PARTICIPATORY COMMUNICATION FOR THE MANAGEMENT OF NATURAL RESOURCES IN AFRICA AND THE MIDDLE EAST

Final Report Submitted by Annie Méar, Professor, Université de Montréal, Grant n°003415-99906501-109

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On behalf of the authors, I would like to acknowledge the contribution of Yacouba Konate, whose unexpected passing occurred during the preparation of this report.

Annie Méar
Foreword

This report is submitted to the International Development Research Centre (IDRC) in compliance with the requirements of Grant No 003415-99906501-109. According to the terms of the grant, the funds allocated within the context of the IDRC institutional fellowship program were to be used to hire a research assistant. The research assistant was to second the principal investigator, Annie Méar, in the organization of a Roundtable in Barcelona, Spain, in July 2002, within the context of the Scientific Conference of the International Association for Media and Communication Research (IAMCR). The Roundtable was entitled: *Participatory Communication for the Management of Natural Resources in Africa and the Middle East.* It was attended by ten researchers from Africa and the Middle East whose research projects were funded by IDRC. Three representatives from IDRC namely Guy Bessette, Olanrewaju Smith and Luis Navarro also participated in the Roundtable. Tricia Bell was the research assistant who was hired to second Annie Méar in the preparation of the roundtable.

This report consists of the ten papers presented at the Barcelona Roundtable. The first chapter by Annie Méar provides an overview of food and water insecurity in the developing world with particular emphasis on the situation in Africa. The second chapter by Guy Bessette provides the methodological context for the projects presented in the report. Most of the papers were presented in French at the Roundtable, as French was the language many of the invited speakers were more comfortable in. As a consequence, most of the papers in
this report are presented in their English translation, as the intent of the organizers of the Roundtable is to publish the series of contributions in a book format with the collaboration of the IDRC publishing department.

I would like to express my gratitude to the ten researchers who participated in the Barcelona Roundtable for their devoted collaboration throughout the project. I would also like to express my warmest thanks to Guy Bessette, Olanrewaju Smith and Luis Navarro who were the principal instigators of the Roundtable and championed the project from beginning to end. Without their constant help the initial idea of the Roundtable would not have resulted in the present manuscript.

A number of other people at IDRC, the University of Montreal and IAMCR contributed either directly or indirectly to the success of this enterprise. Karen Trebert and Rachel Bouchard at IDRC; Myriam Amzallag at the Université de Montréal; Frank Morgan, Thomas Jacobson, Anders Hansen and Rita Mastromonanco at IAMCR.

Finally, last but not least, I would like to express my deepest gratitude to Tricia Bell who lent me her devoted collaboration throughout the project.

Annie Méar
Montreal June 20, 2004
Introduction

The ten experts invited by the International Development Research Center of Canada (IDRC) to present their research at the IDRC-IAMCR Barcelona Roundtable came from Senegal, Burkina Faso, Mali, Ghana, Uganda and Lebanon. The IDRC-IAMCR Roundtable discussed various strategies of participatory communication for the management of natural resources in Africa and the Middle East.

The research projects presented at the Roundtable dealt with the improvement of land management technologies in Ghana, farming practices in Mali, livestock feeding practices in Senegal and banana production in Uganda. Some of the questions asked by the researchers can be stated as follows: How can we improve rice production in Senegal where the coastline is being submerged by the sea? How can we alleviate the water-related conflicts in the villages of Burkina Faso? How can we prevent roving animals from destroying crops in Mali? How can we overcome the impact of growing desertification in Burkina Faso? How can we improve community participation for rural development in Lebanon? Organizational, ethnic as well as professional parameters of culture and communication provided the matrix for discussion.

The main objective of the research projects presented at the roundtable was to discuss the most appropriate communication strategies in order to control the environment and improve agricultural production with the cooperation of the local communities. Most of the problems tackled in the various research projects involved land degradation, salinization, desertification and soil fertility. The aim
was similar in all the projects, namely to allow the local communities to identify the problems affecting agricultural production. Researchers wanted to help the local population design and implement the solutions that would improve agricultural production while also preserving the environment. Each project resulted in better access to food and water for the local populations and thereby alleviated food insecurity and poverty.

For each of the ten researchers involved in the Barcelona Roundtable food security and poverty alleviation through improved and sustainable agricultural production were the main development challenges. The first chapter by Guy Bessette defines the development communication approach used in most of the projects outlined in the report. The other eight chapters describe specific communication strategies in order to increase agricultural production and, by the same token, improve access to food and water.

The ten researchers invited by IDRC were: Fadel Diamé from the West Africa Rural Foundation in Dakar, Senegal; Malâïny Diatta from the Institut sénégalais de recherche agricole in Dakar, Senegal; Safiétou Fall from the Institut sénégalais de recherche agricole in Dakar, Senegal; Nlombi Kibi from the Université de Ouagadougou in Ouagadougou, Burkina Faso; Yacouba Konaté from the Comité permanent inter-états de lutte contre la sécheresse dans le Sahel, in Ouagadougou, Burkina Faso; Drake Mubiru from the National Agricultural Research Organization in Ntebbe, Uganda; Amadou Niang from the International Centre for Research in Agro-forestry in Bamako, Mali; Césaire Pooda from Journalistes en Afrique pour le Développement, in Ouagadougou,
Burkina Faso; Charles Quansah, from the International Water Management Institute, in Kumasi, Ghana; Rami Zurayk from the American University of Beirut, in Lebanon.

The IDRC-IAMCR roundtable was organized jointly by the International Development Centre of Ottawa, Canada, represented by Guy Bessette, Olanrewaju Smith and Luis Navarro; the Participatory Communication Research Section of IAMCR, represented by Thomas Jacobson; the Working Group on Environment, Science and Risk Communication of IAMCR, represented by Anders Hansen; and two members of the Executive Board of IAMCR, namely Frank Morgan and Annie Méar.
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Participatory Communication for Sustainable Development in Burkina Faso and Mali
Ouattara, S.
FOOD AND WATER INSECURITY IN AFRICA

Annie Méar, Département de communication
Université de Montréal
AUTHOR

Annie Mear, Professor
Université de Montréal, Département de communication

Mailing address:
Université de Montréal
Département de communication
C.P. 6128, Succ. Centre-ville
Montréal, Quebec
H3C 3J7
Email: annie.mear@umontreal.ca
Abstract

This chapter first outlines the main parameters of food and water insecurity in the world. The second part analyses the environmental, human and social causes of the food and water shortages. The final section looks at the parameters, causes and consequences of food and water insecurity in Africa.
Food and Water Insecurity

Current levels of food production and water availability are sufficient to meet the needs of the world's population for many years to come. Yet many countries face a serious food and water crisis that threatens the physical well-being of a large percentage of their people. In the twenty-first century, people are still dying of hunger because they lack the most basic food and water requirements in order to survive. They are dying despite the well-intended declarations and numerous development programs of a number of national and international agencies. Thousands of children are particularly vulnerable because they do not have enough to eat and enough water to drink. This unbearable situation begs a poignant question: why do people and especially children, have to die of hunger and thirst in a world replete with agricultural resources?

Food Insecurity

Today there are around 6.3 billion people in the world. Approximately 0.9 billion, or less than one-sixth of the world's population, live in the 50 most industrialized countries. Another 0.4 billion people live in countries considered "in transition", such as the Baltic States, Eastern Europe and the Commonwealth of Independent States. The remaining 5 billion people live in 125 developing countries that have a lower standard of living and lack the goods and services of the high income countries. In those 125 developing countries, over 1.2 billion people live below the international poverty line, earning less than one dollar a day. They even lack the resources necessary to provide adequate and nutritious food for themselves and their families. As a result, around 24,000 people die everyday either from outright starvation or from hunger related diseases. (Bread for the World, 2001).

The latest Report of the Food and Agriculture Organization (FAO) on the State of Food Insecurity in the World (2003) attempts to alert the world about the plight of the developing
world. According to FAO's statistics, 842 million people are chronically undernourished: 10 million in developed countries, 34 million in the so-called "in transition" countries, but the vast majority, i.e. 798 million, live in the developing world. The report also stresses that in developing countries, most people cannot afford the most basic foods required for sound health and growth. Moreover, the authors of the report underline the fact that they face vitamin and mineral deficiencies, which often result in stunted growth, weakness and heightened susceptibility to illness. They add that undernourishment can even hinder fetal development and contribute to mental retardation (FAO, 2003).

The problem of food insecurity is especially dire in South Asia where 280 million people are malnourished, and East Asia where 240 million people lack adequate access to food. Approximately one-third of the world's malnourished population lives in India alone (Mittal, 2003). According to the International Food Policy Research Institute (IFPRI) the food crisis is also quite severe on the African continent especially in the southern and eastern regions. In sub-Saharan Africa, for example, 180 million people are malnourished. Moreover, IFPRI's experts consider food insecurity equally severe in Latin America, the Middle-East and to a lesser extent in North Africa (Pinstrup-Andersen, 2002).

The Bread for the World Institute concurs that Asia is the region of the world most affected by food shortages, followed by sub-Saharan Africa. In Malawi, for example, 3 million people are on the brink of starvation, whereas in Zimbabwe they number around 7 million, in Ethiopia 11 million and in Eritrea, 3 million. Moreover, the food crisis is expected to worsen in sub-Saharan Africa over the next 20 years (Bread for the World, 2001). Among the victims of malnutrition, children are of particular concern to the World Health Organization (WHO). Pregnant women and new mothers breast feeding babies are also particularly at risk.
According to the WHO’s estimates, at present, approximately 153 million children are underweight in the developing world. Worse yet, 11 million children under the age of five die every year, more than half of them from hunger-related causes. Even if most of the deaths cannot be attributed to outright starvation, they are very often caused by a number of diseases resulting from the vulnerability of the children’s weakened bodies. The most common childhood illnesses such as diarrhea, acute respiratory illness, malaria and measles, could all be prevented or cured if the parents had access to immunizations and medicines. The number of children’s deaths could therefore be greatly reduced with proper nourishment and adequate medical care. Among the children who live beyond the age of five, many suffer from impaired physical and mental development (Pinstrup-Andersen and Pandya-Lorch, 2001).

The spreading HIV/AIDS epidemic is also contributing to the food insecurity crisis in developing countries. Of the approximate 42 million people affected by HIV/AIDS in the world, 92.8 percent of them live in developing countries. 3 million of the HIV infected people in the world are children under the age of 15, and 2.9 million of those children live in developing countries, mostly in Sub-Saharan Africa. Adults who die from aids leave behind children and elderly relatives who have very limited resources to fend for themselves. In 2001 for example, 2.5 million children became orphans in Southern Africa alone. A newly coined expression by UNICEF, “child-headed households”, illustrates the gravity of the situation. Those children and the elderly people left behind do not have the ability to produce their own food nor do they have the necessary funds to buy it; they are doomed to hunger and starvation (UNICEF, 2003).

Moreover, since the majority of those falling victim to the AIDS epidemic are young adults, who would normally be in charge of harvesting the crops, food production has
dropped dramatically in the countries most affected by the disease. In Southern Africa, for example, where close to 500 000 people died of AIDS in the year 2001, the human cataclysm precipitated a severe food crisis the following year. As a result, in 2002, more than 14 million people faced hunger and starvation in the region (WHO, 2003).

Unfortunately, according to IFPRI's experts, the situation is not likely to improve any time soon. They even estimate that by the year 2020, the number of malnourished preschoolers will still stand at 150 million, unless some drastic changes are enacted in national and international policies. Preschoolers will be particularly affected by the food shortage crisis in South Asia and sub-Saharan Africa where it is estimated that as many as 77 percent of all hungry preschool children will reside. (Pinstrup-Andersen, 2002). Providing the poorest households in those regions with adequate access to food presents a major challenge for development experts around the world.

**Water Insecurity**

According to the United States Environmental Protection Agency (EPA), a person can live about a month without food, but only about a week without water (EPA, 1995). Therefore, it seems equally urgent to provide all individuals, not only with adequate access to food, but also with easy access to safe water for a healthy and productive life. According to James Wolfenson, President of the World Bank, more than 1.5 billion people in the world do not have access to a safe and adequate water supply (Wolfenson, 1998). The WHO warns that unless immediate action is stepped up to remedy the situation, the number of people without adequate access to safe water could increase to 2.3 billion by 2025 (WHO, 2003).

WHO's experts estimate that most water on earth, i.e. 97.5%, is salt water and of the remaining 2.5%, some 70% is frozen in the polar icecaps. The remaining 30% lies in underground aquifers and in soil moisture. Water experts also stress that hardly 1% of the
world's fresh water supply is readily available for human consumption at an affordable cost as it is channeled from lakes, rivers, reservoirs and underground aquifers (WHO, 2003).

Water access and security is a particularly pressing challenge for developing countries where population growth increases demand for clean and safe water. Since 1970, global demand for water has increased by approximately 2.4% a year (Clarke 1993). Consequently, the World Bank estimates that approximately 60 to 70% of the rural populations in the developing world do not have easy access to potable water or to satisfactory means of waste disposal (WHO, 2003). Moreover, in developing countries, poor people who are not connected to municipal water networks usually pay 12 times more for a liter of water than urban residents who receive city water (World Commission on Water, 1999). Women and children have to collect the water from distant and often polluted sources (WHO, 2003).

According to UN experts, 50% of the world's population does not have access to adequate sanitation (1997). Water systems fail at a rate of 50% or even higher (Katz and Sara, 1997). WHO's experts estimate that every individual needs around 4 or 5 gallons of water per day in order to survive. Whereas the average American uses between 100 and 176 gallons of water each day, the average African family has only 5 gallons of water per day at its disposal. (World Resources Institute, 1999). Urbanization, population growth as well as irrigation demands are the major factors increasing demand for water in developing countries.

The situation is even more critical in the world's largest cities, such as Beijing, Buenos Aires, Dhaka, Lima and Mexico City, which depend heavily on groundwater for their water supply. According to water experts, it is unlikely that aquifers, which take many years to renew, will generate enough water over time to meet the growing demand for exploding urban populations (Global Development Research Center, 1999).
The water crisis is particularly severe on the African continent where 300 million people do not have adequate access to potable water and where most individuals are not connected to a reliable sewage system. If current trends continue, UN experts estimate that seventeen African countries will experience severe water shortages in the near future.

**The Causes of Food Insecurity**

According to UN experts, there is enough food in the world to feed everybody on the planet. They even estimate that current agricultural production is sufficient to provide each individual with as much as five pounds of food per day. A number of factors account for the paradox of food insecurity in the world. Some of those factors relate to land degradation caused by environmental and climatic conditions, such as desertification or drought. A number of human and social elements also contribute to food insecurity, such as the inefficiency of small-scale, low-tech farming methods, and the 'backwardness' of farmers, among others. Compounded with those environmental and human constraints are a number of factors related to the global socio-economic context, which contribute to food insecurity: poor economic policies, growing population pressures, civil strife, and inadequate governance among others. Such conditions have all contributed to create an unstable social and political environment in the developing world, thus impeding economic growth, undermining agricultural production, and ipso facto exacerbating food insecurity.

**Environmental and Climatic Conditions**

Among the environmental conditions that have contributed the most to impede food production in the South, desertification is certainly one of the most critical. The term "desertification" itself does not refer to the spreading of existing deserts. Instead the term "desertification" is normally used to designate the land degradation process resulting from extreme climatic conditions, such as long periods of drought, in arid and semi-arid regions. In
the past, the affected areas used to recover within a relatively short period of time after the long dry spells. This is no longer the case. At present, unless they are properly managed, the dry lands affected by the wind and the water take ages to recover and regain their full biological and economic potential.

According to UN estimates around 70% of the world’s dry lands, or 3,600 million hectares, are currently affected by desertification. In affected areas, the topsoil, the crops, the pastures, the woodlands, and the vegetation covers have all but vanished. Africa, with two-thirds of its territory consisting of deserts and dry lands, is particularly at risk. Moreover, UN experts predict that as much as one-third of the emerged areas of the planet, or 4 billion hectares, will be at risk in the years to come.

Even in the United States, over 30% of the land is affected by desertification. The Latin American and Caribbean regions, with 25% of their territories occupied by deserts and dry lands, as well as Spain with a total of 31% dry lands are also threatened by desertification. China is another region which is particularly at risk. Dust storms emanating from northern China and Mongolia, for example, sometimes blow away as far as Korea and Japan forcing the closure of airports and schools.

Another important consequence of desertification is the fact that the land becomes flooded and salinized. Consequently, the quality of the water deteriorates as the rivers and basins fill with sand. Water experts suggest that the world's drinkable water has diminished by two-thirds since 1950 and each year around 12 million people die either because they do not have enough to drink or because their water is contaminated.

Since the fifties, dry lands have been expanding all over the world. They have invaded some 700,000 hectares of arable lands, 2.35 million hectares of pastoral lands and 6.4 million hectares of woodlands and forests. According to UN estimates as many as 24,000 villages,
1400 kilometers of railroad tracks, 30 000 km of roads and 50 000 km of canals are under constant threat of desertification. The current environmental conditions do not bode well for the future. In fact, experts predict that by 2025, there will be less arable lands in the world than in 1990. Africa, in particular, would see its arable lands depleted by as much as two thirds, Asia by one third and Latin America by one fifth.

According to population experts, over 250 million people currently suffer from the negative consequences of desertification, which threatens one third of the emerged areas of the planet. Another 1.2 billion people, among the poorest in the world, in 100 different countries, live under the constant threat of desertification as they rely on agricultural production for most of their most basic food and water requirements.

**Human and Social Factors**

Besides the environmental and climatic elements mentioned in the preceding paragraphs, a number of human practices also contribute to exacerbating food insecurity in the world, and especially in Africa. Over-cultivation, overgrazing, deforestation and poor irrigation practices due to both ignorance and economic pressures, for example, can have long-term devastating effects. Such human practices cause the food and water supplies to dry up thereby threatening entire populations with famine and economic instability. This often leads to mass migrations.

