of produce and transportation infrastructure in the north is poor.

Solutions:

Improve knowledge and skills in growing, processing and shipment; education on the negative elements in traditional farming attitudes and practices, more farmers joining farmer business to get a stronger voice in farming policies, provide skills to help production and create a coordination agency for food production.

GROUP TWO

Definition: If food is not available in enough quantity, it is insecure.

Causes of Food Insecurity:

Poor soils, poor yields, only a single annual season, too much rain - floods, too little - drought. Inadequate irrigation facilities - dams, poor water and soil management, burning for land clearing, pouring chemicals on the land, farmers have poor knowledge about selection of land for specific crops, too few extension agents, bad road network, inadequate vehicles for produce transportation, lack of knowledge among consumers about the product they want that may be available - marketing, high production costs that make prices too high.

Solutions

The 3-D map shows where roads are possible and needed and locations for dam infrastructure. Better land use planning with high-risk areas identified and avoided, improve the forests and soils. Development partners can use the map to locate good project sites and can build farmers capacities to improve their farming practices.

GROUP THREE

Food Insecurity – Causes

Traditional attitudes and practices – burning, lack of commitment to farming, motivation of individuals, old age of farmers, young people not interested; natural factors: floods, drought, poor rainfall, climate change, inadequate investment, inadequate infrastructure (roads, storage), lack of market control, lack of value chain to increase incomes; not enough outside investment to expand farming, high interest rates, the need for guarantees against risks; lack of integration of livestock and not using livestock as a business; lack of access for women to land for farming due to men's dominance in the traditional culture.

Solutions

Long term political commitment from government to support and improve agric - roads, infrastructure, economic supports; education on farm technology, use the 3-D Map so people can see where land will hold water.

Lunch Break

Facilitator Ernest Dwamena: The next activity will be to discuss how to use the 3-D Map to address some of these problems and then to develop an action plan to spread the information about the 3-D model and encourage its use. As an example of practical use of the map, he showed a map of the Central Gonja District along the Volta Lake which showed many villages located very close to the water. It was clear that changes in the water level would flood the villages. With the 3-D map, people could see that and also see higher ground where they could relocate the villages and still have lake access.

Dwamena and Banaynal also demonstrated the way other types of information could be added to the topography of the model, using different colors to indicate different soil types. They also demonstrated how simple colour based water-level gauges can be used by communities within the catchment of the Volta lake for flood monitoring and management.

The Regional Director of Agriculture, Mr. Faalong joined the workshop and spoke enthusiastically about the 3-D Map. It's a tool that many actors can use. Based on it, people can see more choices of ways to do things: picking production areas, where do the roads go, how many culverts do you need and how often will it flood? The task now is to take this a step further to see what we can do individually and collectively to

use this tool. All districts can imitate and use this. If we can show others how it can be used, we will really be enhancing our food production. What role can District Assemblies play in this? We need to start finding the money to implement this now before disaster strikes. Last week, the President was in the region and he gave 2 orders to District Assemblies. First, he does not want to see polyethylene bags on his next visit and secondly, the districts should be well planned and be prepared for any emergencies and disasters. So those of you here today from the Assemblies should take advantage of this and spread it to all the districts in the north. We need Action Plans by the district assemblies. When you can foresee disaster and prevent it, you are saving a lot of money. How do we tap into this? Who will do what, when, and with what resources?

The director then asked the participants to brainstorm what can be done, to narrow down to priority strategies then break into groups and develop action plans. He asked for 10 major solution ideas and noted that by picking the best 20% of them, they will give a focus and influence the remaining ideas.

