



A Darwin Initiative Project



Buayan-Kionop Participatory 3-D Modelling (P3DM)

A sub-component of the project “Participatory Resource Monitoring in Community Use Zones of Crocker Range Park” (1 August 2007 to 31 July 2009)

March 2008

Global Diversity Foundation, Sabah Parks, PACOS
and the local communities of Buayan-Kionop

1. Background

Participatory 3-D Modelling (P3DM) is an exciting participatory action research tool that integrates protected area management perspectives with indigenous knowledge about a particular area. In Southeast Asia, P3DM approaches have been widely applied in the Philippines, Laos, Vietnam and Indonesia, where Geographic Information Systems (GIS) data is merged with local peoples' ethnoecological knowledge to produce a stand-alone relief model. Data gathered through community mapping exercises and other participatory research techniques is displayed on a 3-dimensional model, thereby providing a visually engaging basis for discussions between protected area agencies and local communities. The resulting 3-D model is a dynamic and engaging platform that can be used to plan further participatory research and monitoring as part of collaboratively managing a protected area.

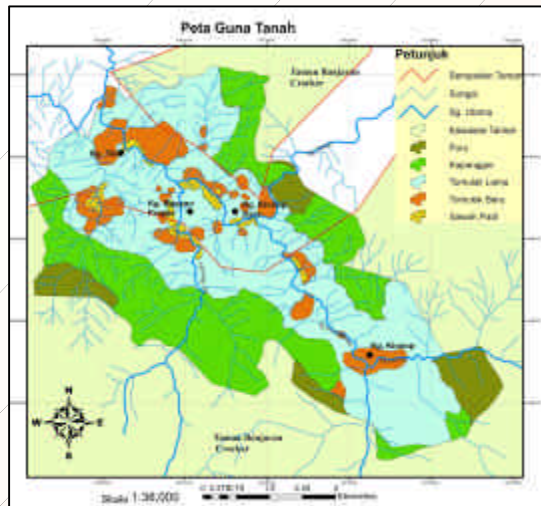
In the case of Buayan-Kionop in the Crocker Range, Sabah, a substantial corpus of data on community resource use and access has been collected as part of the Darwin Initiative project *Ethnobiology of Proposed Community Use Zones of the Crocker Range Park* (2004-2007) carried out by the Global Diversity Foundation, Sabah Parks, and Universiti Malaysia Sabah, in collaboration with Partners of Community Organisations (PACOS) and the local community in Buayan-Kionop.

Over three years, a team of Buayan-Kionop Community Researchers have been trained in community mapping and participatory GIS techniques to collect georeferenced data about community resource use patterns in Buayan-Kionop. The data has been incorporated into a GIS database to produce GIS maps that depict the current patterns of subsistence activities in the Buayan-Kionop area.



Clockwise from top: Buayan-Kionop Community Researchers examining the initial sketch map produced through community mapping exercises in 2005; GDF Field Coordinator James Wong explains the GIS map to a community member in Buayan in 2006; Community Researcher Raymond Sipanis taking GPS fixes with another community member from Buayan in 2007.

A constraint in using GIS technology, however, is that it limits the level of community participation in understanding how data collected through fieldwork is connected to the larger framework of sustainable land utilisation and resource management.



An example of the GIS map layers produced through the project showing the variation in forest and land types according to local Dusun classification. Other maps include layers depicting locations of hill and wet rice cultivation, important hunting areas, and important rattan collection sites.

Community members, especially the elderly, many women, and those without formal education, have difficulties in understanding 2-dimensional maps. This creates a situation where community input towards joint planning and resource management decisions becomes limited to the select few community members who have the training and skills to understand 2-dimensional maps. It is a serious limitation that could influence how decisions are made, and the wider community's acceptance of these decisions.