In fact, according to population experts, 135 million people, the approximate equivalent of the combined population of France and Germany, are currently threatened by displacement due to desertification. They even predict that between 1997 and 2020, around 60 million people will leave the desertified areas of Sub-Saharan Africa and move to North Africa and Europe. The situation is equally severe in Mexico where between 700 000 and 900 000 people leave their villages in the dry lands each year to work in the United States as
migrant labourers. When they leave their respective countries, migrant workers often settle in camps on the outskirts of cities. Consequently, the ecological resources situated inside and around the camps where they settle are subjected to overexploitation. Moreover, migrant labourers often live in squalid conditions and lose their cultural identity which contributes to the social instability of the arid regions. A study conducted in 1994 demonstrated that about half the social conflicts during the year were prompted by ecological conditions characteristic of arid regions.

**The Situation in Africa**

Africa does not have the necessary agricultural resources to feed its exploding population. Over the last decade, over 25 countries in Africa have experienced severe food and water shortages because of the extended drought, the degradation and depletion of natural resources as well as the unfavorable economic and agricultural policies. In many areas, desertification has led to significant losses in biomass and soil productivity, thereby jeopardizing agricultural production, food security, environmental protection and sustainable development. The reduced food production brought famine and starvation to millions of people. Many died of starvation and among those who survived, many children and teenagers in particular, will suffer from impaired health for the rest of their lives, with serious consequences for the overall productivity of the continent.

Ending the food and agricultural crisis is one of the most pressing challenges facing African communities, their governments and the international community. Reaching that goal depends critically on the self-reliance of the local communities who must be given the necessary tools to identify the parameters of the food and agriculture crisis they are facing and to design and implement the necessary grassroots solutions. The local communities must face the fact that the droughts and ensuing famines are the result not only of insufficient
rainfall, but of a combination of human activities and climactic variations. As Lloyd Timberlake states in his book *Africa in Crisis*, Africa has “taken too much from its land. It has overdrawn its environmental accounts” (Timberlake, 1992).

Desertification is particularly acute in Africa where over cultivation, deforestation, overgrazing, bad irrigation practices, political instability and poverty have combined with a prolonged scarcity of rain precipitation and an exploding population to produce an environmental bankruptcy affecting most of the continent. The process of desertification has severely impaired the biological potential of the African continent and the ability of the African populations to adequately feed themselves. In fact, for most of the 400 million Africans living in the Sub-Saharan region, food security is still an impossible dream.

Nowhere in Africa are the effects of desertification more deeply felt than in the arid and semi-arid lands (ASAL) bordering the two great deserts of the continent, namely the Sahara and the Kalahari. It has been estimated that 34% of the African continent is under the threat of desertification. Three regions are particularly at risk, namely the Mediterranean region, the Sudano-Sahelian region and the area south of the Sudano-Sahelian region. The drylands, including the hyper-arid deserts, cover a total of 1959 million hectares or 65% of the continent. The hyper-arid deserts themselves cover one third of the area or 672 million hectares. The deserts are uninhabited except for the oases. The remaining two-thirds of the drylands cover 1287 million hectares and consist of arid and semi-arid lands (ASAL).

The majority of Africans live in the ASAL under the constant threat of recurring droughts. In those areas the annual rain precipitation varies between 100 mm and 600 mm and the ecology is largely based on crop and livestock farming activities which constitute the basis of the food capital for the entire continent. According to the UNEP’s 1991 assessment
of desertification in Africa, 73% of the agricultural lands in the ASALs are affected by land degradation and soil erosion.

One of the major causes of desertification in Africa is the drought which invariably brings with it severe food shortages. Almost every year, there is a major drought in some area of the drylands. Some of the droughts last for several years, as was the case in 1968-73, 1982-85 and 1990-92. With every drought cycle the process of land degradation accelerates and when it lasts for several years, it exacerbates the effects of soil erosion and desiccation increasing markedly food insecurity for the affected populations.

The second major cause of environmental degradation in the drylands is the rapidly increasing human and animal population leading to the overexploitation of the water, land, forest and pasture resources. It is estimated that the human population in Africa's drylands has doubled over the past three decades. Moreover, the population continues to expand at the rate of three percent a year, which translates into an additional 12 million people to feed year after year.

Conclusion

Numbers and statistics may help us grasp the scope of the problems associated with food and water insecurity in developing countries. One must not, however, let the statistics overshadow the ethical considerations raised by such stark living conditions of the citizens of developing countries. The United Nations recognizes the right to adequate food as a fundamental human right and a collective responsibility. The 1948 Universal Declaration of Human Rights stipulated that "everyone has a right to a standard of living adequate for the health and well-being of himself and his family, including food..." Since most countries of the world recognize the right of individuals to adequate food, it should be their responsibility to ensure that their citizens are free from hunger caused by drought, natural disasters, wars or
poverty. In order to ascertain universal access to human, social, economic and political progress, the world community must ensure that every nation in the world provides its citizens with food and water security through adequate development of agricultural resources.
References


DEVELOPMENT COMMUNICATION STRATEGIES FOR LEARNING AND DIALOGUE

Guy Bessette, International Development Research Centre
Ottawa, Canada
AUTHOR

Guy Bessette, Senior Program Officer
International Development Research Centre

Mailing address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada
Email: gbessette@idrc.ca
Participatory Development Communication

Environment and Natural Resource Management (ENRM)

Poverty alleviation, food security and environmental sustainability are closely linked and represent the major development challenges for all actors involved in the field of environment and natural resources management (ENRM). Poverty alleviation requires sustained economic growth and ensuring that the poor benefit from the economic growth. It has also been demonstrated that poverty alleviation has a direct impact on malnutrition. In order to provide food security for the poor, one has to ensure that not only is food available to them through an increase in production and productivity, but also that all the appropriate conditions are in place for them to be able to access and use the food properly.

Promoting environmental sustainability includes challenging goals such as fighting land degradation and especially desertification, halting deforestation, promoting proper management of water resources through various irrigation schemes, and protecting biodiversity. All these activities must be designed and implemented with the active participation of the poor families and communities themselves who are struggling to ensure their livelihood in changing and unfavorable environments. The development agents must also be working directly with the poor communities: governmental technical services, NGOs, development projects, rural media, community organizations, research teams. Finally, local and national authorities, policy-makers, and service providers must contribute to shaping the regulatory environment in which the required changes will take place.

Addressing effectively the three interlinked development challenges of poverty alleviation, food security and environmental sustainability entails working actively with those three categories of stakeholders, by facilitating dialogue, learning and active participation in development initiatives. That is what participatory development communication is about.
Community Participation

Traditionally, in the context of environment and natural resources management, many communication efforts have focused on the dissemination and adoption of technical packages. Those initiatives often had a very limited impact. The new approach suggested by experts in participatory development communication is to use communication in order to empower local communities to discuss natural resource management practices and problems. Communication strategies should also help the communities identify, analyse and prioritize their respective problems and needs as well as design and implement concrete initiatives in order to solve the problems at hand. Finally, one should also set up appropriate communication approaches in order to implement the required initiatives as well as to monitor and evaluate their impact and plan for future action.

Such a communication process includes objectives related to a) increasing the community knowledge-base (both indigenous and modern); b) changing common practices related to water use and soil treatment, in order to manage natural resources more efficiently; c) building and reinforcing the community asset base; d) approaching local and national authorities, policy makers and service providers.

Traditionally researchers and practitioners were accustomed to communication practices that "spread the good word" vertically from top to bottom. The Participatory Development Communication approach adopts a different perspective by focussing on horizontal communication practices that enable the end-users: a) to identify their development needs and the specific actions that would fulfill those needs; and b) to establish an ongoing dialogue with all the stakeholders involved: extension agents, researchers, decision-makers, etc. The main objective is to ensure that the end-users gather enough information and knowledge in
order to carry out their own development initiatives evaluate their actions and recognize the resulting benefits.

**Partnerships for Policy Change**

Participatory Development Communication experts promote partnerships between all the development stakeholders involved in the communities. Local communities work with experts in governmental technical services, NGOs, development projects, rural media, community organizations, research organizations. They all come to them with their own perspective and there is very often no conceptual link between the various development interventions. In order to maximize the impact of various development projects, it seems therefore very important to develop partnerships and build synergies at the community level.

Promoting poverty alleviation, food security and environmental sustainability also requires changes in the institutional and legislative environment. Local and national authorities, policymakers, and service providers are active in shaping and enforcing the regulatory environment in which the required changes must take place. It is therefore important to facilitate dialogue at that level in order to gain the necessary support for the concrete initiatives developed by the local communities.

Development workers have to learn to work with local communities in a participatory way, to develop partnerships with other development stakeholders and to reach the policy environment. That appears to be a very critical issue, which does not receive enough attention. It seems clear, however, that if actors involved in development projects (researchers, extension workers, agents from the governmental technical services, etc.) lack those skills, the impact of their intervention remains quite limited and it is even counterproductive in some cases. Clearly, developing participatory development communication skills should become one of the central components in the field of ENRM.
What is Participatory Development Communication?

For many people, the term “communication” still suggests using the media in order to disseminate information through messages in printed materials, radio or television programs, educational video, etc. Here, “participatory development communication” refers to the use of communication in order to facilitate community participation in development initiatives. The concept can be defined in the following terms:

Participatory Development Communication is a planned activity, based on the one hand on participatory processes, and on the other hand on media and interpersonal communication which facilitates dialogue among different stakeholders, around a common development problem or goal, with the objective of developing and implementing a set of activities to contribute to its solution, or its realization, and which supports and accompanies this initiative (Bessette, 2003).

The term "stakeholder", refers to community members, active community groups, local and regional authorities, NGOs, government technical services or other institutions working at the community level. The term “stakeholder” may also refer to policy-makers who are or should be involved in a given development initiative. To summarize, “participatory development communication” suggests shifting away from informing people in order to change their behaviours or attitudes and focussing instead on facilitating exchanges between various stakeholders to address a common problem or to implement a joint development initiative in order to experiment various solutions and identify the required partnerships, knowledge and material conditions.

Participatory Development Communication Methodology

There is no single, all-purpose recipe to start a participatory development communication project. Each project requires setting up specific communication networks among various groups in order to encourage and support participation in a concrete initiative driven by a community to promote change. It is important to adapt one’s intervention to each situation.
and to each specific group of participants. The methodology, which we refer to, must be used as a reference point only. It has to be adapted to each specific context. It is a logical process, which begins with the definition of development needs in a given community. It should involve the various groups of the community who want to address some specific issues through participation.

The participatory development communication approach is very often described as a series of sequential steps. The planning process itself, however, is far from sequential. The various steps of the process could be represented around a circle. The circle would represent the process of facilitating participation through communication. It develops throughout the total process, during the interactions of researchers and development practitioners with the community. Moreover, all those specific steps are not primarily about applying techniques, but about building mutual understanding and collaboration, facilitating participation and accompanying a development dynamic. The steps of the participatory development communication methodology could then be pictured on the perimeter of that circle, because they all contribute to facilitating participation to a development initiative. Some of those steps could be done in parallel or in a different order. They can also be defined differently depending on the context. It is a continuous process and not a linear one. Once again, one must consider those steps as reference points in a global and systematic process.

Keeping that in mind, here are the ten steps of the planning process of a participatory development communication project (Bessette, 2003):

- Step 1: Establishing a relationship with a local community and understanding the local setting
- Step 2: Involving the community in the identification of a problem, potential solutions, and in a decision to carry out a concrete initiative
- Step 3: Identifying the different community groups and other stakeholders concerned by the identified problem (or goal) and initiative
- Step 4: Identifying communication needs, objectives and activities
- Step 5: Identifying appropriate communication tools
In participatory communication research projects research, where researchers and practitioners define the environmental and natural resource management problems in collaboration with the community, they may find it relatively easy to integrate the other steps of the communication planning process. On the other hand, if the research team has already designed the research protocol without the direct involvement of the community, they will have a lot of difficulty applying the methodology, unless they go back to the community and open discussions on the a-priori of the research. Only then, will they be able to apply the participatory development communication approach in order to get the community involved in the research.

Planning Participatory Development Communication Research

Communication as an Essential Component

When initiating a participatory development communication project, one must first establish a relationship with the local community in order to identify the problems, devise the potential solutions and set up a concrete project. Those initial steps actually constitute the planning phase of any participatory development research project in environment and natural resource management.

Communication must be an essential part of the process. The researcher or development practitioner is primarily a communication actor. The way he approaches a local community, the way he understands and discusses the issues, the way he collects and shares the information involves ways of establishing communication with the people. The way in which the communication is established and nurtured does affect the way in which the people will
feel involved in the issues and the way in which they will participate, or not, in the research or
development initiatives under consideration.

Within that framework, it seems important to promote a bidirectional communication process:
on the one hand, the research team and the development workers approach the community
through the community leaders and the community groups, and on the other hand, the
community itself establishes contact with the research team and the development workers.

One should bear in mind, however, that many researchers tend to perceive community
members as beneficiaries and future end-users of the research results. Even if most people
recognize that the one-way delivery of technologies to end-users simply does not work, the
shift in attitudes and practices is not easy. For that to happen, one has to recognize
community members as stakeholders in the research and development process. Therefore,
approaching a community also means involving people and thinking in terms of stakeholder
participation in the different phases of the research process as a whole.

**Data Collection**

The attitude change has its corollary in methodology. Many researchers start every research
project with a data collection phase. The participatory development communication approach,
on the other hand, suggests that the researchers should attempt to collaborate with the
community stakeholders in order to assemble some baseline information and to share that
information with the community. They can start the research project with a participatory
research appraisal (PRA) in order to assemble the required information in record time and to
facilitate the participation of community members. The community members, however, may
view the approach as restrictive if they feel they have not fully appropriated the various
techniques, such as collective mapping of the area, development of a time line, ranking of the
problems etc. In that case, the techniques remain tools used by the research team only to gather information.

Moreover, one must emphasize the importance of integrating some key questions related to communication in the process in order to design an appropriate communication strategy: Who are the different groups composing the local community? What are the main characteristics of those groups and of the relationships between them? What are the main customs and beliefs regarding the management of land and water? What are the effective interpersonal channels of communication? What are the views expressed by opinion leaders or exchanged by people in specific places? What are the institutional channels, the local associations, the institutions, used locally by people to exchange information and points of views? What modern and traditional media does the community use? Finally, one must also underline the importance of analyzing gender roles in the community in that first phase of any development communication project.

Validation of Local Knowledge

Sometimes, the local knowledge of a problem may be incomplete or even false. Sometimes, it may be appropriate for the previous conditions, which are now different. It may relate to specific types of soil, for example, or to external conditions prevailing elsewhere. The researchers should therefore always validate the common local knowledge against scientific review, discussions with local experts or elders as well as community members. It may also prove useful to combine and blend modern knowledge with local practices in order to render the latter more effective and easier to understand.

The first contacts with the local community allow the researchers to identify the resource persons and the organizations required for the project. It could be a rural radio, a theatre group or an NGO working with the same community. By establishing contacts at the outset of
the project, people feel they can play a useful role in the design of the research project instead of perceiving themselves as the mere recipients of a contract.

**Community Participation in Research Planning**

Traditionally, natural resource management researchers and practitioners used to identify the problem and then tackle it with a given set of tools. Only then, did they enlist the community in the process. The participatory communication approach, on the other hand, proposes to involve the community at the very beginning of the process. In that respect, the first task the research team and the community face is to discuss their respective agendas. When identifying a natural resources management problem and the potential solutions, the researcher should facilitate the community members' involvement rather than lead it from the outside with his knowledge expertise. One must recognize, however, that a natural resources management research team does not come to a community without its own mandate and its own agenda. The researchers should clarify their agenda at the outset of the project when they approach the community. Moreover, the researchers have to specify the specific issues they are interested in pursuing with the community.

**Communication Networks for ENRM**

**Development of a Communication Strategy**

After selecting a development research initiative in collaboration with the community, the next step is to develop a communication strategy to support it. To that end, one must first identify the groups involved and specify their communication needs in order to select the most appropriate communication tools and channels. The groups involved must represent not only the various community groups but also the other groups of stakeholders concerned with the problem at hand. A specific communication approach has to be devised in order to reach each and every one of the groups.
Researchers and practitioners often make the mistake of identifying specific groups according to their respective occupations (fisheries, agriculture, etc.). They may also identify the groups in terms of experimental parameters (soil fertility group, soil erosion group, etc.). They classify "women" and "young people" as distinct categories, as if they did not belong to the other categories. It is very important, at the very beginning of the project, to set up categories that include women and men, young and old, residents of villages or isolated areas and speakers of the various languages. The communication needs of the people involved in the project may indeed vary considerably depending on the category to which they belong.

Communication Needs and Objectives

The researchers usually distinguish between the needs relating to physical conditions and resources and the needs involving communication, information, awareness, learning etc. Among the needs most often cited by community groups is the need to share local and modern technical information related to animal breeding, soil productivity, crops, etc. They also mention the need to develop collaborative attitudes within the community, the need to organize groups as well as the need to promote women's participation in the decision-making process. They wish to share information about various activities and about solutions to common problems. The researchers also recognize the need to reach poor and isolated farmers etc. As for the decision-makers, they often express the need to support a request from a local community to the provincial authorities. They may also wish to clarify the context and the living conditions of poor farmers. In other cases, they may also feel the need for a public debate about some specific conflict situations etc.
Communication Tools in the Planning Process

Many people have a tendency to initiate the communication development initiative by producing a video, a radio program, or a play without knowing exactly how it will contribute to the project. Participatory development communication takes another perspective. It leads participants through a planning process, which starts with the identification of the specific groups as well as their communication needs and objectives. Then the research team identifies the appropriate communication activities and communication tools. The expression "communication tools" itself implies that they are not the "product" or the "output" of the communication activities. The goal is to help each category of stakeholders achieve its communication objectives. The tools may be mass media, traditional media (stories, plays, songs etc.), "group" media (video, photographs, posters etc.), community media (rural radio), information communication technologies or various forms of interpersonal communication strategies (debates, games, visits, etc.). The importance of using those communication tools in a way that will support two-way communication must of course be clearly stated at the outset of the project.

Three criteria seem particularly useful in selecting the communication tools: their actual use in the community, the cost and constraints of their use, the versatility of their uses. They may trigger a discussion, moderate discussion groups, extend group discussion sessions, reach other groups or participants, support learning and promote the exchange of information etc.

