

# Design of Fungal database: a participatory effort

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## ABSTRACT

The present study sought to test the feasibility of a three-way collaboration to develop a database prototype in the area of mycology. The study had two components – research and development. In research component user survey of mycologists was conducted. Survey results and mycologists involvement led towards the creation of a database prototype (Fungal Species Information System – FSIS) for organizing information about fungal species which was the development component of the project. The FSIS prototype was converted into database by computer professional and hosted on the web (<http://www.fungalspecies.co.in>). The prototype was then used by mycologists to populate the database. The efforts of building up the FSIS are participatory. The present proposal discusses the experiences of information professional, computer scientist as well as domain experts i.e. mycologists in creation of FSIS.

## Keywords

Fungal database, FSIS, participatory design, organisation of information.

## INTRODUCTION

The primary objective of this research was to create a tool for organizing information on the Web. This was to be accomplished by working collaboratively with scientists and computer professionals to build a database structure to reflect the needs of scientists working in a multidisciplinary area. The subject area of biodiversity and within that, the field of mycology, in which this research was carried out, was due to the fact that this area is of special importance in Indian agriculture. Moreover, databases on plants, animals and microbial

species were available but it was observed that there were few databases related to fungal species. India, which is an agriculture-based country, has a rich biodiversity of flora. Major crop plants are often prone to fungal infections. Information on this subject is required by multiple audiences. However it is scattered and available across different sources at different levels of detail.

It has been also observed that several scientists and researchers from developing countries are engaged in making small databases of fungal species. There is no central facility where information could gather and share with world users. This calls for a participatory approach to digital data creation and the establishment of appropriate cyberinfrastructure. The design of the FSIS is for long term application. Information which is scattered in these small databases could be gathered in structured format. The web based FSIS provides facility to enter the data into standard format and could become a cyberinfrastructure for mycologists.

This project sought to demonstrate that a three-way collaboration among an LIS professional, an information technologist and a subject expert was necessary to organize scientific information on the web as per the needs of the users. Traditional LIS skills were used to understand information needs, to organize the information in a manner useful to the

## OBJECTIVES OF THE STUDY

The two specific objectives were:

1. To assess the information needs of different groups of users (mycologists, plant pathologists, biotechnologists, farmers, etc.) involved in the study of fungal species and to understand the

differences in the information requirements based on their activities.

2. To create and test a database prototype for mycologists and other users, which would satisfy the needs of different user groups and which could be collaboratively developed into a comprehensive information source on the web.

3. To create online database where scientists could be able to share the information about fungal species collected by them.

### RESEARCH METHODOLOGY

The scope of the research component of the study covered an assessment of the information needs of mycologists, biotechnologists, plant pathologists and farmers. It aimed to relate the needs to the different activities in which the users were involved. Survey method was used to assess the information needs. Questionnaire was designed and circulated among mycologists and farmers by various ways. The sample was small and was limited to mycologists in the city of Pune, although some attempt was made to include outstation experts.

### RESULTS

The survey results indicated that the information requirements of users who were engaged in different research activities were different. Based on user information needs, a list of attributes of the entity fungus was identified. These attributes were organized into clusters (Table 1).

Cluster	Mycology	Biotechnology/Biochemistry	Farmer
Characteristics of fungus	<input type="checkbox"/>		
Biological observations / field observations	<input type="checkbox"/>		
Geographical information	<input type="checkbox"/>	<input type="checkbox"/>	

Host Parasite Interaction Information	<input type="checkbox"/>	<input type="checkbox"/>	
Biochemical changes		<input type="checkbox"/>	
Molecular Sequence information		<input type="checkbox"/>	
Classification of fungus	<input type="checkbox"/>		<input type="checkbox"/>
Economic importance of fungi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fungicide Information			<input type="checkbox"/>
Bibliographic references	<input type="checkbox"/>	<input type="checkbox"/>	
Links to other database entries	<input type="checkbox"/>	<input type="checkbox"/>	

A broad schema was then developed, using the expertise of the scientists. Computer specialists then requested to create the framework of Fungal Species Information System (FSIS). FSIS was hosted on the web (<http://www.fungalspecies.co.in>) and users were requested to enter data, search data and give general comments. After three months testing period, several comments which were received were analyzed and wherever possible changes were made in the database. A facility to develop personal interfaces with the database through the use of self-defined data entry, search and display options was also provided. Different privileges were provided to users, including the facility to create additional templates for data entry, retrieval and display.

