

KUMINFO Case Study, Ghana

Introduction

KUMINFO is an integrated geographical information system for peri-urban natural resource research, which brings together information from individual research projects and organisations in Ghana. Established at the Institute for Renewable Natural Resources (IRNR), Kwame Nkrumah University of Science and Technology (KNUST), KUMINFO replaces a pre project Geographic Information System (GIS) proto type developed by Geographical Data Support (GDS). It provides users with access to maps of Ghana, the Ashanti and Kumasi region, as well as integrated vector, raster and attribute data. KUMINFO also provides structured access to key elements of individual studies, and ergonomic and intuitive interfaces for data analysis. The goal of KUMINFO is to make data available and accessible to stakeholders in natural resource management, such as lecturers, researchers, district planners and farmers. Thus, its success depends on careful organization of datasets, provision of information on available data, data quality, and education of users on the use of the system. The strategies developed to educate users on the KUMINFO system included the organization of workshops, seminars and training sessions, and the preparation of media products such as leaflets, manuals and newsletters (Geographical Information Systems for the Management of Natural Resources in a Peri-Urban Environment, KUMINFO.)

KUMINFO is demand-driven and proving to be very important as a tool for addressing the informational needs of institutions and communities for natural resource management in peri-urban Kumasi. For example, the inclusion of the KUMINFO component in the Kumasi Natural Resources Management Research project (KNRMP) was born out of identified information gaps in the natural resources sector in Kumasi and its peri-urban districts. The gaps were identified through extensive consultation during the identification and design process and related especially to the availability and dissemination of information. This was seen as one of the key problems or constraints to natural resources management in peri-urban Kumasi. Thus, it was realised that what was needed was not just the generation of information through research, but in addition, the storage, retrieval and accessibility of such information. Cognisant of the above shortfall, it was decided that all the information generated and collected under the KNRMP, as well as any other relevant research findings, should be fed into a GIS database and the outputs made available on a regular basis.

<p>SUSTAINABILITY FACTORS</p>	<p>Notes from Interviews</p> <p>Directly Involved (KUMINFO)</p> <ul style="list-style-type: none"> • Dr. J. Quarshie-Sam, Project Co-ordinator • Ms. Nana Ama Asare, Data Manager • Dr. Opong, Data Scientist <p>Users</p> <p>3 Staff members of a national NGO, Ghana Organic Agriculture Network (GOAN), Head Office, Kumasi.</p> <ul style="list-style-type: none"> • Tim Aborah – Treasurer (GOAN) • Ivy Ahun – Administrator • Ben Kusi Appiah – Field Officer /IPM trainer <p>3 beneficiary Community Members (CM)</p> <ul style="list-style-type: none"> • Ms. Alice Konadu – KUMINFO contact person at the community level and also a Community Level Facilitator (CLF) at the Centre for Development of People (CEDEP) • Mr. Hayford Asamoah – CLF at CEDEP • Mr. Gyasi Nimako - KUMINFO contact person at the community level and also a Community Level <p>3 members of Kwabre District Assembly (KDA)</p> <ul style="list-style-type: none"> • Mr. Raymond Amedior – District Agric. Director • Mr. Michael Detoh – District Director of Town and Country Planning. • Mrs. Florence Eshun – District Community Development Officer <p>1 member of the Environmental Protection Agency</p> <ul style="list-style-type: none"> • Mr. Daniel Beningful, Assistant Project Officer, EPA Regional Office, Kumasi.
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	<p>Organisations having an overview</p> <p>1 other service provider</p> <ul style="list-style-type: none"> Mr. Ken Aboagye, Branch Manager of SAMBUS COMPANY LTD, Kumasi.
<p>Objectives</p>	
<p>Policy environment</p>	<p>KUMINFO</p> <ul style="list-style-type: none"> They are not aware of any national policies on ICTs but indicated that the Government is interested in modernising the information sector. Therefore, this project is in line with Government interest. Licensing not required for using the KUMINFO but only required for the software.
<p>Institutional arrangements</p>	<p>KUMINFO</p> <p style="text-align: center;">Organogram of ICT Project</p> <div style="text-align: center;"> <pre> graph TD A[The Director of the Institute of Renewable Natural Resources (IRNR)] --> B[KUMINFO Co-ordinator] B --> C[KUMINFO Data Manager / In- Concert GIS Scientist] C --> D[Service Users] </pre> </div> <ul style="list-style-type: none"> KUMINFO has merged with In-Concert, a Canadian (CIDA) sponsored ICT project. <p>Users</p> <ul style="list-style-type: none"> GOAN: Do not know who owns the ICT project, but they know that the project was initiated by KNUST. They trust KNUST due to a long-standing collaborative relationship. Expectations include the teaching of target groups in the preparation of compost and the dissemination of this information to other farmers. The farmer response has been very good (target communities – Duase, Asago and Maase). For example, GOAN distributed leaflets prepared by CEDEP to target farmers. The target farmers also help in distributing the leaflets to community members on environmental cleanliness and resource management. GOAN usually host two radio programmes to disseminate information on composting to the public on Kapital Radio. GOAN: Farmers (both members and non-members) come directly to source information. GOAN also does field visits to teach/solve/advise on particular problems reported by farmers. CM: KNUST owns the ICT project now CM: Most people have lost the trust that they had for KNUST, because since they attended the workshop in 1999 there has been no follow-ups and community involvement. Despite the fact that through problems identified from the maps at the workshop they were given seeds to nurse for a tree planting exercise and that was the last they heard of their KNUST contacts. KDA: Do not know who owns the programme, but for now it looks like the community owns it. However, lecturers from KNUST call on us to assist