A P3DM approach attempts to increase community participation by building a 3-dimensional model that will display a complicated data set in a way that is easily understood by community members. This process of building the model engages both Sabah Parks staff and Buayan-Kionop community members in a joint effort, from the earliest stages of planning the model to the building of the model in Buayan, uploading of data, and future collaborative monitoring of the Buayan-Kionop Community Use Zone and its adjacent areas.



From top: Buayan-Kionop Community Researchers and Sabah Parks staff in a brainstorming exercise on the potential of P3DM; Community members in Buayan identifying key locations on the topographic map; Sabah Parks staff marking the contour lines on the topographic map.

2. Applying P3DM in Buayan-Kionop

In the Darwin Initiative post-project *Participatory Resource Monitoring in Community Use Zones of Crocker Range Park* (2007-2009), the Global Diversity Foundation, Sabah Parks, PACOS and the Buayan-Kionop community, will build a 3-dimensional replica of the Buayan-Kionop area. The resulting 3-D model will show the topographical features of the Buayan-Kionop area, where locations of rivers, names of hills and important places, and areas where subsistence activities are carried out, will be marked on the model.

The Buayan-Kionop 3-D model will facilitate a better understanding for community members who do not know how to read 2-dimensional maps. Furthermore, the P3DM process will attract more local community members to participate because the 3-D model is manufactured in the village itself.

Importantly, P3DM is a continuous process because the model will be updated each time new data is obtained. These changes in resource use patterns over time can be digitised by taking photographs – a replication of satellite images – which are then logged for future comparison and monitoring over the long-term. As such, P3DM has great potential as tool for collaborative planning, participatory monitoring and evaluation.

To our knowledge, this is the first time in Malaysia that a 3-D model has been built to scale, using participatory approaches with a local community.



From top: Preparing contour lines for tracing; Tracing contour lines on to cardboard sheets; Cutting out contour layers; Starting to overlay the contours; The 3-D model starts to take shape as more contour layers are set in place.

3. Buayan-Kionop P3DM Objectives

The Buayan-Kionop P3DM initiative forms a sub-component of the Darwin Initiative post-project *Participatory Resource Monitoring in Community Use Zones of Crocker Range Park* (2007-2009).

The overall objective of the Buayan-Kionop P3DM initiative is to develop a participatory resource monitoring tool that is accessible to both Sabah Parks and the Buayan-Kionop community, which contributes towards the long-term collaborative management of the Buayan-Kionop Community Use Zone and its adjacent areas.



A Buayan-Kionop Community Researcher marks out the rivers and smaller waterways on the model

In merging geographical information with indigenous spatial knowledge, the Buayan-Kionop P3DM initiative will be a role model for participatory action research in other areas in Sabah.

The specific objectives of the Buayan-Kionop P3DM initiative are to:

3.1. Apply P3DM approaches to develop a participatory resource monitoring tool.

A working 3-D model is never complete because it is a dynamic system where change is a constant. The Model enables local community involvement in resource monitoring activities, where changes over time at resource and landscape levels are shown in 3 dimensions.

3.2. Develop the Buayan-Kionop 3-D model as a communication tool between park management and the local community.

Consequences that emerge from changes in resource use patterns can be discussed in a visually attractive and effective way with a wide spectrum of the local community. Additionally, the model will enable visitors to Buayan-Kionop (e.g. government agencies, researchers, tourists) to gain an understanding of the area, making it an important communication tool to outside audiences.

3.3. Build the capacity of local partners in the effective adaptive management of the Buayan-Kionop Community Use Zone.

The P3DM process builds upon skills acquired during the initial Darwin Initiative project, while further developing the capacity of Sabah Parks and community members to monitor resource use patterns in a participatory way.