### DISCUSSIONS

Information on user needs is a crucial input when conceiving the design of the database since the

process is iterative. The study could be considered successful at several levels. Firstly, it demonstrated that it was possible to organize information in a database that would satisfy users from different disciplinary perspectives and backgrounds. Secondly the involvement of users in developing the database schema led to greater user satisfaction with regard to database content and retrievability.

### **Benefits**

The collaboration among the three professionals (LIS, computer technology and domain expert) benefited each to a great extent such as:

#### **Domain specialists**

“Since we are not at all computer savvy explaining details to the computer specialist was very difficult. It was interesting to realize that the LIS professional could understand our information needs because of their experiences and convey this to the computer person”.

#### **Comments by software expert**

“I learnt from this project how exactly a layperson need information and the way he/she will use this database. It was an opportunity to understand the problems faced by scientists. Having an intermediary was useful as the intermediary was able to understand me better and was able to tell me what the mycologists wanted”.

#### **Comments by LIS professional**

“Experience of working with domain expert (data savvy) and with computer professional (techno savvy) for the development of specialized

database was different. It gave an opportunity to work with domain experts to understand their information needs and Information requirements helped in organizing information in the form of database. As an intermediary between the subject expert and the software specialist, it was possible to understand how LIS professionals could bridge the gap between the two”.

### **Challenges**

In this three way collaborative research, the LIS professional's role as an intermediary was a challenging. Some of the challenges faced like understanding the domain (data in the field of mycology), communication among three different professionals, less technological knowledge of domain experts. The difficulty of being labeled ‘a librarian’ did create a few difficulties. Scientists assumed that when the word information was used the researcher was only interested in bibliographic information. It took some effort to convince them that the researcher's interest in information went beyond that of books and information sources.

The development of data repositories as a part of the cyberinfrastructure presents a challenge, which the LIS profession should face with confidence. It is an opportunity to reaffirm the role of LIS in organising information.

### **ACKNOWLEDGMENTS**

We thank computer professional who actually design the FSIS as per the requirements and domain experts who provided their data during the FSIS testing phase.

# **Designing Participation in Sustainable Tourism Development Planning in Post-Communist Poland: Increasing residents' engagement in local affairs**

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## **ABSTRACT**

At the present stage of economic transition in post-communist localities, sustainable tourism development is often very attractive option to improve economic diversity (Majewska, 2008). The application of environmentally, socially and economically sustainable strategies creates potential to improve the engagement of stakeholders in local affairs. Our discussion of participatory design is based on the real example of such a development project realized in the neighborhood of the Great Poland National Park in Poland

## **Keywords**

Post-Communist social environment, Tourism Decision Making, Residents' Involvement,

## **INTRODUCTION**

Local residents' involvement in and decentralization of decision making has been a noticeable area of research interest in recent years (Parkins and Mitchell, 2005). Empowering residents by including them in tourism development decision making is relatively new approach initially introduced as a crucial element of sustainable development (Saarinen, 2006). The need for applying participatory approach to decision-making has also been strongly emphasized within the framework of 'community

based' or 'community driven' tourism development (Tosun, 1998, Saarinen, 2006) and management (Armitage, 2005) in less developed countries. This approach advocates the distribution of power to "grass roots' resources users and local-level participants" (Zanetell and Knuth, 2002).

In this discussion we draw readers' attention to application of environmentally, socially and economically sustainable tourism development as a tool to improve local actors' engagement in local affairs. The discussion is based on the real example of such development project realized in the neighborhood of the Great Poland National Park in Poland. We attempt to analyze the process of the project realization with particular focus on strategies applied to increase local interest and therefore participation. Also, we suggest that a the participatory approach to tourism planning may impact local attitudes in a post-communist environment. In addition to discussing benefits of the participatory approach to planning in the post-communist environment, we explore difficulties to its successful realization. Identifying existing barriers to local participation is perhaps the most crucial step in the process of democratization of decision making in the post-communism Poland.