	<p>them in the initial implementation of the KUMINFO project. Swedru was chosen as a model village. As a result we help them to draw a physical map of the community, showing forest resources, other communities in the district, rivers, and farmlands. However, we were not given a copy of the map we had drawn. Latter we found out that the KNUST lecturers were not transparent. Thus we were sidelined.</p> <ul style="list-style-type: none"> • EPA: DFID owns the project • EPA's role was limited as far as its scope of work is concerned. EPA served as a source of data. • EPA: The KUMINFO project office was completely in charge of managing the ICT facility.
<p>Target Groups</p>	<p>KUMINFO</p> <ul style="list-style-type: none"> • Every organisation or individual involved in natural resources management in Ghana. These include Agencies, Communities (can only use actual outputs – maps), Consultants and District Assemblies – who can access information on behalf of their communities. Students are involved in collecting data for the project database, but are not regarded as a target group. Students are able to use the data for their thesis and are provided with lunch and transportation. <p>Users</p> <ul style="list-style-type: none"> • GOAN: The target groups are committed to the project because GOAN played it's role very well. However, despite the ongoing nature of the project GOAN is no longer involved. • CM: Lack of facilities like telephone, TV and video deck (no electricity in the community) are constraints to fulfilling their roles • CM: They communicate with KNUST by road transport. Communication is mostly informal and frequency varies from once a week to once a month. • CM: There are no ICT facilities in the community • KDA: Although they have been involved in the project design, they have not been involved in implementation and running. They are not committed to the project because they feel that KNUST has not treated them well. • Usually the KDA do not communicate directly with KNUST lecturers, the lecturers come to the DA for information, on an informal basis. They do not inform us when they are coming. • Other projects in the district are five-year development plan on water and sanitation, marketing, refuse dump preparation, and building of schools. There are computers to facilitate planning of the above programme. Also there is an ill functioning telephone • EPA: Communicate through three local collaborators (Dr. Adusa, Mr. Gyarbaah and Dr. Quarshie-Sam) who are contacted either by phone or visit usually once every month. <p><u>Roles and responsibilities</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • The role of target groups is to provide quality data for building up of both the database. The target groups are also able to both access and analyse the data produced. As well as gaining access to the Geographic Information Service (GIS) for the production of maps • Problem: The production of data is not forthcoming as target groups are not reimbursed for the costs they incur in gathering and bringing the data to KUMINFO. <p>Users</p> <ul style="list-style-type: none"> • CM: All contact persons are aware of the project. They outlined their role and responsibilities as relay of messages and issues of interest relating to KUMINFO project to community members. • KDA: Initially they were very clear on their roles and responsibilities, but latterly do not know what their role is. Their responsibilities initially were mobilisation, physical development drawing of the district, in particular Swedru. • EPA's role includes: monitoring the various water bodies within the catchment's area (rivers, streams, boreholes, springs, etc.), providing scientific support to selected primary schools which have been provided simples tools for checking water quality in their communities.