4. Activities

The Buayan-Kionop P3DM initiative comprises four main activities (a tentative activity plan is outlined in pages 9-11 of this document):

4.1. Planning and preparation through:

- Training courses (basic P3DM in Jan 2008 and advanced P3DM tentatively in May 2008)
- Team discussions with partners to develop a team duty roster
- Team discussions to decide on the location where the model will be permanently stored
- Team discussions with partners to decide on the basic specifications of the model and the types of data that will be shown on the model (e.g. agricultural, hunting, fishing, NTFP gathering data)
- Team discussions with partners on the development of a P3DM protocol as a mutually agreed upon system on how data will be uploaded and logged in future

4.2. Making the Buayan-Kionop 3-D model, which includes:

- Purchasing and transporting materials to Buayan
- Constructing the base table for the model
- Printing a topographical map of the area to be used as the basis of the model
- Building the model (i.e. basic topography, marking locations of key geographical features and village sites)
- Continuous consultation with the wider community (including community members from Kionop Lama and Bolotikon)
- Proposed structural renovation to the Sabah Parks Control Post in Buayan to build a room where the model can be permanently stored



Above and below: Detail of the model



4.3. Initialising the model for participatory resource monitoring, which includes:

- Marking a grid on the model
- Uploading data to the model
- Continuous consultation with the wider community (including community members from Kionop Lama and Bolotikon)
- Taking digital photographs of significant grid locations on the model and logging the photographs systematically

4.4. Evaluation:

- Formal evaluations (as part of the overall Darwin Initiative project) in March 2008, October 2008, March 2009 and June 2009
- Informal evaluations on progress of the model, which is carried out through regular team discussions, consultation with partners, consultation with community members, and feedback obtained from any other participating agencies and individuals

5. Outputs

Although we are still in the early stages of implementation, we are nevertheless able to report the following preliminary outputs:

5.1. Major planning decisions made:

5.1.1. Basic specifications of the 3-D model:

Size: 4 feet x 6 feet

Scale: 1:10,000

Interval: 20 meters

(distance between two contour lines)



From top: Status of the model, as at January 2008; The Sabah Parks Control Post in Buayan

5.1.2. Location of the 3-D model:

It was decided that the 3-D model will be permanently housed in the Sabah Parks Control Post in Buayan. Structural renovation to the Control Post will be necessary to build another room for the model.

5.2. Detailed preliminary outputs to date (reported against the activities outlined in Section 4 above):

	Activity	Timeframe	Team members	Results to date
4.1.	Planning and preparation			
	Initial consultation and team discussions	Sept-Dec 2007	James Wong, Yassin Miki, Maipol Spait, Adrian Lasimbang, Phillip Chin, Buayan JKKK, Buayan-Kionop Community Researchers	<ul style="list-style-type: none"> • Buayan-Kionop P3DM draft proposal developed • Decision made to house Buayan-Kionop P3DM in the Sabah Parks Control Post in Buayan • Overall technical supervision from PACOS secured
	Training in basic P3DM techniques	Jan 2008	17 people from Sabah Parks, PACOS, Buayan-Kionop, and GDF	<ul style="list-style-type: none"> • Basic training in P3DM delivered
4.2.	Making the 3-D model			
	Ongoing effort to build the model	Jan – Feb 2008	17 people from Sabah Parks, PACOS, Buayan-Kionop community and GDF	<ul style="list-style-type: none"> • Basic materials purchased and transported to Buayan • Base table built • Topographic map printed • Preliminary work on building the 3-D model in Buayan initiated
4.3.	Initialising the 3-D model			
	No activities to date			
4.4.	Evaluation			
	Progress presentation during CUZ Workshop	14 March 2008	All partners	<ul style="list-style-type: none"> • Feedback on initial progress obtained

6. Financing

The main source of funding for the Buayan-Kionop P3DM is the Darwin Initiative post-project. The project is particularly interested in supporting the renovation of the Sabah Parks Control Post in Buayan so that a room can be established as a Community Field Biological Station, which will house the model and support the continued work of the Buayan-Kionop Community Researchers. However, it is important to note that the Darwin Initiative project operates on a restricted budget that is contingent upon the consent of all project partners and the Darwin Secretariat.