Pre-testing Contents of Communication Materials

Not all projects aim at developing specific communication material. When they do, however, pre-testing is important. In the old-fashioned pre-testing approach, researchers were only interested to know if people understood the messages contained in the material. They were less interested in finding out what the people thought of the messages. On the other hand,
within the participatory development approach, pre-testing looks at what people think of the messages, as well as what they understand of the messages. Such pre-testing allows researchers to improve on ideas and prototypes for teaching materials by submitting them to participating group representatives in order to obtain their feedback before the final production stage or to check whether the materials already produced are appropriate for the various groups. Preparing a plan for the implementation of activities as well as their monitoring and evaluation must also be part of the overall communication process.

**Evaluation of Communication Strategies**

Researchers define evaluation as a judgment based on the information collected. They usually distinguish between two types of evaluation, namely formative evaluation and summative evaluation. Formative evaluation takes place during the communication process and its purpose is to determine whether the project is on the right track in order to achieve its initial objectives. It usually involves the monitoring of activities in a participatory manner. Researchers often refer to it as monitoring and evaluation or M&E. On the other hand, summative evaluation occurs at the end of the communication process. Its objective is to determine whether the communication development project attained its objectives and had an impact on the problem that the community was tackling.

The joint elaboration of the evaluation framework by all stakeholders involved, the use of simple tools such as brainstorming, observation, use of pictures, prior training as well as the use of the local language, are all useful techniques. However, no matter how important techniques and methodologies are, the most crucial issue is the way in which researchers approach the evaluation process jointly with their partners, the community members and the other development stakeholders so that it becomes a learning experience for everyone involved in the process.
The research team must also address the link between the evaluation and the follow-up of the research project. The researchers must ask the following questions for example: Who will tell the story built on the evaluation? Who will be the recipients of the story? What is the best way to tell that story to specific groups of people? Community groups may want to be able to tell their own story to similar groups, to other communities, decision-makers, policy-makers etc. The researchers may want to tell the story to the donors, other researchers, policy-makers or to some other communities. These considerations open the door to the next step in the process, namely the dissemination and scaling-up of the results.

**Dissemination of Results**

The dissemination of the research results, together with the planning of the scaling-up efforts, are the final steps in the planning of the participatory development communication process and, at the same time, the first steps of a new planning exercise. Dissemination of research results consists in making the research results available in different formats to different groups of users. The researchers must first determine the goal(s) that they, as well as the community members, want to pursue. It seems useful to use the same logic as for planning the communication strategy.

Among other questions, one must consider the following: What is the relevant information needed for the research or development activity? Who could make use of the research results or of the knowledge acquired in the community? What are the appropriate communication strategies and the appropriate communication channels and tools for reaching them? What are their needs in terms of information and communication? What will they need in order to be able to use the information? What should the objectives of the dissemination of results be for each of the groups?
In order to reach policy-makers and implementers one must bring government staff to work with the communities in a different way. In that perspective, dissemination of results means much more than just disseminating information on the community's achievements. It underscores the need to involve government staff in a discussion about that specific knowledge. In order to reach policy-makers more effectively, one must identify key persons during the research or development activity in order to make them aware of the process at work and invite them to share questions or suggestions. The idea is not only to transmit specific information but also to identify the conditions in which they can use such information and knowledge to foster change.

Conclusion

Traditionally, in the context of natural resource management, many communication efforts have focused on the dissemination of information and the adoption of technical packages. The transfer of messages from experts to farmers, in a top-down approach, however, did not bring the expected results. Rather, experience teaches us that it is much more effective to use appropriate communication strategies in order to build the required competences within the local communities. The communities should learn a) to discuss their own natural resource management practices and problems, b) to identify and implement concrete initiatives in order to respond to their problems; c) to identify and acquire the knowledge required to implement such initiatives. Participatory Development Communication has proven to be a powerful tool in order to facilitate such a process.

It is about encouraging stakeholders' participation in development initiatives through strategic use of various communication strategies. It addresses questions such as: How can the researchers and the practitioners improve their communications with the local communities and the other stakeholders? How can two-way communication enhance community
participation in research and development initiatives as well as improve the capacity of communities to participate in the management of their natural resources? How can researchers, community members and development practitioners improve their ability to effectively reach policy-makers and promote change?

Under the old paradigm of research for development, researchers applied their knowledge to the resolution of specific problems, with the collaboration of the local communities and they subsequently published their results. Within the participatory development communication paradigm, the researchers or the development practitioners come in as facilitators of a process, which involves local communities and other stakeholders in the resolution of a problem or the realization of a common goal. This requires a change of attitude. Researchers and development practitioners must perceive local communities not as beneficiaries but as stakeholders. They must also be ready to develop partnerships and synergies with the other development actors working with the same communities.

Acting as a facilitator does not come automatically to most people. One must learn to listen to people, to help them express their views, and to assist them in building consensus for action. For many researchers and development practitioners, this is a new role for which they are not prepared. Nevertheless, communication is an essential component of the participatory research and development process and as such it should be put up-front on the capacity-building agendas.
Reference

THE LOCAL USERS NETWORK:
A PARTICIPATORY COMMUNICATION FORUM

Rami Zurayk, Mona Haidar, Shadi Hamadeh
Faculty of Agricultural and Food Sciences
American University of Beirut
AUTHORS

Rami Zurayk, Professor
University of Beirut

Mailing address:
Faculty of Agricultural and Food Sciences
American University of Beirut
Email: rzurayk@aub.edu.lb

Mona Haidar, Research associate
American University of Beirut

Mailing address:
Faculty of Agricultural and Food Sciences
American University of Beirut
Email: mh29@aub.edu.lb

Shadi Hamadeh, Professor
American University of Beirut

Mailing address:
Faculty of Agricultural and Food Sciences
American University of Beirut
Email: shamadeh@aub.edu.lb

FUNDING AGENCY: People, Land and Water Program (PlaW) of the International Development Research Center (IDRC) of Canada

Mailing address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada
Tel: 1- 613- 236- 6163

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Abstract

This paper reports on the communication component of a project funded by the International Development Research Center (IDRC). The project aimed to analyze the changes, trends and sustainability of farming systems in Aarsal, a traditional Lebanese mountain village. It also sought to improve the prospect for sustainable community development. The results demonstrate that participatory communication can improve people's well-being if the communication tools and activities are adapted to the specific culture. Participatory communication between local communities and development researchers was achieved through the establishment of a Local Users Network (LUN).

The LUN brought together various stakeholders including researchers, decision makers at the local and national level as well as representatives of different socio-economic groups in the community to contribute to the project. The LUN aimed at providing a space for dialogue where the stakeholders could design, plan, implement and evaluate appropriate development initiatives in Aarsal. The traditional "Majlis" structure, common to the Arab world, relying primarily on face-to-face interaction, inspired the LUN framework. The LUN proved to be both innovative and effective in its formulation of a platform for participatory communication. The LUN successfully promoted economic development, socio-political empowerment and it exposed Aarsal to other development projects. Presently, the LUN continues to influence community participation in other rural development initiatives.
Introduction

Until the first half of the 20th century, villages located in the mountains of the Eastern Mediterranean region, including Turkey, Syria and Lebanon, subsisted on agro-pastoralism based on subsistence farming (primarily pulses and cereals) as well as goat and sheep herding. However, important structural changes have occurred in the past 50 years, such as the development of a market-oriented economy, a sharp decline in purchasing power and intense migration to urban centers. Rapid socio-economic and political change has disrupted rural Middle Eastern societies by significantly increasing urban migration (Sanders 1996). In other rural mountain environments (for example the Andes) economic change and market forces have played a similar role in the destruction of the sustainability and productivity of traditional agricultural systems (Altieri 1996). Structural changes have drastically impacted people's well-being and their ability to manage natural resources. The result is that sustainable use of natural resources and the long-term viability of agriculture in these areas are both at risk.

Lebanon is a small country of only 10 452 square kilometers. From north to south, it extends 217 kilometers and from east to west, it spans 80 kilometers. It shares a border with Syria in the north and east and with Israel in the south. Lebanon's topography consists of four parallel belts that extend northeast to southwest. They include a narrow coastal plain along the Mediterranean shore, the Lebanon mountain range, the Bekaa plain and the Anti-Lebanon mountain range.

The country has experienced significant changes during the past fifty years, which include the end of colonialism, the establishment of laissez-faire economic development, and seventeen years of war. The agricultural sector has undergone major changes and this has resulted in intense migration, both voluntary and forced. The people in the mountain
ranges of Lebanon, such as the village of Aarsal, have suffered the brunt of these changes.

Aarsal is a semi-arid village, typical of the Eastern Mediterranean Mountains and located on the slopes of the Anti-Lebanon Mountains. The village covers more than 300 square kilometers and receives an average rainfall of 300 millimeters annually. Aarsal is an isolated community of approximately 35,000 residents. It has one of the largest small ruminant flocks (goats and sheep) in Lebanon (60,000 heads). A large percentage of the Aarsali population is involved in agriculture due to poor off-farm income opportunities. In addition, the majority of the village labor force is unskilled and works outside the village doing seasonal labor or transhumant shepherding. Due to its remote location, Aarsal has received little or no development intervention. Furthermore, its isolation coupled with limited rainfall has forced farmers to rely on agricultural systems that require few inputs such as water or agro-chemicals.

Beginning in 1952 the land area in Aarsal experienced an expansion of fruit tree production. It is estimated that 2 million trees have been planted since 1952, mainly cherry-trees and apricot-trees. The reasons for the shift in farming systems include the flooding of the market with cheap grain and dairy imports from the USA and Europe and land abandonment due to the migration of farmers to urban centers in search of other opportunities. Since fruit trees were planted in areas that had once been used for annual crops, the traditional cereal and livestock based production system in Aarsal was disrupted. For example, animals that used to feed on crop residues and fertilize the soil in return were kept out of the orchards. In addition, establishing orchards disrupted traditional grazing routes, which meant that fruit tree production and grazing competed for the same land. As a result, herders have been driven to poorer land in Aarsal, or forced to move to distant pastures and agricultural fields in the
central and southern Bekaa. Due to these pressures land degradation has become a significant problem in Aarsal today.

In 1992, the Aarsal Rural Development Association (ARDA), a local nongovernmental organization, approached researchers from the American University of Beirut to address the issue of land degradation. During the meeting ARDA expressed the need to improve the management of Aarsal's natural resources. After the meeting consultations were carried out with the different social and resource user groups in the Aarsal, including women and marginal groups. The consultations led to the development of a research agenda, which community members and researchers jointly formulated. The research agenda included the following priorities and activities. The group conducted an inventory and assessment of the existing resource base, and then examined the social, economic and political forces dictating land use in Aarsal. The group also analyzed the farming systems in Aarsal to understand their limitations, and then developed an optimal land use plan. They introduced sustainable agricultural practices, such as the promotion of proper water resource management through rainwater harvesting. Finally, the group facilitated agreements between land users who were in conflict and they attempted to understand gender dynamics in the community.

The research agenda described above enabled the research team to prepare a research proposal for the IDRC's People Land and Water (PlaW) program. PlaW provided the necessary funds between 1995 and 1998 and supplementary funds between 2000 and 2003. The project was entitled: "Sustainable Improvement of Marginal Lands in Lebanon: Aarsal, a case study". The main objective of the project was to create a forum where the local population could collaborate with researchers in order to protect the community's natural resources, enhance economic development, as well as support the socio-political empowerment of marginal groups such as women and livestock herders.
The case study focused on the importance of participatory communication for development research projects. This paper reports on the communication strategies and practices scientists, members of the local community and policy makers used during the project. The chapter seeks to demonstrate that participatory communication can be an effective tool to improve people's livelihood if the communication strategies and practices adopted are specific to the local culture.

**Theoretical Context**

Communication is inherent in rural development. Often researchers have considered communication as a tool for one-way technology transfer from development workers to the local community. A brief review of the recent Food and Agriculture Organization (FAO) literature about communication and development reveals that communication is often confused with dissemination of information. Despite the current emphasis on participatory approaches, our analysis shows two common errors in the implementation of communication strategies. First, there has been an overemphasis on communication tools, such as the media, at the expense of other communication strategies (Dajani 2003). Second, there is a bias in favor of one-way communication between the teacher, such as the extension agent or the researcher, and the pupil, such as the farmer, local resident, or the policy that is particularly evident in the over-reliance on one-way communication tools, such as videos, flip charts, etc. Information and communication technologies (ICT) have dominated communication development work and are still largely concerned with the dissemination of information: they do not promote dialogue between researchers and the local population about community development (Decock 1996).

The basic philosophy guiding the LUN project was that a successful participatory communication development initiative needs to establish a forum for dialogue where all the
stakeholders can participate in the entire research process: proposal, research design, project implementation, and evaluation. The research process must be participatory, interactive and flexible to promote continuous learning. The forum for participatory communication should enable information exchange and knowledge sharing between the different actors who are involved in the research project: Northern development agencies, Western academics, and rural communities. The researchers argued that in the marginal communities of the rural South, existing traditional communication channels are highly effective for discussion, dialogue and knowledge sharing about development issues. Therefore the participatory communication strategy must incorporate traditional methods of communication already in use by the local population if it is to succeed in promoting sustainable land management practices.

**Methodology**

To select an appropriate communication strategy the research team conducted a brief review of literature relevant to communication and development in the Arab World. In addition, they reviewed non-documented communication practices, such as the experience of family planning programs in the Arab World. The personal experiences of the researchers also helped shape the communication strategy since many of them originated from similar rural communities and have been working in participatory development research for at least 10 years.

Published information related to communication and rural community development in the Arab world is scant. One key contributor in this field is Acunzo who planned a communication strategy for natural resource management in the Syrian Steppe, i.e. the dry plains that extend from Northeast Lebanon all the way to Iraq and Jordan. In that region, the environmental and socio-economic conditions are very similar to those in Aarsal (Acunzo
Acunzo provides a perceptive analysis of the social factors that have led to resource degradation. He attributes the major share of the problem to a breakdown in the traditional tribal-based rangeland management model called the "Hema" system.

The Hema system is an ancient traditional practice of nomadic Arab origin, designed to protect both cultivated and uncultivated resources (Draz 1987). Shoup described Hema as the original form of a communal property system developed by the nomadic pastoralists that was also used by non-pastoralists. It was "a system by which lands were held in a reserve ... protected by customary law for specific purposes or seasons of the year and involved land use regulation for grazing, areas reserved for drought times, and the maintenance of land productivity" (Shoup 1990, p.195). Acunzo recommends establishing a consultative decision-making body, which would involve local groups, tribes, cooperatives and the State, to address problems of land degradation and propose methods to improve natural resource management (Acunzo 1998).

In the Arab world, the traditional method of communication and conflict resolution has been based mainly on face-to-face interaction. Tribal "majlis" allow issues to be raised face-to-face in the community, usually in the house of the community leader. The "majlis" are an assembly consisting of the head of each of the most important families in a tribe. They meet on a regular basis and serve as a decision-making group for community planning and conflict resolution. A variation of the "majlis" face-to-face approach was used successfully in Nasser's Egypt to promote family planning. Under Nasser's regime, clerics addressed worshippers during Friday's prayer and conveyed information about family planning. Midwives also conveyed information orally about family planning while assisting women during their pregnancy.
In the LUN project, researchers relied heavily on their past experiences as well as their understanding of the social systems in the rural communities of Lebanon in order to develop a participatory communication strategy. They decided that the communication strategy should be based on face-to-face interaction at informal group meetings similar to the traditional tribal “majlis”. The meetings needed to extend beyond the community, and involve all the stakeholders in development, for example, the local population, the researchers as well as the government officials. The philosophy guiding the initiative was that a participatory communication strategy must bring together different cultural groups and different organizational cultures. The research team brought together, for example, the traditional Sunni Muslim rural community of the Arab Eastern Mediterranean region living in Aarsal as well as the development researchers and support staff who are highly westernized. The following section details the participatory communication framework the researchers established and implemented, based on methods that incorporated traditional aspects of communication among Arabic people.

**Implementation of the LUN**

**Definition of the LUN**

Considering the parameters required to implement an effective participatory communication strategy, the researchers established a “Local User Network” (LUN), which brought together different stakeholders. The stakeholders included researchers, decision makers at the local and national level as well as representatives of different socio-economic groups in the community. The aim of the LUN was to provide a space for dialogue where stakeholders could design, plan, implement and evaluate appropriate development interventions in Aarsal. In essence, the LUN constituted a participatory interactive forum for communication about community development initiatives. The
platform facilitated both information flow and knowledge sharing between all actors involved in the project. Moreover, it helped identify problems and conflicts in the community, and it helped develop appropriate solutions and methods to resolve conflicts.

**Evolution of the LUN**

Interaction between farmers and other groups such as researchers, scientists and Non-Governmental Organizations (NGOs), is essential in order to analyze the local situation and develop a common understanding of both the research and development needs as well as the potential solutions. Since there was no extension structure, which normally would have served as a communication forum between development workers and the local population, the research team established the LUN to communicate with farmers.

At the project's inception the Aarsal Rural Development Association (ARDA), a local NGO, assisted with the introduction of the research team into the community. They identified representative groups of farmers who would help define the project's research needs and objectives. Researchers introduced non-monetary incentives in order to help increase the initial involvement of the local population. The non-monetary incentives available to farmers included the distribution of adapted fruit trees and shrubs, veterinary care, training in improved livestock management practices and installation of soil conservation structures. Fruit growers requested specific technical information related to standard orchard management and pest control techniques. Livestock owners requested specific technical expertise about ways to improve the productivity of their flocks in areas of animal health, feed resources and rangeland rehabilitation.