	<ul style="list-style-type: none"> EPA staff view logistics as a constraint where they have had to use their vehicles for data collection and computers for data entry, which sometimes interfered with other work outside of KUMINFO. <p><u>Data Review</u> KUMINFO</p> <ul style="list-style-type: none"> Data brought to the project office is reviewed. This includes checking for spatial precision and to eliminate conflicts in the data. <p><u>Format/ Technology Awareness</u> KUMINFO</p> <ul style="list-style-type: none"> The data collected sometimes does not fit into the given format. There is also a format for collecting the data and they sometimes find it difficult getting it into that format. <p>Users</p> <ul style="list-style-type: none"> GOAN: The target groups are not aware of and not familiar with the technology. Constraints to fulfilling roles include the lack of finance, do not work hand in hand with KNUST, information is not available in a good format, after initial collaboration KNUST left GOAN, no written project document as far as implementation is concerned, do not have KUMINFO on their PCs (no idea at all on KUMINFO), and was not involved in the design of the project. CM: They are not familiar with the technologies available (know what a computer is but are not aware of software used or even how maps are generated. They have been shown the maps). CM: They believe information is packaged satisfactorily EPA: Maps are self-explanatory and therefore suitable for its intended purpose. <p><u>Gender</u> Users</p> <ul style="list-style-type: none"> In general women show more interest in the project than men. They outnumber men on the project. CM: Representation cuts across the community and includes traditional rulers, religious leaders, and women. KDA: Recommended that facilities be made available to women groups. In particular the DA recommend that women should be supported in the following areas: gari processing and palm oil extraction. EPA: Project facilities are available to women in the program category (regional boss is a woman)
ICT Technology	<p>KUMINFO</p> <ul style="list-style-type: none"> All ICT sources are functioning at present. Three PCs, three printers (2 A4s and 1 A3), one laminator and one scanner. Software consists of customised Archview (KUMINFO) with two extensions – SPATIAL and IMAGE ANALYSTS, and Microsoft Office. <p>Users</p> <ul style="list-style-type: none"> GOAN has 5 PCs and a telephone. WINAKT is installed on their PCs and is used to disseminate information. There is also an information centre. CM: Do not have any idea KDA: No ICT facility was installed, but District Assembly (DA) has a computer for typing reports and budgeting. EPA has two computers (1 desktop and 1 laptop), telephones and the internet. Thus limiting access to hardware for KUMINFO data collection work. EPA: Digitised maps because they give a clear representation of the data used. <p><u>Where are the ICTs obtained?</u> KUMINFO</p> <ul style="list-style-type: none"> Sambus Ltd., a local computer supplies company, supplied the ICTs to KUMINFO,. In-Concert is supplied with Canadian second hand computers. This has proven to be a bad policy and sometimes results in obsolete equipment being provided). <p>Users</p> <ul style="list-style-type: none"> GOAN: As a result of collaboration with Bangor University of Wales GOAN

	<p>has been given WINAKT software. The software is used to bridge the knowledge gap between research and information dissemination. Four persons from GOAN have been trained to use the software. GOAN undertakes farmer field schools using Integrated Pest Management concept and workshop for schools on composting.</p> <ul style="list-style-type: none"> • KDA: Computers were donated by Soka Gakai International, through Mr. Detoh. <p><u>Back up and Repair Service</u> KUMINFO</p> <ul style="list-style-type: none"> • Sambus provides backup service. Originally from Accra, but more recently through their new office in Kumasi. The result has been a faster repair service. <p>Users</p> <ul style="list-style-type: none"> • SAMBUS is used for repairs, which usually takes 1 to 3 days. Power fluctuations are often the causes of the breakdowns. GOAN is not able to buy support services. • KDA: The computers frequently break down, usually due to power fluctuations and outages. The cost of repairs is paid for by the KDA. The repairs can take weeks and the DA does not know where or who does the repairs.
Financing	<p>KUMINFO</p> <ul style="list-style-type: none"> • DFID provided equipment, software, consumables, and allowances for manager and co-ordinator. IRNR provided space, furniture, air conditioners, staff and pays for utilities. Cost of the project is not available in Ghana (check from the British end). <p>Users</p> <ul style="list-style-type: none"> • The DA contributes human resources to the initial design of the project, but are not paid. They also do not know how much it costs the DA to operate the computer currently in use. <p><u>Cost Sharing</u> KUMINFO</p> <ul style="list-style-type: none"> • The project is trying to charge for services but they are having difficulties working out how much to charge. At present they charge for ink, paper, diskettes and lamination. <p><u>Cost Recovery</u> KUMINFO</p> <ul style="list-style-type: none"> • The issue of Data Manager's cost, replacement cost and equipment cost are being raised and will eventually be addressed. • The initial training was done for free to get people interested. The next training is fee paying and will last 3 days. This will be followed by a 3-week intensive course costing US\$3000 where participants will receive both training and KUMINFO software.
Intermediaries	<p>KUMINFO</p> <ul style="list-style-type: none"> • CEDEP, BIRD, SMS (specifically Kumasi Centre for Communicable Diseases), EPA, GWC, KMA and other Faculties of the University (KNUST). • Sources of information to upgrade information at the institute. The project has the database and facilities that these organisations can use <p>Users</p> <ul style="list-style-type: none"> • Different levels of Users: Three above and one below. Which are: KNUST, MoFA, GOAN and the communities. • Goan: with regards to requesting information some community members write and others come to the office personally. Sometimes GOAN writes, calls or goes in person. Constraint to these include delays, letters do not get to them in time. Sometimes GOAN does not have the information farmers ask for, but source it for them. The information is sometimes edited to make it more relevant to farmers • CM: Normally, have contact with three different levels of people i.e. KNUST, CEDEP and the District Assembly but as far as KUMINFO is concerned they have contact with only KNUST. • CM: Representatives pay informal visits to where the information is to be obtained. Sometimes they do not meet the people who can provide the information.