## **CONDITIONS FOR PARTICIPATION IN POST-COMMUNIST POLAND**

The participatory approach to planning tourism is strongly recommended by European Union and specifically in cases where the development planning occurs outside highly urbanized areas.

Many barriers participatory planning approaches, which exist in developing countries (see: Tosun, 2000) may also occur in the post-Communist members of the European Union as well. Important differences exist between developing countries and the post-communist countries in the EU. The latter have usually developed the necessary infrastructure enhancing local participation, such as: decentralization of public administration, presence of the third-sector organizations coordinating and controlling participation processes as well as improving the flow of information and financial support from the EU to facilitate participatory planning. The remaining barrier, however is that post-communist citizens do not show willingness to engage in local affairs and often purposively disengage themselves from local initiatives.

Presumably, lack of trust among post-Communist citizens has been a serious, not to say the most significant constraint, to engaging in collective actions initiated in a locality, even though participation is now voluntary, unlike during the Communist regime (Howard, 2002). Still, little agreement exists to as how local governments in post-communist states can successfully involve residents to participate in such actions. Based on our experience we postulate that projects focused on emerging local and regional issues such as tourism development planning may engage more local actors and become a base to further increase in participation as well as formation of new social networks.

## **THE CASE STUDY**

### **Methods**

At the present stage of economic transition of localities in the CEE (Central-Eastern Europe), sustainable tourism development is often an attractive option to improve economic diversity (Majewska, 2008). To investigate the realization of this development project two qualitative methods were employed 1) analysis of project documents 2) examination of actors' interaction and involvement through observation during planning processes. Interaction with the projects' coordinators helped us to deepen understanding of the process and to developed framework

through which we looked at the potential impacts the project has on participating actors.

### **Planning Process in Great Poland National Park**

The planning process involved actors from 8 administratively distinct localities surrounding Wielkopolski National Park. For many of these small areas tourism development is a form of economic development. The initiative to involve the local actors in planning process for development of tourism facilities came from non-governmental organizations (Partners for Local Government, The Foundation in Support of Local Democracy in Poznan) after consultation with local governments and authorities. The realization of the projects proposal was co-funded by the Civic Initiatives Fund and involved the management of Great Poland National Park.

The main goal of the project was to create foundations for developing tourism and recreation in the communes of the "micro-region" of the Wielkopolska National Park through engaging stakeholders, associations and general public in the decision-making process. Organizers in cooperation with the park management provided space for local interaction and dialogue. Interaction was pursued at the two distinct levels such as within-community individual interactions and that of a community with external actors (Allen & Korsching, 2004; Flint, Luloff & Theodori, Unpublished Manuscript). Introduced educational activities significantly deepened knowledge of participants about sustainability and its philosophical foundations. Participants actively engaged in preparing a base for developing a sustainable tourism plan.

The facilitating organizations had researched the most prominent local issues of concern before the project began. The lack of interaction and communication among local government, business owners and other residents has diminished efforts to develop recreation facilities. Local residents, however, showed enthusiasm toward the developing tourism facilities because these facilities would serve their recreational needs as well. The findings influenced the project

design. Participants were made responsible for collecting information about potential tourism attractors in the neighborhood of the Great Poland National Park (e.g. Bicycle Association identified potential bicycle trails). They also actively engaged in preparing the document. Meetings organized in form of topic panels aimed at improving communication. Educational workshops helped to identify recreational needs and tourism development concerns. In addition the facilitators engaged local schools to interview students about their recreation needs and potential recreational resources they identify in their neighborhoods. Meetings, at which experts shared knowledge about sustainability and tourism development attracted mainly local associations, authorities and of schools. These short seminars discussed: 1) the importance of local partnerships and collaborative decision making; 2) concepts of tourism capacity and sustainable tourism; 3) environmental protection in the EU, 4) tourism product and promotion of the 'micro-region Wielkopolska'. General information and specific reports were made available through local newspapers and public announcements and e-news.