The farmers who initially participated in the project eventually became the main members of the LUN. Follow-up consultations with the local authorities and the NGOs helped define the parameters of the LUN as a communication forum and ensured that there was adequate
representation of the various groups in the community. The research team identified various socio-economic groups and invited selected members to participate in the LUN. The LUN structure was flexible to ensure that the participants could change their approach as needed. As the LUN evolved, specialized working groups sharing specific interests emerged and later developed into 3 sub-groups. Two of the sub-groups were involved in the main productive sectors in the village, namely livestock and fruit production. The third sub-group addressed women's need for non-agricultural income generating activities. Each person could be a member of more than one sub-group. The researchers designated local coordinators to direct the activities of each sub-group. The livestock and fruit growing sub-groups of the LUN designed and implemented specific on-farm trials. They experimented with new varieties of forage plants and methods to improve animal health. The sub-groups for livestock herders and fruit growers also included research and development actors from the Northern Bekaa region. The LUN also included local authorities, regional deputies, and representatives from the Lebanese Agricultural Research Institute, the International Center for Agricultural Research in Dry Areas (ICARDA), the Ministry of Agriculture, the International Fund for Agricultural Development (IFAD) and the United Nations Development Project (UNDP) Integrated Rural Development project in Baalbeck/Hermel. The first priority of the livestock and fruit growing sub-groups was to draft a list of recommendations and sector-specific action plans pertinent to each productive sector. The list included recommendations and action plans related to improving animal feed and health, integrated livestock-crop production, tree vitality, soil erosion, pest management as well as soil fertility management and marketing. The sub-group related to women's needs brought together women from different socio-economic and political groups in the village as well as gender researchers and trainers from the project team. The priority of the sub-group was to explore gender related issues while
focusing on improving the socio-economic status of women and promoting their empowerment. The sub-group provided women with the opportunity to discuss potential income generating activities. These discussions led them to establish carpet and rug weaving as well as food processing facilities.

Activities of the LUN

The LUN organized the following activities: regular, issue-centered, round-table meetings of the various sub-group members; community outreach activities by university students during their training programs in agriculture; "live in the village" experiments that allowed researchers and students to spend extended periods of time with selected families and "work with the farmer" experiments that allowed students to participate in harvest and land preparation activities. The LUN also established a field implementation of good practices in natural resource management, such as the building of terraces, which involved LUN members and people from the Aarsal community. The LUN produced short video documentaries, newsletters, and website information about natural resource management issues. The LUN organized a series of workshops on various themes related to natural resource management and community development on topics such as soil and water conservation, crop-livestock integration, building of managerial and technical capacities, marketing and income generation. Finally, the LUN was a forum used to assess and evaluate the communication activities proposed and implemented by the participants. The research team organized workshops at least twice a year in an effort to involve a larger number of participants and monitor the progress of the LUN.

Community Participation

Right from the beginning of the project, researchers ensured that LUN members were representative of the various groups of herders and fruit growers in the community.
Adequate representation ensured that the needs of all community members would be voiced in the forum, which in turn meant that the solutions developed through the LUN would be relevant to the entire community. Community representatives communicated information about development issues to the remainder of the local population, which promoted widespread dissemination of the information generated in the LUN.

Researchers created a unit of the LUN called the “Environmental Forum” (EF), which consisted of Aarsali youth whose specific purpose was to communicate research results to the entire community. The project team trained the EF members in natural resource management practices developed during the LUN meetings. Then EF members disseminated the information to the local population. To achieve their mission they relied primarily on face-to-face interaction with end users during the critical periods, such as harvests or animal vaccination. In addition, EF members used material to complement the face-to-face interaction, such as the “best practice booklet”, which the LUN developed to summarize and simplify the project’s findings in a language accessible to farmers. The EF also functioned as a two-way communication channel between the community and the LUN. The objective was to identify any constraints that could interfere with the widespread adoption of good practices or suggested remedial measures. Finally, the EF raised young people’s awareness about their community’s ability to manage their own natural resources and attempted to involve them in the promotion of sustainable development.

Results

The LUN was an effective participatory communication strategy because it utilized culturally appropriate methods of communication. It enabled face-to-face dialogue between all the stakeholders involved in the development project, and it improved people’s well-being. More specifically, the LUN established various institutional frameworks for participation. It
empowered marginal groups, promoted economic development, enabled conflict resolution, fostered collaboration between various actors within the community, focused research on community needs, developed and implemented sustainable natural resource management practices, and exposed Aarsal to a number of development agencies. The following subsections provide additional information about each specific outcome.

**Socio-political Empowerment of Marginal Groups**

The LUN facilitated the establishment of two cooperatives, one for livestock herders and the other one for women. The cooperatives provided an institutional framework, which could facilitate communication about improved natural resource management practices. Women and livestock herders are marginal groups in Aasrali society. Organizing both groups into cooperatives gave them the opportunity to communicate with decision makers. It also allowed them to express their needs and to discuss various methods to fulfill those needs. At present, four years after its implementation, the livestock cooperative has become independent from the LUN, but remains extremely active in development work. The livestock cooperative participates in nation-wide initiatives such as the implementation of the Lebanese National Action Program for Combating Desertification led by the Ministry of Agriculture.

**Economic Development**

The women’s cooperative manages two income-generating facilities, namely a rug weaving facility and a food processing facility. Both started as small-scale projects and both have added value to the products of other production systems. Wool provided by livestock herders has been used in carpet making, while cherries and apricots provided by fruit growers have been used in food processing, for example. The LUN enabled the women to express their training needs, which led LUN members to recruit a designer to conduct workshops in carpet and rug design. The United Nations Development Fund for Women (UNIFEM) also offered
training in entrepreneurship and accounting for women. Moreover, the LUN helped the women's cooperative establish contact with potential marketing outlets, such as Artisanat du Liban, Conserves Chtoura, etc., which greatly increased the output of the cooperative. Today more than forty women are regularly involved in the cooperative and they derive a significant income from the activities. Finally, key members of the cooperative are being hired to offer training in their areas of expertise to other women's groups in villages throughout Lebanon.

Conflict Resolution

As noted previously, transition, which occurred in the 1950s, from agro-pastoralism based on seasonal transhumance and annual crops, to a more sedentary agricultural system based on fruit tree cultivation has created conflicts over land use, between livestock herders and fruit growers. Pastoralists, who used to roam freely, have been forced to utilize marginal lands. The LUN was instrumental in resolving conflicts because the needs of both parties could be voiced, and compromises could be explored. The LUN discussions led to the adoption of vetch in the orchards. Vetch is a legume crop that was planted under the trees. It enhanced soil fertility, protected the soil from erosion, and could be harvested as animal feed. Finally, vetch provides supplemental animal feed and therefore compensates for the loss of grazing land due to the rise of fruit tree cultivation.

Fostering Collaboration within the Community

The LUN collaborated with ARDA in order to become a more effective partner in research and development. Members of the LUN were trained to participate in the implementation of the surveys and evaluations required to achieve the project's objectives. The LUN members were also trained to implement participatory research methodologies, such as the Participatory Rural Appraisal and the Farming Systems Analysis. Finally, the LUN members helped gather information through research and surveys about issues such as the
assessment of the nutritional status of women and children and the evaluation of methods of soil conservation.

In addition, the LUN allowed its members to reach an agreement about their local needs and to develop local action plans. The LUN meetings provided the opportunity to communicate with decision makers about the action plans. For example, the LUN organized a workshop about livestock and range resources in June 1999. Local authorities, government representatives as well as 150 farmers attended the workshop. The participants agreed on a list of recommendations and follow-up actions. The LUN then formed a follow-up committee including scientists, government officials, and farmers in order to implement the recommendations.

**Focusing Research on Community Needs**

In general, development research expertise in Middle Eastern academic institutions is rather weak. Most researchers do not receive adequate training in order to tackle the real-life problems that face them. The LUN addressed the problem by setting up participatory development training workshops. Training enhanced the interdisciplinary skills of the project team and eventually resulted in shaping the research agenda according to local needs. Each researcher was called upon to contribute according to his expertise. Soil scientists, range specialists, horticulturalists, socio-economists, nutritionists, and gender specialists all worked together to focus their research on people rather than resources. Although the aim of the researchers has been traditionally to promote resource conservation, they have not always taken the local population into account. As communication evolved during the LUN meetings, the need for a people-centered, integrative approach became apparent. Therefore, the LUN members adopted a new framework for action, which is called "sustainable livelihood". It puts
people at the center of the development initiative and it currently forms the basis of research plans, objectives, implementation and evaluation.

Sustainable Natural Resource Management Practices

The LUN constituted the main vehicle to address the natural resource management needs in Aarsal. The LUN also linked the community to the technical and financial resources they required. The LUN members initiated a participatory land management method, which was a collaborative decision making process about planning land use in the village. A participatory land management method that the LUN members developed and implemented was the range management and rehabilitation program. It included the establishment of a nursery for forage shrub production, range protection and rehabilitation agreements with the municipality, and growing vetch under fruit trees in orchards. Finally, LUN members developed and introduced rainwater and snowmelt harvesting techniques, which are currently being tested in several locations.

Discussion of Results

In order to be sustainable, resource management must rely on communication channels that allow all stakeholders to participate in the process. Moreover, it must be based on an analysis of the needs of the community and use the appropriate language and tools for participatory communication (Ramirez 1997). A thorough understanding of the various methods of communication in a specific community is extremely important. A common error in development projects has been the universal application of communication approaches without considering how local conditions may change from one village to another (Dajani 2003).

The LUN was an effective participatory communication forum to exchange information, share knowledge, and develop specific action plans to improve natural resource management in
Aarsal. Although the LUN had some success, it requires improvement. Researcher's evaluation of the LUN's influence in Aarsal confirmed its achievements, but also revealed some of the obstacles to overcome in order to improve the LUN as a participatory communication forum.

One obstacle consisted of familial and tribal conflicts that prevented members, who were on non-speaking terms, from communicating and collaborating together in the LUN to collectively address their natural resource management problems (Baalbaki 2002). Researchers aim to ensure that the LUN remains active in the community after the project ends. Therefore the project team has presently commissioned an external consultant to evaluate the LUN in order to assess its viability as a participatory communication forum for future development projects. The following sub-sections highlight additional issues that need to be resolved in order to improve the functioning of the LUN as a participatory communication forum.

Land Tenure

Communication is only one component of development; other requirements must be satisfied in order to ensure the success of a development project. For example, in the case of Aarsal, lack of land tenure constitutes a major obstacle when attempting to address land use issues, conflicts and identify possible solutions. Dialogue within the LUN would have been more productive if land tenure issues were resolved.

Lebanese Government

The Lebanese government has no comprehensive development policies and regional planning authorities do not exist. Therefore there is little room for national adoption of any action plan that has been developed at the community level.
Centralized decision-making within government institutions in Lebanon means that government officials do not communicate well with technical and field personnel, who are represented in the LUN. LUN members tried to overcome this problem by disseminating information specifically targeted at government decision-makers through newsletters, websites, and conferences. LUN members also attended seminars or workshops where government decision-makers were keynote speakers to provide information to them. Their efforts have led to positive outcomes. For example, LUN members halted the implementation of a government plan to establish large-scale quarries in Aarsal, which would have destroyed parts of the mountains and was opposed by the community. Development workers in the field must strengthen communication and collaboration with national government officials.

**Conclusion**

Information is not knowledge. People cannot work together if they do not plan together, and they cannot plan together if they do not have the opportunity to share knowledge. Information sharing is at the heart of any participatory process. The LUN in Aarsal, based on traditional methods of communication, proved to be a successful participatory communication tool. The LUN allowed knowledge to be shared regardless of the cultural origin of the members. Through the LUN members were able to achieve a common vision, set shared agendas and achieve joint success to promote sustainable natural resource management practices and ultimately improve the physical and social well-being of the local population.
References


LAND DEGRADATION IN WESTERN KENYA:
PARTICIPATORY COMMUNICATION REMEDIAL STRATEGIES

Amadou Niang, Mary Nyasimi, Tina Sven Hansen
International Centre for Research in Agro-forestry (ICRAF)

Michael Odongo, Aggrey Otieno
Kenya Forestry Research Institute (KEFRI)
AUTHORS:

Amadou Niang, Regional Co-coordinator
International Centre for Research in Agro-forestry (ICRAF)

Mailing address:
BP 320 Bamako, Mali
Email address:
a.niang@cgiar.org

Mary Nyasimi, Research Assistant
International Centre for Research in Agro-forestry (ICRAF)

Mailing address:
P.O. Box 30677, Nairobi, Kenya
Email address:
icrafsm@africaonline.co.ke

Michael Odongo, Research technician
Kenya Forestry Research Institute (KEFRI)

Mailing address:
P.O. Box 20412, Nairobi, Kenya
Email address: afrresmaseno@africaonline.co.ke

Aggrey Otieno, Research Technician
Kenya Forestry Research Institute (KEFRI)

Mailing address:
P.O. Box 25199, Kisumu, Kenya
Email address: afrresmaseno@africaonline.co.ke

Tina Sven Hansen, Research Associate
International Centre for Research in Agro-forestry (ICRAF)

Mailing address:
P.O. Box 30677, Nairobi, Kenya
Email address: icrafsm@africaonline.co.ke

FUNDING AGENCY: International Development Research Centre
Mailing address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada
Tel: 1-613-2366163

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Abstract

Researchers set out to address past failures of development projects that did not permit farmers to participate in the design, selection and implementation of appropriate technology to improve soil fertility in Kenya. Soil degradation, food insecurity and poverty impact the majority of small-scale farmers in Western Kenya. Although many small-scale rural farmers understand the importance of agricultural inputs, such as fertilizer, or other soil fertility management practices, such as applying crop residues to their land or leaving land fallow, they are unable to implement such strategies because they are consumed by their immediate survival needs. Therefore the research team conducted a participatory soil fertility project in Western Kenya to promote farmers' participation in the entire research process, but especially in the dissemination of agro-forestry methods, and to improve the social and physical well-being of the most vulnerable members of the population.

Researchers collaborated with farmers to identify the resources available in rural villages as well as the pre-existing local groups, which organized discussions and actions to address problems of soil fertility. The research team and the farmers engaged in a wealth ranking exercise to determine the various categorizations of wealth and determine the links between wealth and soil fertility management practices. Researchers and farmers then collectively assessed farmers' methods of soil fertility management in each village before generating strategies to improve the adoption rates of agro-forestry methods to improve soil fertility.

The research team learned about the heterogeneity of the rural villages studied as well as the importance of gender analysis. The project successfully fostered collaboration with rural farmers to assess the problems related to soil fertility and devise strategies to overcome land degradation.
Introduction

The regions studied in the Soil Fertility Project in Western Kenya are in the highlands and constitute 15 percent of the total area of the country and represented 40 percent of the country’s population. The regions have a high population growth, over 3.4 percent per annum and a high population density, which ranges from 500 to 1200 persons per square kilometer. Farm sizes vary between 0.5 and 2.0 hectares and the average is 1.2 hectares (David and Swinkels 1994). Despite adequate and reliable rainfall, between 1500 and 2000 mm per year, degraded soils negatively influence agricultural productivity and income generation. Therefore soil degradation also influences poverty in Kenya; more than 53 percent of the farmers in the Western province and 42 percent of the farmers in the Nyanza province were classified as absolute poor in 1998 (Ministry of Planning and National Development 1998).

Low levels of phosphorus, nitrogen and potassium in the soil throughout Kenya constitute a widespread problem. About 80 percent of the farms in the Vihiga, Siaya, Busia and Kisumu districts are severely deficient in phosphorus. Many farmers in Western Kenya understand that fertilizers compensate for the soil’s nutrient depletion due to harvesting, crop residue removal, erosion and leaching, but many small-scale farmers cannot afford to purchase fertilizer. Approximately 40 percent of small-scale farmers use mineral fertilizer, but they use it at a lower rate than recommended and often not at the most critical times. The problems of poor soil fertility, lowered levels of agricultural productivity, food insecurity, and poverty all interconnect because farmers often cannot afford agricultural inputs, like fertilizer, to improve degraded soil and increase income generation possibilities. Therefore impoverishment and food insecurity increase while soil fertility continues to decrease.
The research team set out to address the failures of past development projects that did not involve farmers in the design, selection and implementation of appropriate methods to improve soil fertility in Kenya. Conventional approaches to development often failed to ensure that the local population adopted the appropriate technology to improve the soil fertility in their communities because extension workers disseminated technology through ‘top-down’ methods. A “top-down’ approach consists of development ‘experts’ dictating to farmers the technology they should adopt and does not consider farmers’ perspectives about the appropriateness of the technology.

A simple definition of agro-forestry is the use of trees on farms. More specifically, the International Centre for Research in Agro-forestry (ICRAF) defines agro-forestry as a dynamic, ecologically based, natural resource management system that, through the integration of trees on farms, diversifies and sustains production for increased social, economic and environmental benefits for all land users. The ICRAF began research about the potential of agro-forestry to improve soil fertility in 1978 and in 1991 began receiving financial and technical support from the Consultative Group for International Agricultural Research (CGIAR).

Between 1992 and 1997, the number of farmers participating in on-farm research through experiments conducted with farmers on their plots about the potential of agro-forestry to improve soil fertility, increased from 700 to more than 7,000 (Denning 2001). In 1997 researchers from the ICRAF, the Kenya Agricultural Research Institute (KARI) and the Kenya Forestry Research Institute (KEFRI) collaborated with farmers to develop methods to disseminate information about the promising agro-forestry methods they developed through the on-farm experiments. The on-farm experiments integrated organic inputs, such as improved fallow of Crotalaria, Tephrosia vogelii and Sesbania or biomass transfer of Tithonia
*diversifolia*, and inorganic inputs, such as Minjingu phosphate rock. The experiments demonstrated that the technology was low-cost and complemented farmers' local conditions. Researchers recognized that to facilitate the adoption of agro-forestry technologies, farmers needed to be involved throughout the entire research process. Therefore the research team began the development project from the premise that the design, implementation and dissemination of agro-forestry technology must draw from the diversity of farmer's indigenous knowledge, capacities, and perceptions as well as the resources available in the rural villages. The primary objective of the project was to improve the food security and the socio-economic situation of resource poor farmers and the most vulnerable members of the community by increasing household incomes for example. Researchers attempted to achieve this objective by developing and implementing agro-forestry methods to improve soil fertility, which would enhance agricultural productivity and promote long-term sustainable farming.

Researchers implemented the following participatory communication strategies to achieve the project's objectives. They collaborated with farmers to identify the resources available in rural villages as well as the pre-existing local groups, which organized discussions and actions to address problems of soil fertility. The research team and the farmers engaged in a wealth ranking exercise to determine the various categorizations of wealth and determine the links between wealth and soil fertility management practices. Researchers and farmers then collectively assessed farmer's methods of soil fertility management in each village before generating strategies to improve the adoption rates of agro-forestry methods to improve soil fertility.