	<ul style="list-style-type: none"> • KDA: In contact with KNUST and community, that one above and one below. If KNUST want information on the physical map drawing of the district, they come to the DA without prior notice. The community also does not give them prior notice. • KDA: The major constraint of not giving them prior information is that, it conflicts with their departmental programmes. Also persons who can give relevant information may not be available. Thus accurate information may not be obtained. • KDA: The content of the information at the workshop was suitable because the workshop centred on edited information we had collected ourselves. However, the information was very technical and was presented in English, which did not go down well with some participants. They recommended that in the future the local language be used for such programmes for optimal benefit.
<p>The project process</p>	<p>KUMINFO</p> <ul style="list-style-type: none"> • There are no limits to data collection what is considered is availability and usefulness of the data. <p>Users</p> <ul style="list-style-type: none"> • GOAN got involved in the project in late 1998. No alternative technology was offered. Very clear on roles and responsibilities. Have signed a memorandum of understanding with KNUST, but have not been involved through out the project period. • CM: They were first involved in 1999 at the implementation stage of the project. • KDA: Got involved in June – July 1999. Do not have information on whether alternative technologies exist or not. • KDA: Their participation ended after helping to draw the community's map. However, KNUST did organise a 3 day workshop for DA staff involved in the design of the project and some community members from Swedru and others on the outcome of the map drawn. They were not happy with the technical setup of the project, therefore not aware whether the community monitors the ICT project or not. • EPA became involved in January 2000 • EPA: No alternative technologies offered <p><u>ICT application process</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • The mechanism used for communities to apply for ICTS is by writing or visiting the office. The most preferred channel is verbal description as it is easier to understand what the communities really want and leaves no room for misunderstanding. <p>Users</p> <ul style="list-style-type: none"> • EPA: Request for maps is made through DFID collaborators who in turn instruct the KUMINFO office to carry out request. • EPA: Procedure too cumbersome. • EPA: Information provided to KUMINFO is packaged satisfactorily as digitised maps. <p><u>Memorandum of Understanding</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • No MOU signed with any community Instead there is a mutual agreement to work together. <p>Users</p> <ul style="list-style-type: none"> • KDA: There was memorandum of understanding between Swedru and KNUST, but not the DA. • EPA: Signed an MOU. Although their responsibilities have not been interfered with through out the project, some extra responsibilities have been incorporated (e.g. doing field work with DFID collaborators, working with school children as well as supplying reagents for testing water quality) <p><u>Reporting and Monitoring</u></p> <p>Users</p> <ul style="list-style-type: none"> • Community does not monitor the ICT project because they do not have information on the project. Usually GOAN reports on performance through Dr. Nsia Gyabaah (A researcher collaborator on the KUMINFO project) • EPA: Performance is monitored by way of stakeholders meeting where the core responsibilities of all involved are reviewed to keep them on track and also to assess the way forward.