The tourism development planning project provided space for interaction and development of trust and shared values. Organizations involved in the project built a relationship with participant by providing advice and guidance. Perhaps, shared values and interest in the locality would emerge from the intensified interaction among actors. Emerging collectiveness and community spirit (Wilkinson, 1991) under the condition of cooperative local officials results in more positive attitudes toward other residents, community as a whole as well as toward local government. Government is perceived as an actor coming from the community and facilitating activities reflecting community interests.

### **Conclusions**

The paper discusses participatory design applied in the Great Poland National Park in post communist Poland. Mistrust to officials and individuals' belief in their inability to influence decision making appear to be the most significant

constrains to engagement in development process. This small case study illustrates that tourism development planning projects show potential to successfully engage local actors. We observed that actors made decisions about participating in the planning process based on available information about the purpose of the project and expected outcomes. The outcomes of the process would influence entire area, including all residents. Perhaps individuals understood potential tourism impacts on their lives and such understanding motivated them to engage and influence project outcomes. In addition, available information is crucial in shaping people's perception of tourism as a local activity that will directly influence them. Also the environmental concerns and social issues are important factors in motivating actors to participate in planning process. In other words, the notion of tourism combines perceived benefits with possibilities of negative impacts and these various interests encourage actors to engage in the deliberative planning processes. However, we should emphasize that the project we discuss did not involve decisions, which would significantly disadvantage some of the local actors in order to allow others to exclusively benefit. Rather, the project dealt with potential tourism impacts distributed within the neighborhood of the national park.

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# Where is the power located?

Andy Dearden:

Statement for the PDC 2008 Workshop on Participatory Design in Development

Throughout the history of the participatory design tradition, questions of power have been central to our understanding. A key objective in early Scandinavian projects such as DEMOS, DUE and UTOPIA was to alter the power relationships between capital, management and labour in the introduction of new technologies to industry (Ehn & Kyng, 1987). The methods developed and explored in Greenbaum & Kyng (1991) are concerned with how users can operate as active decision makers in the software creation process, rather than merely passive informants. But successful participation is not a neutral process, but involves an explicit attempt to shift power. The methods are a means to that end, not an end in themselves. In attempting to map participatory design to a new setting of international development we need to subject the power relationships inherent in our own working practices to critical examination.

A useful starting point is Oakley's (19??) characterisation of the different aims of participatory working in development. Oakley suggests that participation may refer to three very different forms of engagement:

- Level 1: Participation as contribution or passive participation: Here participants make voluntary contributions to a predetermined project in return of some perceived future benefit.
- Level 2: Participation as Organisation or Externally Driven Participation: Here, the external development actor leads the reform or creation of some new organization through a process of participation.
- Level 3: Participation as Empowering and Leading Social Inclusion: Here participation aims to develop skills and abilities within the community to enable people to manage their own needs better and decide on aspects that they select and determine. This type of participation seeks to build the capacity of the community to act on their own in the future.

These different forms of participation imply very different types of relationship between project staff and beneficiary groups, and have very different outcomes from the perspective of development.

Many attempts to design new technical solutions for developing countries may fit into Oakley's model at level 1. The general aims of the project are defined before engaging with any specific community, and participants have only a marginal input to make. The difficulty with participation at level 1 is that the project has been defined outside of the community that is meant to benefit and often will miss the real local needs of the people. Of course, the detailed contextual, ethnographic and participatory methods used in design all aim to avoid this situation, but the level of detailed study and relationship building required are rarely practical within the constraints of a few short visits by designers to the community. In any case, this form of participation can only provide for discussions of the means by which technology might be used to achieve some given ends, but does not open the question of whether the ends themselves should be prioritised. Chambers (1994) discusses the problem of 'development tourism' in which development staff base their conclusions on brief visits, to places that are close to good transport links, interacting with only a small subset of the people that they hope to reach. Poorly informed decisions are then enacted which can have major unintended consequences. This problem is just as relevant to ICT as it is for any other kind of development project. Researchers must answer the question of how they avoid the risks of 'development tourism'.