P3DM BUAYAN-KIONOP IMPLEMENTATION TABLE 2008

Step	Activity	Expected Results	Venue	Team	2008											
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	P3DM Training 1. Theory Training 2. Practical Training	1. Small scale model of Buayan-Kionop started	Keningau Kg. Buayan	GDF, PACOS, TTS JKKK Buayan												
2	P3DM Construction 1. Enlarging the model	1. Larger model under construction 2. Basic features of Buayan-Kionop added to the model	Kg .Buayan	GDF, PACOS, TTS, JKKK Buayan												
3	Baseline Information 1. Major rivers 2. Major hill names 3. Village locations 4. Previous settlement areas	1. Discussion conducted 2. Baseline information added 3. Wider community involvement	Kg. Buayan	GDF, PACOS, TTS, JKKK Buayan												
4	Workshop 1. Discussion with local community on P3DM	1. Feedback from community 2. Suggestions and comments	Kg. Buayan	GDF, PACOS, TTS												
5	Communities from Kionop Lama and Bolotikon come to Buayan 1. Discussion 2. Enlarging model with communities from Kionop Lama and Bolotikon	1. Discussion and internal training 2. Data from Kionop Lama intergrated into model	Kg. Buayan	GDF, JKKK Buayan												
6	Agricultural Areas 1. Entering agricultural data	1. Agricultural data included	Kg. Buayan	GDF, JKKK Buayan												
7	Evaluation P3DM participatory evaluation	1. Progress of P3DM monitored and discussed	Kg. Buayan	GDF, PACOS, TTS, JKKK Buayan												

Step	Activity	Expected Results	Venue	Team	2008												
					Jan	Feb	Mac	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
8	Hunting Areas 1. Entering hunting data 2. Entering animal feeding areas	1. Hunting data included in the model 2. Animal feeding areas included in the model	Kg. Buayan	GDF, JKKK Buayan													
9	Discussion 1. Community discussion	1. Amendments to the model if any	Kg. Buayan	GDF, JKKK Buayan													

P3DM BUAYAN-KIONOP IMPLEMENTATION TABLE 2009

Step	Activity	Expected Results	Venue	Team	2009												
					Jan	Feb	Mac	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
10	Fishing Areas 1. Entering fishing data 1. Entering <i>Tagal</i> data	1. Fishing data included in the model 2. <i>Tagal</i> zones included in the model	Kg. Buayan	GDF, JKKK Buayan													
11	Forest Resource Areas 1. Entering ntfp data	1. Areas for ntfp gathering included in the model	Kg. Buayan	GDF, JKKK Buayan													
12	Workshop 1. P3DM progress presentation 2. Feedback 3. P3DM evaluation	1. Status of P3DM Buayan-Kionop presented to all project partners 2. Amendment and upgrading of P3DM Buayan-Kionop	Keningau Kg. Buayan	GDF, PACOS, TTS, JKKK Buayan													
13	Future Protocol 1. Finalising and updating P3DM Buayan-Kionop 2. Preparing long-term data entering protocol 3. Preparing 5-year workplan For P3DM Buayan-Kionop	1. Information on the model updated 2. Guidelines for future P3DM data entry established 3. P3DM 5-year workplan prepared With Sabah Parks and community	Kg. Buayan	GDF, PACOS, TTS, JKKK Buayan													

Step	Activity	Expected Results	Venue	Team	2009												
					Jan	Feb	Mac	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
14	P3DM Handing-over 1. Final presentation on status of P3DM 2. Official handing over of the model to Buayan-Kionop community and Sabah Parks	1. Final version of P3DM presented to all project partners 2. P3DM 5-year workplan presented to all project partners 3. P3DM Buayan-Kionop handed over to Buayan-Kionop community and Sabah Parks	Keningau Kg. Buayan	GDF, PACOS, TTS, JKKK Buayan													
	Darwin Project Ends																