<p>Key linkages</p>	<p><u>Target Groups</u></p> <p>Users</p> <ul style="list-style-type: none"> • Communities receive information from GOAN by visiting, through workshops and information literature. Community members visit the information centre of the secretariat.. • CM: Generally, they communicate with the DA through the CLFs, assemblyman and traditional rulers but have no communication with DA on KUMINFO issues. • CM: Extension officer visits to perform normal duties but is not involved in promoting the use of the project facility. • KDA: The user communities communicate with the DA through either their chief, assemblyman or other opinion leaders of the community. However, as far as KUMINFO is concerned the community communicate directly with Mr. Nkrumah. Extension officers have been helping but not tied to KUMINFO project. They do their mainstreaming extension activities. It should be noted that agricultural activities are fast diminishing in the district because of the expansion of Kumasi, therefore businessmen would not be interested in buying outputs from KUMINFO project for agricultural purposes. <p><u>Local Groups</u></p> <p>Users</p> <ul style="list-style-type: none"> • GOAN: If a local business is interested in the KUMINFO project, then it would be GOAN, as many people come to GOAN for information on organic farming. • CM: Farmer groups e.g. Nnobia Co-operative Food Farmers Association would be interested in using the facility (maps) to improve production to get more income. <p><u>National Groups</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • CEDEP, Bureau of Integrated Rural Development (BIRD), Geodetic Engineering Dept. KNUST, Kumasi Metropolitan Assembly, Statistical Service of Ghana, School of Medical Sciences - Kumasi Centre for Communicable Diseases Research (KCCR). The links are mainly in the form of participation in generation data of interest to KUMINFO and the organisations for digitisation. <p>Users</p> <ul style="list-style-type: none"> • GOAN Collaborate with MoFA extension staff on farmer field school programme. They mostly do follow-ups to ensure that information received is being put to good use and practiced. As well as giving technical support. <p><u>Remote Sources of Information</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • Remote sources of information include existing satellite imagery and maps.
<p>Capacity</p>	<p><u>Staff Training</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • Training was provided to the previous Data Manager in U.K, whilst the current one was trained in Canada. <p><u>User Training</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • A couple of users have been trained by the Data Manager in how to use the KUMINFO to generate maps – however, these tend to be researchers. This training has been undertaken at the request of the trainees. There are plans to organise regular training activities in the near future. <p>Users</p> <ul style="list-style-type: none"> • GOAN: Have not been trained by KNUST, but have been invited for a workshop. However, other NGOs have trained users on environmental issues. • CM: No training on KUMINFO • CM: CLFs have had training on development education from CEDEP – natural resource management, income-generation, sustainable credit use, etc. • KDA level staffs were not trained in the use of KUMINFO and Archview. Lectures were given mostly at the workshop, which many of them did not understand. <p><u>Participation</u></p> <p>KUMINFO</p> <ul style="list-style-type: none"> • No PRA training has been given.
<p>Development benefits</p>	<p>KUMINFO</p> <ul style="list-style-type: none"> • Training students to use the facilities and apply knowledge and skill in their

	<p>various areas of study. 2 core courses to be incorporated at postgraduate level.</p> <ul style="list-style-type: none"> • What has been planned is: to support all the Utility Service Providers e.g. electricity, water, wood fuel, etc.; collaborate with EPA to work on water quality and Town and Country Planning for Landscape Architecture. • Information and communication outputs are used for community level work, mainly research work. There is little development work associated with this. <p>Users</p> <ul style="list-style-type: none"> • GOAN: Information received is used to plan properly. However, the project should have added TV programmes, installed softwares and have access to research results. Also provision of a video camera would be very useful. • GOAN: In general not satisfied with facility because target communities not know if they can access to it. • CM: There is clear evidence because when community members saw the maps awareness was created. This prompted actions like tree planting along the rivers to protect the rivers. Farming and building of houses along rivers also stopped. • CM: Information obtained is used for determining soil types and which crops are suitable, layout of the community, • CM: The chief used the information obtained to enact a law against cutting of trees, farming and building of houses along rivers. • CM: Information can also be used for planning purposes by the District Assembly and Government • CM: Satisfied with the facility because it is very useful to the community in solving its problems (forest and land degradation) • KDA: Nothing has changed. For example, sand wining is still going on, and community members still defecate in bushes. However, community members have started cleaning their environment of ice water sachets. They have become more aware of their responsibilities as far as the environment is concerned. • EPA: Served as an eye opener for communities to change certain habits. In one community, water testing revealed huge amount of bacteria presence and on investigation it came to light that a community member had directed their septic tank to the stream (River Akosua)
Anecdotes	<p>Users</p> <ul style="list-style-type: none"> • CM: In one area the chief used the information obtained to enact a law against the cutting of trees, farming and houses along rivers.