Cooke & Kothari (2001) provide a collection of papers that examine how projects that are described as 'participatory' often involve exercises of power by remote bureaucracies and donors acting upon particular communities and localities. One recurring theme in this collection is the way that labelling activities as 'participatory' can be used by project sponsors to provide legitimacy to their activities, whilst their practice on the ground may be more closely one of patronage towards particular individuals. A focus on the methods and techniques of participation may serve to obscure the underlying reality of these power relations. In particular, as projects move from early stages of discussion to delivering changes to specified timeframes & budgets, projects may increasingly involve centralised decision making and manipulation of the very people whose interests are supposed to drive the project.

Projects always involve a range of stakeholders. In ICT for Development, we can identify people participating in design, people in the same locality who are not participating in design, donors, the 'research community', designers, software and hardware developers and vendors, providers of network services, local government officials etc. These individuals and groups have different goals and are subject to different rewards and incentives. When they come together within a particular project, it is a mistake to suppose that they are equal participants in a free negotiation. There are massive differentials in power. The technology designers and donors are free to make major decisions and deploy very substantial resources that the 'beneficiaries' will find hard to counter. Decisions that seem small to the external designers may have massive impact on local conditions.

Some basic questions that need to be answered in a project that claims to be participatory are: Who decides on the overall aims of the project? How might someone in the 'beneficiary' community be able to change the direction or focus of the project? What mechanisms are available to do this? What budgetary control does the community have over the project? To what extent are the software and hardware designers contracted to deliver benefits to the community, or is the community contracted to service the needs of the designers (for example to publish original research)? Who decides on the timeframes and the allocation of resources in the project? Who will judge project success (or otherwise)?

Development is a political process. Claims to be participatory in ICT for Development projects deserve close critical scrutiny.

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# Challenges in Organizing Tourism in Vladimir, Russia

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## **ABSTRACT**

According to forecast of World Tourism Organization, Russia will become one of the ten most visited destinations in the World in 2020. Available national statistical information also indicates continued post-Perestroika growth in number of international tourists. Our main goal is to emphasize political barriers that diminish tourism development in the city of Vladimir in the Golden Ring and indicate actions that external to the city actors have undertaken to improve cooperation among private and public sector as well as different levels of governments.

## **Keywords**

Tourism development, stakeholders' participation, conflict of interests, tourism training, Golden Ring

## **INTRODUCTION**

Transition in reference to Eastern and Central Europe is usually understood as a process of change from a centrally planned towards a market driven economic system. Transition processes involve enormous political, economic and social changes at every level of society (OECD). The centrally planned economy of the Soviet Union saw tourism narrowly as a profitable undertaking, which resulted in domination of "union" or social tourism. Tourism development in the Soviet Union was understood by leaders as an activity requiring additional governmental commitments (Burns, 1998). Contemporary development paradigms do not accept this form of tourism as a contender for contributing to modern economic development (Sofield, 2005). Thus former tourism destinations

of the Soviet Union face significant challenges of re-developing tourism facilities based upon competition for consumers' time and money.

Nowadays, many of previous republics of the Soviet Union still face challenges of a transitioning economy and continue adjusting to new conditions. Furthermore, analysis of the governmental system in Russia and attitudes of the citizens show that society of 'modern' Russia lacks trust to newly formed local authorities and any organizations that exceed the sphere of personal relations among individuals (McCarthy and Puffer, 2003).

This presentation briefly discusses background of economic and social transition in Russia. It is mainly concerned with unrealized potential to develop tourism in the city of Vladimir. We illustrate the main barriers to successful tourism development in the city, which we believe occur as a consequence of the persistent conflict among tourism stakeholders. We also discuss what occurs when independent tourism development organizations operating outside political influences do not exist. Our main goal is to discuss constrains we identified that diminish efforts toward tourism development and to suggest how these constrains could be overcome.