This chapter outlines the participatory communication methods the researchers designed and implemented as well as the results. The chapter highlights the importance of participatory
communication methods to achieve the project’s goals of enhancing soil fertility and the well
being of the local population, in particular the most vulnerable groups in the society.

Research Methods

The researchers asked the following methodological questions at the beginning of the project.
How can researchers involve farmers, especially the poorest, in the process of agro-forestry
technology development and dissemination? How can technologies be developed that
incorporate the diversity of socio-economic and environmental conditions that individual
farmers face? How can researchers promote and facilitate farmer’s access to knowledge
about methods and technology to improve soil fertility in the current situation where
mainstream extension services are poor and deteriorating? How can researchers ensure
dissemination moves beyond the village level to the regional level? The following paragraphs
outline the methods researchers used to select villages to study and the participatory
methods they implemented.

Selection of Pilot Villages

Researchers selected pilot villages through a process, which consisted of gathering
information about the western region of Kenya including demographic characteristics, levels
of rainfall, soil types and cropping systems. The research team then complemented this
information with an analysis of the different ethnic groups in each region (Bradley 1991;
Carter 1995).

Researchers learned that strongly leached acid acrisols and ferralsols soil existed within the
western highlands of the Rift Valley and of Mount Elgon. Researchers found some more
fertile soils in the northern region of Kenya while the northwest region, consisting of several
river valleys, had predominantly hydromorphic gley soils. In the Kisii highlands, the vertisols
and nitisols dominated the area with isolated swampy areas. The poorest soils, acid, infertile, shallow, stony and often lateritic, were in the Siaya district.

Farming systems and land use varied throughout Western Kenya. Twelve types of farming patterns existed and differed according to the type of production, such as cash crops or subsistence crops. Demography, migration patterns, labor availability and environmental conditions, such as rainfall, slope and elevation, also influenced the type of farming system in each region (Carter 1995).

The researchers identified five ethnic groups living in Western Kenya. The Luhya-speaking people constituted the majority of people in the region and inhabited the northern part, and the Luo-speaking people lived in the south, southwest and in some parts of Kakamega. The Iteso-speaking ethnic group inhabited the western region near the border with Uganda, the Kalenjin-speaking (Nandi) ethnic group lived in the eastern region and finally the Abagusii-speaking ethnic group lived in the south.

The process allowed researchers to select three villages engaged in subsistence farming and implement the project to disseminate information about agro-forestry methods for improving soil fertility.

**Participatory Communication**

Participatory communication ensured collaboration in the research process between between farmers, researchers and development agents in order to design, implement and disseminate agro-forestry technologies that were suitable to farmers. Participatory methods allowed researchers to combine indigenous knowledge about agro-forestry practices with scientific knowledge. The research team ensured that the participatory communication research approach was flexible enough to allow farmers and researchers to evaluate the research process and make changes as necessary. A key methodological component researchers
promoted was fostering an environment based on respect and recognition of the value of indigenous expertise in order to resolve problems related to soil degradation. The participatory research approach increased farmers' awareness of natural resource management strategies to improve soil fertility and fostered confidence in the project because farmers felt that their contributions and knowledge were important.

Many of the methods to disseminate information about agro-forestry technology and improve soil fertility were visual methods, such as maps and diagrams, in order to facilitate communication and information exchange between members of the research team and the farmers who were illiterate. The research team and farmers collectively identified the various natural resources and different groups in each village attempting to address problems related to decreasing soil fertility. They also identified the connection between wealth and soil fertility management practices and conducted an assessment of farmer's methods of soil fertility management. Finally, the research team and farmers assessed methods to increase the adoption rates of agro-forestry methods to improve soil fertility.

**Project Implementation**

The following paragraphs provide details about the implementation of the participatory methods used to improve the adoption rates of agro-forestry practices in an effort to improve soil fertility, food security, and ultimately the social and physical well-being of the local population in Western Kenya.

**Identification of Village Resources**

The initial research step consisted of researchers collaborating with farmers in each village to construct a pictorial map depicting the boundaries of each village and the natural resources, such as the type of land, livestock, trees and water. Farmers were responsible for drawing the maps and identifying the village population's knowledge and experience about natural
resource management strategies (Pachico et al. 1998). The farmers determined the territorial boundaries, identified the soil types and outlined the causes of land degradation for each village. The farmers then marked the map with this information. The process of developing a pictorial map allowed the farmers to identify and define the resources in their village as well the problems related to natural resource management. Moreover, researchers required the farmers to participate in the identification of soil types and the causes of land degradation in order to implement appropriate solutions to overcome soil degradation and poor soil fertility.

The researchers needed to understand the methods of communication farmers used to address problems in their communities. The traditional method to address and resolve problems was used by farmers when they organized themselves into social groups, which were formed according to the issues that affected each of the members, such as land management practices on communal land, and functioned as a forum to implement action. Social groups varied in size from a few members to the entire village and in most cases the membership remained within one village, but in some instances it included people from surrounding villages. If farmers did not belong to a social group in a village they probably belonged to a clan, which constituted a group of people who would meet to discuss problems in their village and strategies to overcome them. The researchers asked the farmers to identify the social groups and clans in each village in order to connect with the groups who were working to overcome the problems of soil degradation.

**Wealth Ranking**

Wealth ranking was important to understand the indicators of wealth that farmers identified and categorize farmers in each village according to different levels of wealth. Farmers, mainly the Luo and Luhya ethnic groups, from twelve different villages identified indicators of
wealth during a meeting that the research team organized. Farmers grouped each household from their village into a wealth category according to the quantity and quality of the resources each farmer had access to as well as the farmer's control over the management of natural resources in their village (Grandin 1988).

Wealth ranking was an important exercise because wealth correlated with a farmer's ability to implement natural resource management practices. Poor farmers had more difficulty implementing methods to improve soil fertility and could not take risks to test new technologies because they were completely dependent on their farm income. Therefore the exercise pinpointed the most vulnerable people in the village who require assistance to implement soil fertility practices and improve their food security.

**Soil Fertility Management Practices**

The depletion of soil fertility contributes to declining crop productivity, which results in food shortages three to five months per year in each household (Niang et al. 1999). As noted previously, farmers understood the importance of soil fertility for crop production, but the high cost of inorganic fertilizers prohibited most farmers from using any inputs, which in turn contributed to low crop yields. A few farmers used organic manure, yet it was either limited in its amount or inappropriately stored before its application on the fields. Small-scale farmers owned one or two heads of livestock, such as cattle, sheep, goats and chicken, that were poorly fed and therefore did not produce enough manure that could have been used as an organic fertilizer. Moreover, the livestock grazed freely along roadsides making the collection of their manure impossible. Finally, small-scale farmers utilized their crop residues as a source of fuel and therefore they did not put the residues on their land to improve its soil fertility. Researchers needed to collaborate with farmers in order to determine the methods
of soil fertility management they implemented and then determine how to improve soil fertility management.

**Adoption of Agro-forestry Innovations**

In the past, extension workers disseminated research results regarding improved soil fertility practices (Bohringer et al. 1998). Although disseminating information through extension workers has not always been effective because the scientific results are often too complicated for extension workers and farmers. Moreover, the traditional approach is 'top-down', which means that farmers do not have input into the design or selection of appropriate methods to improve soil fertility in their village. In addition, in the last twenty years developing countries have decreased government funded services for rural farmers, including the availability of extension personnel. In Western Kenya, there is only 1 extension worker for 1600 farm-holdings. Finally, the problems associated with using extension workers to disseminate information about soil fertility management practices also includes high operational costs, such as staff salaries or the purchase of vehicles, a lack of objective specific to different regions or villages, poorly trained field staff, and the failure to provide a forum where farmers can share information about successful methods of soil fertility management. The following paragraphs provide detail about the strategies researchers implemented to overcome the problems associated with disseminating information to farmers through extension workers.

The researchers analyzed the dissemination strategies utilized by non-governmental organizations (NGO) and community-based organizations (CBO) operating in the region, rather than relying only on the traditional extension services of the Ministry of Agriculture. Therefore they compiled a list in order to identify all the development agencies operating in the area. At the same time researchers assessed the population size, the number of field-
based staff and intervention strategies of the development agencies operating in Western Kenya. Then the three organizations, ICRAF, KEFRI and KARI, established a framework to collaborate with the development groups and outlined the roles and responsibilities of each group in their efforts to facilitate communication and exchange information with rural farmers as well as initiate strategies to overcome land degradation.

The researchers also initiated training for development workers, developed extension manuals, organized visits to farms in villages for extension staff, and produced radio and TV programs in order to disseminate information to farmers about agro-forestry methods to improve soil fertility. The research team also organized annual meetings to foster information exchange about problems related to decreasing soil fertility and develop methods to improve the dissemination about soil fertility management practices.

The researchers wanted to create a forum where rural farmers could access the researcher's findings about improved soil fertility management practices, such as agro-forestry methods. The research team set out to strengthen the technical and administrative skills of local social or clan groups in order to facilitate information exchange about soil fertility management among farmers within one village or between villages and between farmers and development researchers. Researchers organized farmers to elect a member from each of their social or clan groups as a representative of a village committee, which had the role of addressing problems related to soil degradation and decreasing soil fertility. The village level committees collaborated with the project researchers to plan and execute activities related to the dissemination of agro-forestry methods, such as on-farm tests with specific seeds and tree species, field visits to communicate with farmers and training about agro-forestry methods for farmers in different villages.
Results

The following paragraphs outline the project's results, including the information gathered about each village, the relationship between wealth and soil fertility management practices, the types of soil fertility management farmers in rural villages utilized the types of farmer organizations and methods to improve dissemination of soil fertility management through agro-forestry methods in Mali.

Farmer's Assessment of the Villages

The farmer's pictorial representations of the villages revealed that soil fertility management practices differed according to the soil type and village location. For example, limwamu, or the black soil in the Luhya community, was rich in organic matter. Maize, beans, bananas and vegetables yields were good in this type soil. Farmers then identified villages that showed signs of land degradation and soil erosion, which enabled researchers to identify areas that required information about soil fertility management practices, such as agro-forestry. Researchers then conducted transect walks, which involved walking through each village, to confirm whether the information farmers provided was accurate.

Men and women drew village maps separately. Men typically had more knowledge about village boundaries, such as who owned which piece of land, farm boundaries and roads. Women typically were more knowledgeable about the soil types, characteristics, quality, workability (easiness to plough or weed) and the level of soil fertility. Women have this knowledge since they are mainly responsible for subsistence needs and therefore have greater agricultural responsibilities, such as planting, weeding and harvesting (Sharland 1989). Researchers also discovered that women had the greatest source of indigenous technical knowledge about soil fertility management and appropriate crop selection according
to the type of soil. Therefore women’s knowledge about soil fertility must be taken into account when determining improved methods of soil fertility management.

Overall, farmers displayed great enthusiasm when discussing their environment and most often reached a consensus about appropriate natural resource management practices. Although farmers often knew how to improve soil fertility, researchers learned that they did not have the income required to implement improved soil fertility methods, such as constructing soil conservation structures to limit soil erosion.

**Wealth and Soil Fertility**

Farmers identified the following wealth indicators: the size of a farm in a village; the use of organic and/or inorganic fertilizers; the type of house farmers lived in; the breed and number of cattle; the physical appearance of household members; the number of times a family eats each day and the type of food eaten; the level of income; the source of household fuel; the existence of hired labour for farm activities; the educational level of the parents as well as children; and the frequency of contacts with extension staff. Other indicators of wealth included: the number of wives a husband had; the type of kitchen ware or furniture in the home; or the presence of radios, television or newspapers.

Wealth indicators differed according to gender. Women in the Maragoli ethnic group identified the physical appearance and health of the household members, the type of food and number of meals eaten each day, whether there was harmony within the household, and the sources of fuel available as indicators of wealth. In contrast, men identified the type of housing, the size of farm and the number of livestock as indicators of wealth. In general, men considered income generating activities, such as growing cash crops or other off-farm income generating activity important while women focused on the importance of subsistence needs. Men’s assessment of wealth also focused on material goods, such as land, whereas...
women focused on non-material indicators of well-being, such as having harmony within the household (Nielsen et al. 1995). Although men and women both agreed that livestock was important to generate additional income, which was necessary to pay school as well as hospital fees or purchase household commodities and farm inputs. The researchers discovered that typically female-headed households were poorer than male-headed households, which meant that women had more difficulty implementing natural resource management practices. Researchers also learned that sometimes poor farmers had to take drastic measures to deal with decreasing agricultural productivity due to a lack of soil fertility. A high population density in the Luhya region meant that poor farmers sold their land and migrated to urban centers to try and earn a better living. The rich farmers bought their land and improved the soil’s fertility by constructing soil conservation measures to limit soil erosion and applied organic as well as mineral fertilizers. The situation differed in the Luo region because farmers would not sell ancestral land, therefore rich farmers and poor farmers could have poor or fertile soils.

**Soil Fertility Management Practices**

The farmers classified three categories of farmers according to their soil fertility management practices. The first category of farmers were good soil fertility managers because they could afford to apply inorganic and organic fertilizers, implemented soil conservation methods on their farms, practiced crop rotation, had little or no parasitic weed infestation, used pesticides and fungicides on vegetables and accessed soil fertility management information through extension services. The second category of farmers were poor soil fertility managers because they could not afford to purchase fertilizer, could not invest in methods of composting or leave their land fallow to regenerate the soil’s fertility. In addition, the poor soil fertility manager’s land had a lot of *striga* weed and they planted and weeded too late in
the growing season as they were working on wealthier farmers' land to generate additional income. Finally, poor soil fertility managers had little contact with the extension staff because they typically visited farmers who had resources and could risk investing in new technologies that extension workers promoted. The third category of farmers were average soil fertility managers because they implemented some of the methods that good soil fertility managers practiced. Preliminary results revealed that 14 percent of the farmers in the Sarika village were good soil fertility managers, 22 percent were average and 64 percent were poor managers of soil fertility.

Researchers also learned about the presence of some weeds or plants and their relationship to soil fertility. Decline in crop yields and soil fertility occurred due to large amounts of striga, couch grass (*Digitaria scalarum*) and white cotton weed (*Xanthium pensylvanicum*) in the villages. Farmers revealed that soil fertility declined because of continuous cropping with little or no fertilizer inputs, a lack of crop rotation, poor planting seeds, the presence of eucalyptus trees as they caused the depletion of nutrients and water from the soil as well as soil erosion.

Researchers learned that soil fertility management practices and level of soil degradation differed from village to village. Moreover, researchers learned that universal recommendations to improve soil fertility were not appropriate because communities were heterogeneous. Researchers realized that recommendations to improve soil fertility must consider the socio-economic factors, such as the income potential, access to inputs and access to extension services.

**Farmers' Organizations**

The following paragraphs provide information about the social and clan groups farmers identified. The farmers noted the activities of each group, and especially income generating
activities, the frequency of group meetings, who attended the meetings as well as the group’s ability to offer credit. The research team learned that the villages in the Luhya region had fewer farmer organizations than the Luo region. In the Luhya region the majority of farmers belonged to a clan or church group, while farmers in the Luo region typically belonged to women’s groups or social welfare groups. The research team learned that the number of farmers not affiliated to any groups in Luhya villages was higher, 14 percent, than in Luo villages, 5 percent. In the Luero village of the Luo region all the farmers belonged to at least one group and on average each farmer belonged to four groups. In contrast, in the Luhya region each farmer belonged to an average of two groups. Poor households in all regions typically belonged to church group.

Previous studies revealed that larger communities tended to be more heterogenous and therefore the chances were greater for disagreements about community action and activities to overcome land degradation (Edward and Jones, 1976). The on-farm research confirmed that heterogeneous communities posed difficulties when attempting to reach consensus in the community about action. Research results demonstrated that the number of farmers willing to test improved fallow technologies over the past 18 months remained limited in the Luhya region, which is densely populated and more heterogeneous in terms of clan composition than the Luo region. Although, another factor that influenced the dissemination and adoption of improved soil fertility methods in the Luhya region was the migration of males to towns and cities in search of additional income. Finally, researchers learned that the most vulnerable farmers were often not members of any social group.

Dissemination of Agro-Forestry Practices

The Ségou Region in Mali illustrates the approach researchers implemented to disseminate strategies to improve soil fertility practices through existing development.
organizations operating in the area. More than 34 development organizations operated in the Ségou region, including the Ministry of Agriculture and non-governmental organizations (NGOs), but the NGOs were mainly concentrated around the cities. Therefore only the extension department of the Ministry of Agriculture provided services to farmers in rural regions. In an effort to connect development organizations in Mali, the researchers established meetings to exchange information, plan, monitor and evaluate research activities about soil fertility improvement. They also sought to promote public awareness of research results as well as solicit additional funds. Despite the efforts to foster collaboration between existing organizations the meetings did not address the problem that the Ministry of Agriculture provided field-based extension workers to farmers at a ratio of one extension worker for 2000 farmers. Therefore, researchers decided to test and implement an approach to connect with farmers in rural areas through their existing social groups.

Researchers identified social groups in twenty-eight villages and compiled a list of each group's membership and activities. Farmers then nominated and elected representative farmers for village and regional level committees. Farmers chose representatives that were respected in the community and able to interact with diverse groups of people, for example, poor, rich, widows or youth. In addition, the representatives of the village committee needed to be someone who the community could rely on for their commitment to improving conditions in the village for everyone. The village committee constituted a forum where farmers could collaborate with researchers and extension workers to disseminate agro-forestry technologies.