General Brainstorm Ideas

- Ensuring that settlement is planned away from risk prone areas
- Intensive education on land use planning/awareness creations
- Marking and demarcation to show land use planning
- Identification of water resource locations (small dams)
- Map out fluoride prone areas especially in Bongo District using community involvement
- Source fund for every assembly to produce district models
- Promote alternative livelihoods for community dwellers based on land use planning
- Build district capacity to embrace model
- Identification of collaborators/investors to partner with district assemblies
- Communities know the areas that are vulnerable but they go on using them, so promote values that change the attitudes that create problems

Other Comments

- Use the map to show the importance of the community areas and all districts so people are familiar with where they should locate their activities and farms
- All districts don't have the capacity to have these maps so start small and let them see how it works.
- Don't expect it all to be done by government, identify partners to support the district assemblies.
- Use the map to empower people to know what they have and begin to see how they can be used.
- Maps can also help define and understand legal issues.

Participants then voted to pick the 4 best of these ideas to prioritize for action plans. The Regional Director urged them to think of the indicators that should guide the priorities: what is the best technology for farmers, for people with limited resources. What will be the most productive use of time? Have the most impact? Which of these 10 will be most worthwhile based on our expertise, how many district assemblies will take this up?

Which 4 will have the most impact in northern Ghana?

The top four identified actions were the following: These will become the outputs

- Awareness creation through intensive education in Land Use Planning. (Identify an audience and the content you want them to have and how to deliver)
- Build the capacity of the district assemblies to embrace the model
- Identify and seek funds to enable every assembly to produce district 3-D Maps
- Map all lowland areas, rivers and streams

Next, the Regional Director assigned one of the 4 priority actions to each discussion group and instructed participants to list 5 core activities to achieve each. They were also asked to list the resources needed to carry out the actions and to say who would carry it out and what budget and time frame would be needed.

Finally, each plan was presented with a few questions and comments about subactivities and planning

Group 1: Building District Assembly (DA) Capacities to use the 3D model as a tool for community empowerment

Activity	Resources	Who	Time
<i>Identification of DA people to train</i>	<i>DA staff list, Funds, A staff representative to promote the 3D model</i>	<i>DA person to be put on the project</i>	<i>1st month</i>
<i>Planning Meeting</i>	<i>Meet and persuade key DA people, Develop concept presentation</i>	<i>DA person and Technical 3D person</i>	<i>1st month</i>
<i>Raise funds for training</i>	<i>DA's fund, NGO's and collaborators</i>	<i>DA person raises funds, partners</i>	<i>2nd month</i>
<i>Identify local issues and develop training content</i>	<i>Training facilitator Training materials Fuel</i>	<i>Training consultants, Technical person</i>	<i>2nd month</i>
<i>Deliver Training/Follow-up</i>	<i>Logistic, venue, funds, materials, follow-up (M&E)</i>	<i>DA person Training facilitator</i>	<i>3rd - 5th month</i>

Group 2: Intensive education on land use planning

Activity	Time Frame	Resources	Responsibility
<i>Identify the needs of the people in the area (ground trooping)</i>	<i>1st-15th April</i>	<i>Fuel, accommodation, food</i>	<i>Ministry of Food and Agriculture, District Assembly</i>
<i>Prepare land use curriculum</i>	<i>15th – 30th April</i>	<i>Stationary</i>	
<i>Identify the target group</i>	<i>15th – 30th April</i>		
<i>Formation and Preparation of educational teams</i>	<i>1st-7th May</i>	<i>Radio</i>	
<i>Conduct community education</i>	<i>8th – 30th June</i>		

Group 3: Source funding to construct 3D model for all districts in Ghana

Activity	Source of funds	Who	When	Budget
<i>Sensitization meetings</i>	<i>Common funds</i>	<i>Resource person, DA</i>	<i>April – May</i>	<i>GH₵ 1000</i>
<i>Identification of potential donors</i>	<i>DA, UN, NGO's</i>	<i>Regional Coordinating council</i>	<i>June</i>	<i>GH₵ 500</i>
<i>Fund raising</i>	<i>DA, NGO's, MP's, UN system</i>	<i>Regional coordinating council</i>	<i>June</i>	<i>GH₵ 22,000</i>
<i>Disbursement of funds to districts</i>	<i>DA, NGO's, MP's, UN system</i>	<i>Regional coordinating council</i>	<i>July</i>	<i>GH₵ 500</i>
<i>Monitoring and evaluation</i>	<i>RCC</i>	<i>RCC</i>	<i>Dec</i>	<i>GH₵ 3000</i>
<i>Grand total</i>				<i>GH₵ 27000</i>