## **METHODS**

The area in which to conduct the study was chosen because of unique tourism attractions, which we considered as economic strength of local society. The study focused on tourism development in Vladimir begun in 2004 with support from Sister Cities International. Also in 2004 for the first time researchers had opportunity to visit the city and surrounding

communities. In-depth personal interviews were conducted with government officials at the city and Oblast (regional) levels, tour operators and tourism related enterprises. We returned to Vladimir in 2005, 2006, and 2007 which allowed us to deepen our understanding of the conditions for developing tourism, conduct follow-up interviews and to assess progress. Repeat visitation significantly added in our ability to understand the situation and provide recommendations that viewed as credible by local leaders.

### **FINDINGS**

For economies in transition tourism development is often an attractive option to improve local economic diversity. In the Soviet Union, the Golden Ring area had an established position as a tourism region rich in Russian cultural attractions and acquired a strong and valuable “brand identity”. The Golden Ring is known widely for the significant structures of Russian Orthodox Church many of which have received UNESCO World Heritage Site status. Demand for visiting the Golden Ring area should increase as more tourists look for destinations outside the “must-see” cities of St. Petersburg and Moscow. Vladimir is one of several destinations in the Golden Ring, and the main motivation for tourists to visit the city is its cultural heritage. However, the city is also perceived inseparably from the Golden Ring and thereby has not managed to establish unique identity. Under these circumstances developing tourism must involve intensified local activities aiming at creating distinguished image (Sharov, 2005). Also much attention needs to be directed to improve the tourism infrastructure and increase the quality of tourism services, which in Vladimir and other Russian destinations are often far below international standards. If the city of Vladimir attempts to become a distinguishable tourism destination it must be able to compete with other,

already developed cities in the Golden Ring area, which will require cooperation among the three sectors (public, private, and non-governmental organizations).

Additional participation of the private sector in tourism development will occur only if credible tourism statistics and information about growth of the tourism sector in Russia become available. Also consistent government policies appear to be an important factor encouraging private tourism investments in Vladimir. To encourage tourism entrepreneurs local and regional authorities need to cooperate and together and facilitate tourism development, instead of competing with each other. The governments must realize that joint initiative would allow for more efficient use of available funds. Especially the fact that that low financial support for long term tourism activities makes them highly dependant upon limited annual budget. They are afraid of the political consequences if intensified long-term tourism development responsibilities exceed their financial support for them.

Another barrier to cooperation of public sector is persistent conflict between local and regional governments, which is intensified through subordinate role of the Vladimir City Administration to the Oblast. Local administrations emerged as a result of political reforms and often they were created to ‘imitate’ local governance. At that time, however cities like Vladimir have increased their economic and political dependence upon the central government. The conflict deepens because the Oblast supports increasing the dependency of the city (Russian Regional Report, 2005). The conflict of interests and protection of “turf” between local, regional and federal authorities, thus generating resentment, is the main cause for lack of cooperation among public institutions influencing tourism development in Vladimir.

### **Conclusions**

Collaboration between stakeholders and the tourism sector is now virtually nonexistent in the Vladimir. In fact, the lack of interest in independent tourism development of Vladimir showed by the regional government on the one

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hand and no opportunity for the Vladimir Administration to have a significant impact on tourism activities in the city on the other keep the private tourism sector from investing in the city. Politically independent tourism organization, could negotiate conditions of collaboration between public and public sectors and help to reach an agreement about the shape of future developments in the city. To date, however many of responsibilities of such an organization have been fulfilled by experts and researchers who have: 1) annually produced report and recommendations to be distributed among authorities 2) produced maps and other DSTL 3) provided translation services 4) initiated training program for area tourism stakeholders 5) created English-language website 6) provided travel support and programming for local officials to meet tourism leaders in Central Eastern Europe (Poland) and 7) with assistance of summer interns began collecting marketing data from domestic and international visitors.

Although an active private sector is a critical factor to successful tourism development, in some cases entrepreneurship has gone to excess and tourism business owners do not trust one another and do not work toward common goals. A politically independent tourism organization often functions as the main negotiator/mediator between stakeholders in conflict and therefore is often necessary for consistent tourism policy to be developed and to activate tourism private sector. The organization must also act as a representative of private businesses to regional and local authorities and advocate their needs in the context tourism development plan. Free tourism information and transparency are required to increase trust of local entrepreneurs and involve them in tourism development process. Such organization would also help businesses to gain external funding for tourism

development projects and help to collectively promote tourism. Of course it would provide visitor service and conduct necessary training and led educational meetings as there remains a lack of understanding about a functioning of the tourism system. A process of education and networking must continue.