Previous studies revealed that women, and particularly widows, were poor and did not receive extension visits because they were unable to invest in the technology extension workers offered. Women were typically members of social groups that assisted them with
subsistence farming activities such as ploughing, weeding and harvesting. The formation of
the village and regional committees permitted women's participation in discussions about
agro-forestry methods to improve soil fertility. In two of the regional committees, Sauri and
Jina, the representation of women was higher than in the other three. Overall, 57 percent
women and 43 percent men made up the members of the village committees, and 54 percent
of women and 46 percent of men respectively made up the regional committees. Therefore
researchers ensured that women's perspectives, often a vulnerable sector in the population,
about problems related to soil fertility management were represented.
The researchers implemented the following communication strategies to facilitate access to
information and promote dissemination about agro-forestry methods to improve soil fertility.
Researchers produced written material, radio and TV programs in local languages about
agro-forestry methods and organized field visits and tours to areas that have successfully
improved their soil fertility,

Conclusion
The research project demonstrated that a participatory communication approach is very
important to facilitate the wide scale adoption and dissemination of agro-forestry methods to
improve soil fertility. The researchers in the project found that participatory approaches not
only increased adoption of technologies, but also increased knowledge and information
sharing within local communities. The challenge that remains for researchers is how to
spread the adoption of agro-forestry methods beyond the community where a development
project occurs to other communities with different socio-economic and environmental
conditions.
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IMPROVING BANANA PRODUCTION IN UGANDA THROUGH PARTICIPATORY COMMUNICATION

Wilberforce K. Tushemereirwe, Drake N. Mubiru, Esther L. Ssemakula, Moses Buregyeya, Enoch Lwabulanga
National Agricultural Research Organization (NARO)
Kampala, Uganda
Authors:
Wilberforce K. Tushemereirwe, Leader, National Banana Research Programme
National Agricultural Research Organization (NARO)

Mailing address:
P.O. Box 7065 KAMPALA, UGANDA
E-mail: banana@imul.com

Drake N. Mubiru, Soil scientist, Soils and Soil Fertility Management Programme
National Agricultural Research Organization (NARO)

Mailing address:
P.O. Box 7065 KAMPALA, UGANDA
E-mail: banana@imul.com

Esther L. Ssemakula, Development communication specialist
National Agricultural Research Organization (NARO)

Mailing address:
P.O. Box 7065 KAMPALA, UGANDA
E-mail: banana@imul.com

Moses Buregyeya, Development communication counterpart specialist
National Agricultural Research Organization (NARO)

Mailing address:
P.O. Box 7065 KAMPALA, UGANDA
E-mail: banana@imul.com

Enoch Lwabulanga, Site knowledge specialist
National Agricultural Research Organization (NARO)

Mailing address:
P.O. Box 7065 KAMPALA, UGANDA
E-mail: banana@imul.com

FUNDING AGENCY: International Development Research Centre (IDRC)

Mailing address:
IDRC
P.O. Box 8500
Ottawa, ON K1G 3H9
Canada
Tel: 1-613-236-6163

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Abstract

Ddwaniro sub-county of the Rakai district is one of Uganda’s leading banana producing areas. However, yields in the region have sharply declined in recent years due to poor soil and water management, declining soil fertility as well as socio-economic problems. Rural farmers lacked access to technical knowledge about natural resource management techniques as well as a forum to share information with other farmers in their community about their successful natural resource management practices.

Therefore the project team developed and implemented a participatory communication approach in Ddwaniro sub-county that promoted collaboration between farmers and researchers in order to improve natural resource management strategies, increase banana productivity and ultimately improve food security in the region. Researchers and farmers collaborated to define the various problems related to land degradation and decreased banana productivity, including how other productive activities, gender and wealth influenced natural resource management practices. After assessing the problems that influenced decreasing banana productivity, the farmers organized themselves into three groups. The focus group discussions allowed farmers to identify the main problems they faced and devise potential solutions to overcome them.

The farmers implemented the strategies they devised and improved banana production in the Ddwaniro sub-county. Despite the project’s success several challenges remain, including rural farmer’s lack of resources, the difficulty of making scientific concepts accessible, and problems related to male domination.
Introduction

Uganda has 58 decentralized local government administrative units (districts). Each district comprises several sub-counties, which on average have about 25,000 people. The Rakai district is located in southwestern Uganda and it is one of the smallest districts in Uganda, with an area of approximately 4989 square kilometers. The Rakai district is divided into three main topographic zones: the Lake Victoria shore, the northeastern and the western hills, and the northwestern plains. Ddwaniro sub-county falls within the northeastern and the western hills. The Rakai district, and the Ddwaniro sub-county especially, is the leading banana producing area in the country.

Banana cropland covers 1.3 million hectares, or 33% of all agricultural land, and annual production has been over 9 million tons yr\(^{-1}\), in bunch weight, since 1996, while per capita consumption has been over 200 kg yr\(^{-1}\) (Tushemereirwe et al. 2001). Bananas constitute the primary subsistence crop and with suitable spacing, such as 10 feet by 10 feet, as well as an appropriate pruning scheme that maintains a collection of suckers emerging from the mother plant to make up three generations, there is food all year round. Banana production contributes up to 22 percent of the rural population's revenue and alternates with coffee as a leading source of family income (Bagamba 1994; Embrechts et al. 1996). Nearly all the bananas sold by farmers supply the Ugandan market for local consumption.

Banana crop productivity has undergone a drastic decline since the early 1970s. In the traditional banana growing areas of central Uganda, such as the Ddwaniro sub-county, productivity is approximately 6.0 tons ha\(^{-1}\) yr\(^{-1}\), while in western Uganda it is approximately 17.0 tons ha\(^{-1}\) yr\(^{-1}\). In 1992-93 a preliminary study was funded the International Development Research Centre (IDRC) and the Rockefeller Foundation to determine the causes of decreased banana productivity. Declining banana productivity was attributed to poor soil and
water management, pests, diseases as well as socio-economic problems. In addition, rural farmers were unable to access technical support from government extension workers. The results of the preliminary study prompted the implementation of a participatory research approach to improve soil and water management in the Ddwaniro sub-county.

The Rockefeller Foundation, IDRC and the Department for International Development (DFID) in the United Kingdom provided financial and technical assistance in 1998 to implement a project that would experiment with various promising natural resource management methods, such as the construction of water channels, mulching and composting, to improve banana productivity. The project team aimed to improve the adoption rates of successful natural resource management methods by rural farmers. Some experiments occurred at agricultural research stations while other experiments occurred on farmer's plots. A review of development literature revealed that conducting experiments on farmer's land was a successful strategy to determine improved methods of natural resource management and then disseminate the information to rural farmers.

Project researchers selected three sub-counties, which represented different levels of soil degradation, soil types, climactic patterns and socio-economic problems to conduct on-farm experiments in collaboration with the local farmers. The sites were the Ntungamo district in Western Uganda, Kisseka of the Masaka district in central Uganda and Bamunanika of the Luwero district in central Uganda. By the year 2000 farmers identified and implemented the following methods of managing natural resources: trenches to prevent soil erosion and water run-off; composted manure combined with mulch to improve soil fertility and water retention in severely degraded regions; the application of mulch to regions with moderate land degradation; and a pruning scheme that left one banana plant per mat for each generation to
optimize the plant’s density and reduce competition for soil nutrients and light. Each method proved successful in the effort to improve banana productivity.

Introducing the results of the experiments to other regions and villages throughout Uganda became the new challenge for the research team. Traditionally, government extension workers have been responsible for the dissemination of development research results to small-scale farmers, but unfortunately extension services in Uganda have not always been successful. Structural adjustment policies have caused a shortage of extension workers, one extension agent for every 5000 farmers in Uganda; decreased training for extension workers; and reduced agricultural subsidies for small-scale farmers as well as decreased access to credit.

Extension programs have also failed because extension agents implemented ‘top-down’ methods to disseminate information about natural resource management methods to improve banana productivity. A top-down method of disseminating information often fails because it does not allow farmers input into the selection methods of natural resource management nor does it provide a forum for farmers to exchange information about the successful methods of natural resource management they already use. Consequently, researchers determined the need for a participatory research approach, which would foster rural farmer’s participation in the selection, implementation, and evaluation of appropriate natural resource management strategies. In addition, a participatory research approach ensures that farmers are involved in the process of dissemination to share information about these methods with other farmers (Bessette 2001).

A research team from the National Agricultural Research Organization (NARO) received financial support from the International Development Research Center (IDRC), to initiate a participatory research project in the Ddwaniro sub-county of the Rakai district in Uganda.
The "Improving Banana Productivity in Uganda through Participatory Communication" project's primary objective was to increase banana productivity. The project team established other objectives, including identifying the causes of decreasing banana productivity as well as potential solutions, fostering collaboration with the local population to meet their natural resource management needs and collaborating with other development organizations to improve methods of dissemination about natural resource management practices.

**Methodology**

The research team considered the following questions before implementing the project. What factors influence banana productivity? How do small-scale farmers acquire knowledge about natural resource management practices? What techniques do they use to cope with problems of decreased soil fertility? What do small-scale farmers need to know or do to maintain and improve soil fertility? Finally, what communication strategies can foster information exchange about the improved natural resource management methods within rural villages? The following paragraphs outline the methods researchers used to select the site to study, identify the range of natural resource management problems the local population faced, organize focus groups, select appropriate communication strategies and monitor the research process.

**Site Selection**

Initially, a team comprised of a socio-economist, a communication specialist, a soil scientist, and an extension agent already working in the community toured the Rakai district and then selected the Ddwnaro sub-county to study. The team selected the Ddwnaro sub-county because banana production constitutes the primary agricultural crop, it has a relatively good road network, the farmers are hard-working and banana productivity has been decreasing.
The team chose three parishes, Buyamba, Ddwaniro and Kayoonza, to represent the different altitudes in the sub-county, the major enterprises aside from banana production, the various natural resources in the region as well as the extent of soil degradation. The project team began by organizing a series of consultative meetings with district, sub-county and opinion leaders as well as extension workers before approaching the farmers. The preliminary meetings familiarized each group with the project’s goals and attempted to attain each group’s support of the project.

Identification of Management Problems
Researchers asked members of the Ddwaniro sub-county to identify natural resource management problems related to banana production as well as their causes and potential solutions. Researchers conducted individual interviews with men and women from various households as well as group discussions to learn more about banana production. Researchers complemented the information they gathered during interviews with a literature review of the socio-cultural, environmental, such as land degradation, and political factors that influenced banana production.

The key influences on natural resource management strategies included: the type of resources in each region, such as water sources, forests, hills, soil types; whether agricultural production was subsistence or cash crops; the availability of extension services; and wealth.

Organization of Farmers Groups
Under the guidance of the research team farmers formed focus groups from twelve pre-existing farmer’s groups in the Buyamba, Ddwaniro and Kayoonza parishes. Researchers invited five representatives from each focus group to attend a workshop at the sub-county headquarters. At the workshop the representatives organized themselves into three groups according to the natural resource management problems they identified and then prioritized
the problems. The farmers established objectives to address each need and then determined strategies to achieve the objectives. Farmers noted that the strategies must be easy to use, manipulate and sustain. In addition, the communication strategies must be adaptable and have low production costs (Bessette 2001).

**Participatory Communication Strategies**

The research team plans to facilitate community participation in the development and selection of communication strategies. The researchers will pre-test the communication strategies to evaluate their content, clarity, relevancy and visual appeal (Bessette 2001). Researchers plan to ask community members with a talent for art and design, for example still photography, to contribute in the process of developing methods of communication to disseminate information about improved natural resource management practices. The research team will develop a plan to share information about improved soil and water management practices within neighboring communities.

The project team will ensure that the communication strategies are appropriate. For example, they will select communication strategies about methods of natural resource management that are appropriate for community members who are illiterate. In addition, the project team wants to ensure that the community will continue with activities to improve methods of natural resource management and therefore increase banana productivity after the development project finishes.

**Participatory Monitoring and Evaluation**

To monitor and evaluate the project's progress the research team and farmers plan to elect seven people who will form a committee in order to determine the relevancy of the collected information in relationship to the problems the farmers identified. The committee will then review the strategies that the farmer's groups developed to disseminate natural resource
management strategies. The committee will also identify people in the Ddwaniro sub-county and outside the sub-county who could benefit from improved natural resource management techniques and if possible request their participation in the project. Finally, the committee will prepare reports for the various development partners, such as donors, policy makers and NGOs.

**Project Implementation**

The research team collaborated with the rural farmers in the Ddwaniro sub-county to identify the causes of land degradation and the major enterprises aside from banana production in the region. In addition, researchers and farmers identified the women's and men's roles in agricultural production and compiled a list of wealth indicators to determine the influence of wealth on agricultural productivity.

**Causes of Land Degradation**

Soil degradation occurred due to overgrazing and bush burning, which provided a new pasture for livestock. Soil degradation also occurred from soil tilling practices that did not incorporate measures to control soil erosion, such as grass bunds and trenches, or mulching. Grass bunds are rows of grass or shrubs planted along the perimeter of agricultural crops in order to protect the soil's fertility while trenches ensure that rain water collects in the crops. Mulching utilizes decayed vegetation matter to improve soil fertility. Finally, soil degradation occurred due to continuous farming with no periods of fallow.

Charcoal and brick burning also caused soil degradation in the Ddwaniro sub-county. Farmers noted that these activities decrease soil fertility because of the excessive heat generated in the burning process. In addition, bricklaying destroyed the relatively fertile topsoil and left behind less fertile soil.
Major Enterprises in the Sub-County

The research team and the farmers collectively identified the key enterprises in the sub-county and prioritized their importance. The process confirmed the research published by the Rakai District in 1994, which stated that agriculture constituted the main economic activity (Rakai District Policy Guidelines 1994). More than 80 percent of the population engaged in agricultural production, although other major enterprises included local beer brewing, raising cattle, trade and fishing.

The research team and farmers assessed the prioritization of other productive activities in order to understand the influence on natural resource management methods. For example, farmers in Buyamba parish ranked raising cattle second to farming. Since farmers in this region used animal manure to improve soil fertility, cattle ownership afforded this community greater food security and better livelihoods. Farmers in the Kayoonza parish ranked fishing second to farming because of their close proximity to the lake. Researchers learned that fishing had a negative impact on the livelihood of people in the Kayoonza parish because they invested a lot of time in fishing but their catches were sometimes very low. Therefore the time dedicated to fishing compromised the productivity of their gardens and decreased food security in the region.

Gender Analysis

During meetings with women and men researchers asked them to describe their responsibilities for family care, the types of farm activities they engage in, the natural resource strategies they implement and if they have input in decision making about natural resource management at the village level. Women revealed that they were responsible for most domestic activities, such as family care, as well as providing the family's subsistence crops. Men noted that they were mainly responsible for the cash crops, such as bananas,
coffee and maize. Researchers learned that women are responsible for more labor in most enterprises.

In addition, gender influenced access to and control over resources and their benefits. Men controlled almost all the family resources, even in cases where they were not the major contributors of the labor that generated these resources. Men were, in most cases, the voice of the household, which meant that they represented the household at public gatherings. At the group meetings the research team organized approximately 98 percent of the men from the village attended. Although the meetings were not well attended by women, some women did attend and furthermore some of these women had positions of responsibility on the local councils.

**Wealth Ranking**

Through a consensus decision-making process the farmers compiled a list of indicators of wealth including: income; farm size; assets, such as a car, house, number of cattle; methods of farm maintenance, such as applying agricultural inputs; ability to meet household needs, such as the children's education; number of coffee trees; and size of a household's banana plantation. An analysis of the wealth indicators revealed that most farmers were not wealthy. Land fragmentation has occurred during the past two decades and has decreased most rural farmer's standard of living. Land fragmentation occurred in throughout Uganda and it involved breaking up communal land holdings into small privately owned land holdings. The result of smaller land holdings for rural farmers in Uganda has been fewer coffee trees, smaller banana plantations, lower incomes, and an inability to combine livestock production and farming.
Results

During the group meetings farmers first identified the constraints that influenced decreasing banana productivity. Then farmers formed three focus groups according to their specific soil fertility management needs. The focus groups permitted farmers to share their opinions about the problems related natural resource management as well as potential solutions. The following paragraphs provide details about the factors influencing decreasing banana productivity and the results of the focus groups.

Reasons for Decreasing Banana Production

Farmers identified poor soil fertility as the major cause for decreased banana productivity. Poor soil fertility exists because of phosphorus deficiencies, aluminum toxicity and drought (Logan 1990). In addition, a high population density has contributed to land degradation and therefore decreased soil fertility since some farmers could not afford to leave their land fallow, which would restore soil fertility. Drought has also influenced decreasing banana productivity because soil in the Ddwaniro sub-county has a low water retention capacity. Although many farmers applied mulch to their plots in an effort to retain water in the soil, their efforts have not increased banana productivity substantially. Researchers noted that mulch alone is not enough to increase banana productivity because the degraded soil required nutrient supplements, such as manure or inorganic fertilizer (Zzake 1993). Therefore the research team and the farmers decided that mulch should be applied in combination with manure in order to improve banana productivity.

Poor soil fertility and decreased banana productivity also linked to problems of soil erosion. The Ddwaniro sub-county consists mainly of hills, although there is a flat plateau towards Lake Kijanebalola. The majority of farmers established the banana plantations in the valleys and on the flat plateau, which contained relatively fertile soils. However, improper soil
management practices and continuous farming have degraded the soil in these regions. Therefore some farmers shifted their plantations to the steep slopes of the hills where the soil was prone to erosion due to the high-speed surface runoff. Moreover, most farmers lacked the skills or labour to make trenches in order to prevent soil erosion on the steep slopes. Therefore the group meetings ensured that farmers could discuss appropriate and cost-effective ways of making the trenches.

In addition, farmers lacked knowledge about modern soil and water management methods because the extension system in Uganda was poorly funded. Rural farmers often have valuable indigenous knowledge about methods of improving soil fertility and therefore banana production, but have been unable to share this information with other rural farmers or access information about methods to improve soil fertility through radio programs or newspaper articles. Finally, small-scale farmers have difficulty accessing credit because of high interest rates and short repayment terms, which prohibits farmers from purchasing agricultural inputs to improve soil fertility.

Farmers Focus Groups

In the three parishes of the Ddwaniro sub-county twelve farmer’s groups participated in the project. During group meetings the farmer’s groups organized themselves into three focus groups according to their common needs and objectives. The first focus group, the soil fertility and moisture management group, consisted of farmers faced with declining soil fertility and conditions of drought. The farmers in this group decided to rejuvenate their land by applying organic fertilizer or mulching to conserve soil moisture. The second focus group, the soil erosion management group, consisted of farmers with plantations in the hilly areas prone to soil erosion. The farmers in this group decided to monitor water runoff from hilltops in order to prevent soil erosion and crop damage. The third focus group, the soil fertility,
moisture, and erosion management group, decided to enhance the soil’s nutrients and organic matter in order to improve its water retention capacity. The following paragraphs detail the strategies and activities each group undertook to improve soil fertility and banana productivity in the Ddwaniro sub-county.