Group 4: Flood zone mapping of lowlands, streams and rivers

Activity	Time Frame	Resources	Responsibility
<i>Sensitisation of communities</i>	<i>1 week</i>	<i>Information van, fuel</i>	<i>DA</i>
<i>Sourcing of funds</i>	<i>1 month</i>	<i>Information van</i>	<i>DA</i>
<i>Identification of technical persons on 3DM</i>	<i>1 week</i>		<i>DA</i>
<i>Identification of lowlands, stream and rivers</i>	<i>1 day</i>	<i>Refreshment</i>	<i>DA, community members, Technical person</i>
<i>Mapping</i>	<i>1 day</i>	<i>Refreshment</i>	<i>DA, community members, Technical person</i>

The Regional Director of Agriculture thanked all participants for their attendance and work to begin the planning process. He said now the real work begins and charged everyone to go back to their agencies and districts and spread the word about the great potential for increased public involvement and better, more sustainable land use planning with the use of the 3-D Maps.

Facilitator Ernest Dwamena wrapped up the workshop in concluding that the 3D map will move Northern Ghana ahead to help protect the region from disasters, and secure the landscape that can prove improved living conditions for the people of N. Ghana.

Participant Comments

A participant thanked VSO for coming out with this model and expressed the feeling that Bolga Tenga will be able to use it to improve local management. She also thanked MoFA for its effort in helping to reduce the peril of flooding when people can't identify safe havens. This will help people map them and know where they should go. She said this process comes a long way in making our work less to understand these problems.

Another woman representing the Upper West Regional Director of Agriculture, said when she left to come, she had only seen this on paper and asked 'what can it do for me?' But when I have followed this session, even though the emphasis is moving the

plan forward, it has so much to do with us. This is a very beautiful tool that will help our situation in northern Ghana and all the decisions that follow. After giving my Director a briefing on what I have heard, I want to take positive action. Thank you to the Region Director of Northern Region. Help me make a passionate appeal, support me in my recommendations to my Regional Director. We need you to support us, we will need that and give us all the information so we will move along.

A third participant said he was very touched to be here. "I've learned a lot and I hope to be an ambassador of this program, because I see how this will help. And my NGO can help our district to grow. We are fortunate to have this, I plead that the districts should take it upon themselves so they have it to use in their districts.

A fourth participant: "I add my voice, we are ready for this and we are happy a representative of the district assemblies is here. The case study that has been used is the map of Central Gonja. We will make sure to make good use of what has been presented, MoFA and VSO we thank you very much. My observation is that we should also thank the funders that have made it possible for us to be here. MoFA in the Northern Region has started to get things going in this region. And soon we will receive requests for this from other districts.

A fifth participant said a group from Malawi visited Ministry of Food and Agriculture in the Northern Region and upon seeing the map said this was the tool they need to engender collaboration in their country.

One participant spoke with Metro TV and said he had heard from a District Assembly Engineer, about how the 3-D could support the district to build the capacity of villages to protect against flooding and improve land use and he wanted to attend this workshop but had another engagement. He believes 3-D is the only means to help the residents protect from flooding.

The Regional Director declared the workshop closed - but not really - the work has only just begun. I want to leave the thought: our VSO group in Northern Ghana did this. I also want to recognize the three young interns; they have had an extraordinary opportunity to learn something unique. I hope the collaboration has just begun. This is not just a plan, it is a model that allows us to know where the water will reach and that will help save lives and build our agriculture to remove poverty from our people.

5:30 p.m. Workshop closed.