It is widely known among tourism development professionals that to realize a functional tourism system all its main components must be working toward a common goal. To date the economic, political and social components of the tourism system in Vladimir have not managed to catch up to the desired level of cooperation although incremental progress is being made.

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# Participatory Design in Rural Kenya

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## Abstract

The following is a presentation of some of the challenges we have faced in participatory design in rural Kenya. The perspective we have taken is that the design and usability of technology needs to be guided by the needs of the community and the activities they engage with daily.

## Introduction

In rural communities in Africa, most people rely upon farming to provide food, yet lack valuable farming information — about soil conditions, the weather forecast, or the location of the best market for their goods. They also lack basic literacy skills, and have little or no knowledge about digital technologies. However, one technology—the mobile technology has been pervasive. It is used by majority of the people even in the rural areas and has been projected to be the main platform for Internet access.(1) The mobile technologies can provide a two-way flow of information as rural farmers can not only receive data about markets, pests: but also collect biodiversity data to send o scientists or shared databases.

Many projects have attempted to introduce digital technologies to the developing world, but are often driven by the technologies themselves, run up against literacy or usability barriers, or simply the lack of power and other infrastructure. Sustainability and self-sufficiency are often hampered by hardware or software that require ongoing support or whose interfaces are designed for very different contexts, since existing technologies, interaction design methodologies, and usability testing techniques are all developed by and for the developed world.

Our research explores the interface and interaction design of mobile, two-way information systems, initially in two rural villages in Kenya. Mobile technologies are employed to bridge remote sensor networks and centralized access points, with novel power solutions usage scenarios, and device interfaces — all aimed at end users with little or no knowledge of digital technology, but with rich local agricultural and cultural knowledge.

## The VeSeL project

VeSeL (Village e-Science for Life) [3] is a research project, part of the Bridging the Global Digital Divide network sponsored by the Engineering and Physical Sciences Research Council (EPSRC) in the UK. It runs for three years from September 2006. The aim of the VeSeL project is to enable rural

communities in Sub-Saharan Africa to use advanced digital technology to improve their agricultural practices and literacy levels, with particular emphasis upon educational barriers.

### **Initial findings**

Initial field research was carried out in 2007 in the Kenyan village communities of Kiangwachi and Kambu by researchers from the University of Nairobi and Thames Valley University who are versed to some extent in the local languages and cultures.

The methods included evaluations of interfaces of existing mobile devices such as phones, cameras and iPods; a structured survey of technology usage and coverage; and ethnographic study of local agricultural and community practices among 36 adult farmers in Kambu, and 40 in Kiangwachi; in both communities the farmers are part of agricultural self-help groups.

### **The following are the main challenges we have encountered so far:**

- (a) There is a lack of familiarity with digital technology to the level that most have no clear mental model of how technologies work or of how they could be useful.
- (b) Poor telecommunication infrastructure means that activities that could be followed-up from a distance or meaningful communication between the two dispersed groups prove to be a challenge.
- (c) Because of the dispersed geographical distances, apart from the prohibitive travelling costs, the community perceives this as a lack of commitment on the designers' team as they leave the community 'behind'.
- (d) Literate and older professionals (therefore more literate) tend to record their farming activities. Others however, do not keep track of this and therefore can often not tell the extent to which they are operating at a profit or loss.
- (f) The literacy level of the community is low and meaningful communication in some instances can be difficult.
- (g) Power distance, the perceived status between the host communities and the designers was evident, however, in this case because the researchers were of similar cultures; this problem was not a major issue.
- (h) The Cultural/language barriers although present were also minimal as the researchers were of similar cultures to the rural communities.

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### **References**

- [1] <http://allafrica.com/stories/200712190781.html>.
- [2] <http://www.veselproject.net/>