**Soil Fertility and Moisture Management Group**

The main objectives of this group were to conserve soil and water and increase food production as well as family incomes. In order to achieve these objectives farmers discussed the skills and knowledge they must first acquire. Farmers noted that they required skills about the application of compost manure and they required knowledge about appropriate methods of mulching. Farmers also wanted access to credit institutions that offered favorable lending terms to small-scale farmers and information about marketing outlets. Farmers wanted information about banana-based intercropping methods, such as intercropping banana and beans or banana and coffee, and they wanted to combine indigenous knowledge with modern technology. Finally, farmers required knowledge about appropriate methods of handling perishable farm produce post-harvest.

The group suggested organizing training sessions, including demonstrations, about compost manure and appropriate methods of mulching for rural farmers. Farmers suggested using brochures, photographs, video, posters, newspapers, newsletters and exhibitions to facilitate the training. The group also suggested organizing visits to farms within the community that practiced successful methods of composting and mulching. If visiting farms was not possible the group suggested providing information to rural farmers about farmers who had success improving soil fertility through videos, photographs or newspapers. Farmers suggested training rural farmers about the procedures to access loans in order to facilitate rural farmer’s access to credit with favorable lending terms. They also suggested
facilitating meetings between farmers and credit institution managers so that farmers could learn about the lending process and terms of credit. The group recommended providing information to rural farmers about market outlets through newspapers, the radio, posters or agricultural shows.

In order to acquire knowledge about banana-based intercropping methods, the group noted that farmers require training. The group suggested providing training for rural farmers through brochures, the radio, videos or photographs. Moreover, farmers noted the importance of combining indigenous and modern methods of improving soil fertility. Therefore they needed establish a forum, which would allow them to acquire information from scientists about methods to improve soil fertility as well as share the information they learned with other farmers in their community.

Finally, the group recommended training sessions to facilitate rural farmers' knowledge about methods to handle perishable farm produce after harvest. The training could occur through the use of brochures, photographs or video.

**Soil Erosion Management Group**

The group's main objectives consisted of increasing food production as well as household incomes, developing and implementing improved soil fertility management practices and pooling their resources to access credit or create a bigger market outlet through group sales. In order to achieve these objectives the group discussed the skills and resources they must first acquire. The group concluded that rural farmers needed knowledge about constructing appropriate and cost-effective water trenches in order to prevent soil erosion. They also noted that rural farmers required access to affordable agricultural inputs to improve the soil's fertility. Finally, the group determined that rural farmers need to have a forum to access
information about improved soil and water management methods as well as exchange information with other farmers in their community.

Rural farmers needed technical information about soil erosion and water runoffs as well as the benefits of constructing water trenches. In order to provide rural farmers with the skills to construct appropriate and cost effective water trenches, the group recommended establishing a training program to provide information about the benefits of water trenches as well as the skills to build them. The training sessions could utilize brochures, photographs, video, posters, radio broadcasts or visits to other farmers within the community who have experience in construction of water trenches.

The group suggested establishing a 'cash-round', or pooling funds together, to facilitate rural farmer's access to affordable agricultural inputs. They also recommended requesting assistance from credit institutions, NGOs, government funded development programs to acquire agricultural inputs, such as hoes, machetes, improved seeds or fertilizer. Rural farmers could acquire information about the value of pooling resources to access credit or gain more bargaining power in the market through radio broadcasts or face-to-face meetings.

In order to facilitate information exchange among rural farmers, the group suggested organizing group meetings at the village level to discuss problems related to soil fertility as well as potential solutions or methods currently practiced to overcome poor soil fertility. The farmers recommended utilizing traditional methods of communication at the meetings, such as poetry, song, or theater. In order to facilitate information exchange between farmers and researchers, the group suggested organizing agricultural training programs where researchers could share the technical aspects of improved soil fertility management with rural farmers.
Soil Fertility, Moisture, and Erosion Management Group

The group's main objectives consisted of increasing food production and improving the well-being of the local population. The group determined similar resources and skills that rural farmers required, but their prioritization differed slightly. The main priority consisted of farmers need for knowledge about methods of soil and water management to improve banana productivity. The group also noted the importance of affordable agricultural inputs, knowledge about intercropping bananas with other crops, such as coffee, integrated pest management and appropriate methods of handling of perishable farm produce after harvest. In order to facilitate knowledge about natural resource management practices to protect and improve crops, soils, and water systems, the group recommended organizing training workshops for rural farmers. Farmers wanted training in banana crop intercropping, compost and mulching methods as well as appropriate and cost-effective ways of constructing water trenches. The group suggested that the training workshops could utilize brochures, photographs, videos, posters, radio broadcasts or visits to other farms to learn about farmer's successful practices.

Conclusion

Although farmers require resources, such as agricultural inputs or credit, to improve banana productivity, this initiative focused on communication needs of rural farmers, such as training and information exchange. The project successfully involved farmers and facilitated their participation in the effort to improve banana productivity. Moreover, the three focus groups implemented the strategies they devised to improve natural resource management practices and banana production has increased. Despite the success of the project the final paragraphs outline the challenges that remain.
Lack of Resources

Most farmers already know about methods to improve their soil and water management practices, but they lack resources to implement them. Rural farmers in Uganda need money to buy agricultural inputs, such as mulching materials or fertilizer, and to hire labor for certain activities, such as weeding or pruning. Although farmers have proposed approaching credit institutions to finance their material and labor requirements the credit institutions have unfavorable lending terms, such as high interest or a short re-payment schedule, that prohibit small-scale farmers from borrowing. Therefore the research team plans to hold a meeting between the farmers and credit institutions to discuss this issue. They also plan to produce a video about small-scale farmer's need to access credit and disseminate it to the top managers at credit institutions as well as policy makers in the Ministry of Finance who might not be able to attend the meeting.

Farmers and Scientific Concepts

Many farmers had difficulties conceptualizing scientific principles, such as the active ingredients in fertilizers. The research team must determine how to illustrate scientific information in a simple manner so that farmers can grasp the concepts and later be able to exchange the information with other farmers.

Women's Silence and Inequitable Resource Control

An additional challenge relates to the fact that in most communities women tend not to talk in meetings if men are present or if the meetings bring together large groups of people. Women feel that men, or their leaders, must always talk for them. Yet, in most cases, women's views are the most important since they do most of the farming activities. The research team suggested organizing meetings with women's groups and making home visits to engage in informal conversation with women as they do their work at home.
A final challenge that the research team did not overcome and requires a long term commitment to influence social and cultural patterns relates to the fact that men control income while women do most of the farm activities. The result is that the resources that should be re-invested into farm activities are dedicated to less critical areas, such as men's leisure.
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THE SALINIZATION AND SOIL RECOVERY PROJECT:
PARTICIPATORY COMMUNICATION IN WESTERN SENEGAL

M. Diatta, Institut sénégalais Recherches Agricoles/Centre National Recherche, Dakar, Senegal
D. Pastenack, International Program for Arid Land Crops and International Crops Research Institute for the Semi-Arid Tropics, Niamey, Niger
M. Sene, Institut sénégalais Recherches Agricoles /Le Centre d’Etude Regional pour l’Amelioration de l’ Adaptation a la Secherese, Dakar, Senegal
F. Matty, University Cheikh Anta Diop, Dakar, Senegal
C. Seck, AFRICARE, Kaolack Senegal
AUTHORS:

M. Diatta
Institut sénégalais Recherches Agricoles/Centre National Recherche

Mailing address:
BP 2057 Dakar, Senegal
Email: dgisra@isra.sn

D. Pastenack
International Program for Arid Land Crops and the International Crops Research Institute for the Semi-Arid Tropics

Mailing address:
BP 12404, Niamey, Niger
Email: IPALAC@bgumail.bgu.ac.il

M. Sene
Institut sénégalais Recherches Agricoles /Le Centre d’Etude Regional pour l’Amélioration de l’Adaptation a la Secherese

Mailing address:
BP 2057 Dakar, Senegal
Email: icrisatsc@cgiar.org

F. Matty
University Cheikh Anta Diop

Mailing address:
BP 5005, Dakar-Fann, Senegal
Email: info@ucad.sn

C. Seck
AFRICARE

Mailing address:
BP 2272 Dakar, Senegal
Email: development@africare.org

FUNDING AGENCY: International Development Research Centre of Canada

Mailing address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada
Tel: 1-613-236-6163

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Introduction

Soil degradation impedes attempts to improve agricultural production. The problem of soil degradation also interferes with the efforts of the local populations to address poverty, improve food security and promote income generating activities. An increase in the soil's salt content is one of the major factors contributing to soil degradation. Researchers estimate that 160,000 hectares of soil become salified every year (Barrow 1987, 1991). Salty soils cover about 53 million hectares in Africa and approximately one million hectares in Senegal (Lal 1984; Pereira 1985; Middleton and Thomas 1997).

In West Africa, people have experienced soil salinization for decades (Massibot and Carles 1946), but in recent years the problem has become much worse. In all the collection basins of the Sine Saloum and Casamance regions, for example, the salinization and hyper-acidification of the soil are responsible for the complete disappearance of the mangrove in the upper streams and their affluents. In the past, the mangrove played a very important part in agricultural production. It protected the crops from salt water, prevented the soil from eroding, and the sand from accumulating in the affluents, thus ensuring fresh water irrigation.

In order to counter the effects of salinization, the "Salinization and Soil Recovery Project" was recently implemented in the Sine Saloum Basin. The climate in the region is of the Soudanian tropical variety with two strongly differentiated seasons: a long (8 to 9 months) dry season and a short (3 to 4 months) rainy season. Since 1971, however, the Sahel region has been hit by severe periods of drought, thereby shortening even further the already short rainy season. In addition, the Saloum River and its affluents influence the agricultural production in the region. Under the influence of climatic pressure, the course of the affluents was inverted thus bringing sea water upland. Under the sea water which covered large areas, the
forest vegetation all but disappeared and any kind of agricultural production became practically impossible in the Sine Saloum region.

The farmers in the region have attempted to overcome the negative effects of salinization in two ways: first by using organo-mineral fertilizers and secondly by building small dams in order to collect rainwater and reduce the flooding of the land by sea water. Despite the farmers' efforts to overcome soil salinization, the results have been disappointing in the face of the magnitude of the problem.

Since 1965, the government has also been involved in the construction of large anti-salt dams in order to overcome the negative effects of land degradation (Sadio 1990). Unfortunately, the projects were usually carried out in a very technocratic manner without allowing any input from the local populations. The local populations were not even consulted about the usefulness of the dams, nor were they asked to contribute to their maintenance. As a consequence, the large-scale dams exacerbated the problem of soil salinization and acidification, instead of alleviating it. Moreover, forestry researchers also conducted studies on salty soil and on the behaviour of a salt tolerant species (i.e. lignin). Neither state initiated projects nor forestry researchers' efforts halted soil salinization. As a consequence, critical questions emerged about research design and methods in the areas impacted by soil salinization. Past failures to overcome the salinization of land confirmed the need for an integrated, multidisciplinary, and participatory approach. In other words, the local populations and especially the women had to become involved.

Salt and toxic products from the sea have caused massive destruction to the vegetation cover, which in turn has led to a dramatic loss in bio-diversity. Land degradation negatively impacted the food security of the local populations who rely on subsistence farming. Women are
particularly affected as they are the main producers of the subsistence crops of rice, millet, and sorghum.

It has now become quite apparent that the soil in the Sine Saloum region requires immediate regeneration in order to enable sustained agricultural activity, reduce existing land conflicts between farmers and herders as well as prevent any further migration from the villages. The research project presented in this chapter clearly demonstrates that in order to successfully regenerate the land and improve soil fertility the local populations have to become involved. The following section outlines the main objectives of the « Salinization and Soil Recovery Project ».

The main objective of the project was to recover the salinized soil of the west coast of Senegal in order to allow for agricultural and livestock production. The researchers set out to achieve that objective by planting a mix of salt tolerant trees and fodder that would improve the soil’s fertility. They recognized the need to involve the local populations, and particularly women, in the design and implementation of socially compatible and economically rewarding technologies that would address the land salinization problem. They aimed at identifying and implementing activities that would encourage ongoing community participation such as the construction of dams, the planting of shrubs and trees as well as the cultivation of vegetables and rice.

**Research Methods**

The project involved three research institutions, namely the Senegal Institute of Agricultural Research, the Institute of Environmental Sciences and the International Program of Cultures in Arid Zones as well as one NGO, Africare Senegal. All four institutions which focused on participatory technology development, social development through adult education and training as well as the health of the people in areas impacted by soil salinization.
Initially the researchers from the three research institutions reviewed the existing literature about previous soil salinization research projects conducted in Senegal, and elsewhere in Africa. After the literature review they decided to conduct an evaluation of the situation at various locations in the villages of the Saloum Delta region. The researchers decided to study that region for the following reasons: low agricultural productivity and loss of biodiversity in the Saloum Delta region because of soil salinization. In addition, the local population experienced additional problems, such as a lack of food security related to land degradation.

The research team initiated the project by participating in Local Development Committee (LDC) meetings, which function as the local administrative structures at the district level. The LDC meetings allowed the researchers to discuss the results from their preliminary analysis with the administrative authorities and the local groups. The LDC meetings proved an excellent opportunity to exchange information about the issue of land degradation with the village leaders as well as the rural counsellors.

A number of ideas to address the problem of soil salinization emerged at the LDC meetings. The participants decided to combine mechanical (dams) and biological (plants) methods in order to overcome soil salinization. The participants decided to build small dams with the available labour power, in order to stop the flow of the salt water. The participants also emphasized that the dams had to be stabilized with plants which would provide a good vegetative cover, so that the rain and the livestock would not damage the dams. The plants would also regenerate the vegetative growth and help improve soil fertility. The participants recommended planting trees that could resist flooding by sea water and would remove excessive salt from the surface of the soils. Finally, the participants decided to select herbaceous plants that would provide good soil coverage as well as good fodder for the livestock.
An additional concern related to women’s needs emerged during the LDC meetings. The women noted that it was difficult for them to contribute to long-term programs to address soil degradation, as their main preoccupation was survival. Consequently, they suggested a variety of action plans in order to help them achieve sustainable revenues, such as vegetable and rice production. The women agreed that the land had to be recovered but their first priority was to provide for their family’s subsistence.

**Project Implementation**

The project team worked with a series of organizations: women’s and men’s as well as mixed. The consultations showed that although land salinization mainly impacted women because they are responsible for their family’s subsistence needs, it is nevertheless important to involve men because building dams is a labour intensive activity which cannot be performed by women alone.

The researchers learned that the local population shared most of their information verbally, in face-to-face meetings or celebrations, for example. In order to discuss the issue of soil salinization with farmers, they asked the Local Development Committee members when farmers would be available to meet and how often. Researchers also considered activities such as weekly markets, gathering of water and firewood, food preparation and cooking, cultural and recreation activities, to ensure that meetings did not conflict with these activities.

Then the research team facilitated visits for the committee leaders at the experimental plots (Ndiaffate) and at farmer’s plots in other villages. Visits were organized twice each year. The project team also took advantage of training that was already occurring in the villages about methods to control soil salinization. Researchers attended the training meetings to share their ideas about methods which could be useful to improve soil fertility: building dams or planting trees for example.
The first priority of the project was to halt soil salinization. To that end, the researchers organized the farmers in teams so that they would build mud dams around existing plots. The dams served as retention basins for rainwater. The farmers also planted various shrubs that were resistant to salt. The trees helped to decrease the layer of salty water layer through a process called evapo-transpiration which refers to water loss through plant transpiration. In addition, the tree roots dug into the soil and created canals, which further accelerated rainwater infiltration.

The researcher’s experiments confirmed that the dams should be planted with a fast growing, salt resistant shrub such as *Atriplex lentiformis*, in order to make them more stable. The researchers also determined that 20 percent of the region devoted to rice production should be planted with *Distichlis spicata*, which is an herbaceous salt-tolerant fodder plant in order to drain the salt from the surface of the soil. Moreover, the research team proposed planting a third salt resistant species, the *Atriplex lentiformis*, which helps reduce soil salinity as well as wind and water erosion.

In addition to pursuing the long-term goal of regenerating salinized land, the local population also collaborated with the researchers in order to implement a series of activities that would improve the immediate food security of households. The activities included improving vegetable production, such as okra, onions, tomatoes, eggplant, and cabbage, and forest fruit tree production, such as *Ziziphus*, grenade, etc.

Overall, the rate of participation was good, especially among women. That clearly demonstrated that the local populations were very interested in learning about methods aimed at halting soil salinization. The researchers had to remind them, however, that the project’s objectives would probably not be met in the short term, and that the effort to overcome soil salinization would probably require a long-term commitment.
Results

The following paragraphs outline the results of the project designed to overcome the problem of salinized land and in the process improve soil fertility, as well as the physical and social well-being of the local populations.

Regeneration of Land

Building dams regenerated the salinized lands and it led to the reappearance of spontaneous vegetation. At the beginning of the project, the researchers accounted for three species of plants in the region that had a coverage rate of less than 1%. After three years, they accounted for 100 species that have a coverage rate of 33%. Furthermore, the bio-mass production was insignificant at the beginning of the project and at the end of the project it had reached an estimated level of three tons per hectare.

Salt Resistant Plants and Trees

The lignin species, Tamarix aphylla var erectus, responded well in salinized soil. The average survival rate is now 62 percent and it has satisfactory growth; after 24 months, its average height is between 4 to 6 meters and its diameter is approximately 1.7 centimeter. With this species, one could probably reforest large portions of salty lands in Senegal with Tamarix aphylla. The other experimental species, Distichlis spicata and Atriplex lentiformis, did not respond well in a salty environment and therefore it was replaced with a different salt tolerant species. The local populations and the researchers decided collectively to test Vetiver zizanoïdes instead of Atriplex lentiformis to see if it would protect the dams. During the project, the researchers and the local populations conducted a search for a different herbaceous fodder plant in order to replace Distichlis Spicata. Finally, the trees planted at the experimental plots confirmed the hypothesis that they maintain the salinized soil at a level underground that does not affect agricultural activity.
Improving Skills of Local Population

During the research project, the farmers acquired knowledge about soil salinization and the action required to overcome the problem. Farmers learned how to build dams and which salt-resistant plants to grow. The researchers predicted that the local populations would not be able to grow rice on the experimental plots until four years after implementing methods to halt salinization with dams and salt resistant plants and trees. After only two years of experimenting with potential solutions to halt soil salinization in the Saloum Delta region, however, the farmers attempted to grow rice in the regions where the researchers had conducted their experiments. The farmers did not harvest much rice, but they were still quite satisfied because the land that was abandoned showed signs of possible recovery.

Dissemination of Research Results

In 1999, the researchers held discussions with decision-makers including the Minister of Agriculture and Livestock, the agricultural adviser to the Prime Minister, the President of the Administration Council of the SIAR, and the Governor of the Kaolack Region. Researchers also held discussions with media representatives from television, radio and newspapers. The Senegalese Radio and Television group allowed the research results to reach a wider audience.

The project team presented the participatory strategy to address land salinization and the preliminary results to the African Ambassadors Committee at a UNESCO meeting in Paris in March 2000. Ambassadors from other African countries in regions affected by salinization, such as Gambia, Guinea Conakry and Guinea Bissau, were very interested in the “Salinization and Soil Recovery Project” and promised to discuss the issue of soil salinization with their government officials.
The project team also organized meetings with scientists from Israel, the U.S., and France, as well as national research scientists. French scientists were interested in our project and agreed to help design a project to recover pastures with salinized soil. Two scientific papers have already been published about this topic.

Agricultural and forestry development agents working in the area contacted the project team to exchange information and develop a partnership in the struggle against land degradation. In addition, nine students and trainees from different agricultural schools or the University completed thesis work on the topic of soil salinization and have disseminated their research about salinization in the national scientific community.

The researchers planned to organize a closing seminar where a large number of people would be invited at the end of the fourth year (for example, decision-makers, community members, local community groups, NGOs, government development agents, donors, etc.). They also plan to disseminate the report widely. Finally, they planned to produce a thirty-minute documentary disseminate their results at the regional, national, and international level about the project to halt soil salinization.

Conclusion

Collaboration between the development organizations and the local populations proved to be necessary in order to promote a participatory approach to resolve the problem of land degradation, even though participatory methods require more time. Research projects that foster exchange with the local populations are indeed necessary because the researchers need to leave their laboratories and learn about the dynamics of the local problems they are studying. In the project at recovering the salinized lands in Senegal, the researchers attempted to foster collaboration between scientists and members of the local populations in order to promote sustainable management of natural resources. The "Salinization and Soil
Recovery Research Project" demonstrated that the expertise of researchers and scientists must be combined with the knowledge and expertise of community members in order to achieve the objective of improving soil fertility and ultimately the population's physical and social well-being.
References


PARTICIPATORY COMMUNICATION TO COMBAT SALINIZATION
IN THE DJIBANAR VALLEY OF SENEGAL

Fadel Diame, Adama Ndiaye
West African Rural Foundation (WARF)
Dakar, Senegal
AUTHORS:

Fadel Diame, Executive Director
West African Rural Foundation (WARF)

Mailing address:
WARF, C.P. 13 Dakar Fann, Dakar, Senegal
Email: warf@cyg.sn

Adama Ndiaye, Chief Officer, Research and Development Division
West Africa Rural Foundation (WARF)

Mailing address:
WARF, C.P. 13 Dakar Fann, Dakar, Senegal
Email: warf@cyg.sn

FUNDING AGENCY: International Development Research Centre

Mailing address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada
Tel: 1-613-236-6163

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This chapter details the participatory communication methods the West Africa Rural Foundation (WARF) implemented to assist inhabitants of the Djibanar valley in Western Senegal overcome land degradation due to salt water flowing inland from the sea. The objective of the project was to mobilise the local population and build the administrative and technical capacity of local organizations in order to rehabilitate their land and secure agricultural production. WARF implemented a participatory approach that successfully gathered and mobilised populations in the village and throughout the Djibanar valley to generate dialogue about natural resource management as well as build and restore dams to halt salinisation and test new varieties of rice that were more likely to thrive in a salty environment. The project successfully led to the rehabilitation of two hundred acres of degraded land, which then was equitably distributed among the farmers who participated in the project. Researchers learned the value of collaborating with multiple development organisations and the private industry to implement participatory methods and develop a resource management plan for communities suffering severe land degradation and food insecurity.
Introduction

The Djibanar valley is located in the River Casamance Basin of Western Senegal. The Djibanar valley belongs to the administrative region of Kolda in the south of Senegal, which is the smallest administration division in Senegal. Seven villages share the basin slope and their populations range from 250 to 2000 inhabitants. The main productive activities in the region are related to agriculture.

Local production systems used to consist of women harvesting rice twice each year in the valley and men growing millet, groundnuts and maize in the plateau areas. The combination of rice cultivation and millet, groundnuts and maize used to satisfy local food needs, but rain deficits and increased salinity have decreased food security thereby forcing the local population to search for alternative strategies to produce enough food.

For several decades the valley regions have experienced land degradation. The salinity of valley lands has reached the highest level to date. The elevation of rivers in the Djibanar valley is approximately sea level. Therefore cyclical phenomena of drought, rain deficits and high evaporation rates caused river levels to drop, which then allowed sea water to surge inland and leave salty deposits in low-lying rice growing areas. Salt sediments have degraded valley lands and made the cultivation of traditional rice crops almost impossible.

The valley lands needed protection from salinisation and rice production needed restoration. Some development organisations tried to mobilise the local population to build anti-salt dams in the valley, but since they lacked sufficient resources the projects did not always succeed. The failure of past projects created a sense of great disappointment among the local population. Therefore, the project “Participatory Technology Development in the Djibanar valley of Senegal” began because members of the local population wanted to remobilise their community to collaborate with development groups and rehabilitate the valley lands. Local
leaders in the Djibanar valley requested help from the West Africa Rural Foundation (WARF), which then initiated a collaborative effort to rehabilitate degraded rural land and implement improved natural resource management practices.

This chapter outlines the participatory communication methods and strategies used to facilitate the remobilisation of the local population and develop partnerships with external institutions to overcome land degradation in the Djibanar valley. The project successfully led to the rehabilitation of two hundred acres of degraded land, which was then equitably distributed among the farmers who participated in the project. Researchers learned the value of collaborating with multiple development organisations and the private industry to implement participatory methods and develop a resource management plan for communities suffering from severe land degradation and food insecurity.
Research Methods

The Djibanar valley project illustrates WARF's general approach. WARF, based in Dakar, Senegal, is an African-staffed Foundation that provides grants and technical support to grassroots organizations in five countries: Senegal, Gambia, Guinea Bissau, and Mali. WARF aims to mitigate the negative impact of cutbacks in state services to rural regions by improving the technical and administrative capabilities of local organizations as well as working with the local population to design remedial projects. WARF's mission consists of supporting rural populations to become self-sufficient. WARF also strives to empower a local population by establishing participatory frameworks that allow experimentation with innovative solutions to overcome various crises.

WARF asserts that research and development programs in rural Africa often fail because the researchers and technical staff who intervene continue to hold the decision-making power. Researchers and development workers often do not foster mutual dialogue with peasants; instead they view peasants as passive recipients of the 'innovations' they bring. The consequence has been poor adoption rates of the methods and technology that development organizations bring to rural communities. Therefore researchers and technicians require training in participatory technology development methods. The fundamental principle of participatory technology development is that development workers and the local population share the decision-making power about which technologies to implement in the community.

The participatory technology development research process includes the following elements. Researchers must negotiate the conditions of collaboration between the research team and the local population from the outset of the project. Researchers must listen to peasant farmers to understand the constraints they face in agricultural production as well as identify potential solutions. Assessment of constraints in agricultural production must be
participatory; researchers and farmers must collaborate as equal partners in the assessment. Finally, the local population and researchers must collaborate in the implementation of the solutions, follow-up and evaluation of the results.

**Implementation of Project**

The following paragraphs provide detail about the implementation of the participatory assessment of the Djibanar valley, the organisation and mobilisation of the local population to implement technical solutions in order to overcome the problem of salinisation as well as ensure that local farmer organisations were able to sustain a land management approach, and the efforts to develop partnerships with development groups working in the region on similar issues of land degradation.

**Participatory Assessment**

A multi-disciplinary team of researchers, from university and research institutes and of various nationalities, completed a training session on participatory assessment methodology before initiating the Djibanar valley project. WARF's main focus consists of building the capacity of local organizations to negotiate with other development groups and government departments so that they can achieve project development goals, such as rehabilitating degraded land. The participatory assessment method required that researchers and farmers work together in a village for several days to collectively assess the problems and constraints associated with agricultural production. Participatory methods forced researchers and farmers to confront each other's perspective and most importantly the researcher's perspective was not privileged in the assessment.

Researchers triangulated the preliminary assessment information to ensure its validity using the following methods. Researchers observed the physical environment by conducting village transect walks, assessed the social environment through an analysis of health, and
identified the local needs as well as their prioritization. The preliminary assessment enabled researchers and the local population to develop an action plan that could overcome the problems they identified. Following the preliminary assessment the team concluded that the Djibanar valley needed a land management approach that would encompass the technical aspects of land rehabilitation as well as water conservation and local farmer organizations required support to sustain an ongoing natural resource management program. Therefore the next step was to remobilise and organise the local population.

**Grassroots Participation**

The participatory assessment concluded with an intervillage workshop and each village from the Djibanar valley had representation at the workshop. One of the most important conclusions from this meeting was the need to create an institution that would connect the various local organisations in the valley with development organizations already working in the region. Following the workshop a series of informal or formal meetings occurred between the various stakeholders, such as the traditional chiefs, leaders of farmer’s organisations and state administrative authorities. A leader from a farmer’s organisation facilitated the meeting and since the different stakeholders rarely had an opportunity to discuss development programs in the valley, it proved useful. The village workshops facilitated interaction between various organisations working in the Djibanar valley region and helped strengthen the local organisation’s ability to protect and enhance the natural resource base, adopt appropriate technological solutions to overcome land degradation and improve agricultural productivity and food security.

The intervillage workshop as well as the formal and informal meetings led to the creation of the Community Based Committee of Dialogue between Producers in Balantacounda (CBCP). At a general assembly meeting of the CBCP, which included about 10 organizational groups,
each group elected an executive bureau to define action plans to restore degraded land and improve natural resource management practices in the Djibanar valley. WARF and CBCP then collaborated to initiate a project to rehabilitate degraded land in the valley. The formation of the CBCP fulfilled a critical component of WARF’s participatory approach in this project. WARF asserts that the local population must receive the technical, financial and administrative support that they need in order to sustain action after the project finishes. In other words, the local population must be able to continue to apply participatory methods in order to resolve problems related to land degradation in the Djibanar valley that are influencing decreased agricultural productivity and a lack of food security.

WARF and CBCP designed the project according to the following principles. They agreed that the valley lands needed rehabilitation and they sought to accomplish this by improving local knowledge about natural resource management. CBCP and WARF were both committed to a progressive approach, which meant the farmer’s organisations would direct the project. The Mandingo principle “doman doman”, which translates into “little by little”, served as a reference for research action during the project. Therefore the representatives in both groups agreed to start with small initiatives and proceed slowly in order to ensure that they overcame obstacles, involved all stakeholders in the process, maintained flexibility to alter the approach as needed, and attained the project’s objectives. Moreover, after each phase of the project researchers and the local population gathered to collectively evaluate their efforts; the goal was to assess their methods, identify constraints, failures or successes and adjust their methods accordingly.

CBCP members and researchers from WARF went to each village to facilitate grassroots participation in the project; they explained the objectives of the rehabilitation project and invited villagers to participate. Researchers then created nine village committees (VC) to
mobilise and facilitate community participation in the project's land rehabilitation activities.

Only one village did not establish a village committee because two ethnic groups had pre-existing conflicts and refused to work together. The project team plans to hold a workshop in order to define the roles and responsibilities of each village committee. In addition, the meetings between members of the nine village committees will allow different villagers to reach an agreement about the scope of the problems related to land degradation in the Djibanar valley, the constraints they face, and the action required to rehabilitate the valley land. Grassroots involvement in the project allows people to share their ideas and perceptions about the constraints influencing agricultural production in the entire valley. Researchers noted the importance of bringing together WARF researchers, farmer's organisations, such as the CBCP, and the grassroots population to pinpoint the commonalities between different villages as well as understand the differences that exist in order to implement an appropriate land rehabilitation project.

**Development Organizations**

Prior to WARF's intervention in the Djibanar valley, the local population encountered other development research and extension organisations. Although, many past organisations failed due to their interventionist methods, which constituted a 'top-down' imposition of community development. WARF recognized the problems associated with 'top-down' methods of development and therefore implemented participatory research methods, which fostered equitable research partnerships in order to empower the local population to define problems related to land degradation, potential solutions, and the skills to initiate action to rehabilitate land.

WARF emphasized that the representatives of research institutions must listen to farmers for successful collaboration. "Listening" meant that researchers and extension officers
recognised the limits of their scientific background and learned more about the value of indigenous knowledge. The concept of “listening” also meant that researchers lived in the same conditions as peasants during their stay, the interview time schedules remained flexible to ensure that they did not interfere with people’s daily obligations and researchers respected the local customs, practices and agricultural techniques. Effective collaboration meant that the local population felt as though they owned the project and therefore shared responsibility for its success or failure. The following two paragraphs provide detail about the methods WARF utilised to foster an equal research partnership between farmers and researchers. The rehabilitation of the deteriorated lands required certain types of interventions, such as building small dams and testing rice cultivation on the recovered lands. Local organisations needed resource people, such as hydrologists and agronomists from both the private and public sector, to help identify the factors influencing land degradation in the valley and to provide technical support. The role of WARF was twofold; first, they provided the financial resources needed for the commitment of skilled people who would provide technical assistance and second, they supported the process to monitor the quality of technical services. CBCP leaders hired a local hydrologist from the private sector to build anti-salt dams and also negotiated with the Senegalese Institute of Research in Agriculture (SIAR) officials in order to determine the level of support they would provide for the rice variety experiments.

WARF then organised workshops to facilitate collaboration between farmer organisations and development organisations in order to design and build the anti-salt dams as well as establish the research parameters for the rice cultivation experimental plots. The farmer’s knowledge, the rigor of participatory research methodology and the technical expertise of the local hydrologist were all important to address land degradation in the valley. During the
workshops farmers shared information about their methods of rice cultivation in the low-lying areas of the valley susceptible to salinisation. Researchers and farmers then formulated objectives related to improved rice cultivation and determined which experimental methods to apply to achieve the objectives, such as which crop varieties to select, how to conduct tests and who would conduct them. Farmers and researchers also planned the monitoring and evaluation components of the research process, which comprised workshops where farmers could express their opinions about the appropriateness of the methods selected to address salinisation in the Djibanar valley.

Results

Construction and Repair of Dams

The nine village committees provided free labour and local materials, such as gravel, sand and water, to repair four pre-existing dams, which had deteriorated due to lack of maintenance, and build two new anti-salt dams. Each dam stood over a sub basin, which was shared by various villages. The various production activities, such as plateau, sediment, and shallow rice growing, fruit arboriculture, gardening and animal breeding, demonstrated the heterogeneity of land use as well as the different water needs of farmers. Therefore the functioning of the dams had to be coordinated with the varying land and water requirements for divergent production activities in the Djibanar valley. The reconstruction of the four dams and the construction of another two dams in the valley contributed to the recovery of two hundred hectares of salinised land.

Management of Local Water Resources

The local hydrologist who was hired to do the technical work proposed a water management model. Members of the nine village committees gathered at a workshop in order to study the management model and make modifications to the model if necessary. They decided to test
the water management model the hydrologist proposed for a period of time and then meet again to discuss its effectiveness. The workshop to discuss the proposed water management model stimulated dialogue among farmers and enhanced their perspective of resource management beyond their village to include other villages in the Djibanar valley.

**Reallocation of Rehabilitated Lands**

Nine villages in the Djibanar valley collaborated during the project even though some villages were more negatively impacted by degraded land. To prevent potential conflicts regarding the reallocation of rehabilitated land the village Chiefs, former landowners and government authorities implemented a consensus decision making approach, which resulted in a decision to lift the former owner’s rights and allow a commission to reallocate the lands equitably between all the people who contributed to the rehabilitation project.

**Rice Cultivation Experiments**

Building new dams and fixing pre-existing dams resulted in the rehabilitation of land, improved farmer’s technical skills to protect and regenerate land in the valley and reduced the risk of food insecurity. With the support the Senegalese Institute of Agricultural Research (SIAR) researchers, farmers in the Djibanar valley then tested ten varieties of rice in the different ecological settings of the valley to determine the best yields on the rehabilitated land. Farmers selected three of the ten varieties that had the highest production yields.

**Lessons Learned**

The research project team demonstrated the importance of facilitating collaboration between the project’s researchers, the technical experts, the local population and the development organisations working in the region. The involvement of the local population helped save money for labour and material costs as well as the costs involved with conducting rice variety tests because farmers gave researchers access to their land and assisted with the
experiments. The nine village committees provided the forum to generate dialogue among farmers about natural resource management problems throughout the entire valley. Village committee meetings also promoted the visibility of CBCP and fostered mutual trust between local organisations. However, researchers also learned that establishing a forum for dialogue between different local organisations was not simple because farmers from different villages in the valley had different problems and needs, which could raise conflicts of interest. Therefore researchers determined that they must try to balance the priorities in a specific village or of specific farmers with the different priorities that influence natural resource management of the entire Djibanar valley.

The project demonstrated that relationships with the private industry were simpler than with SIAR researchers. Researchers and farmers provided private consultants precise direction and then paid for their technical expertise and services. In contrast, SIAR provided input into the objectives farmers and researchers determined, which meant that they had to negotiate with SIAR to justify their methods. For example, CBCP leaders expected researchers to test methods of rehabilitating degraded land only in the context of the Djibanar valley, but SIAR proposed solutions that could extend to other valleys. Collaborating with SIAR meant that researchers and farmers needed to reconcile diverging ideas about the project’s objectives to ensure the project progresses.

**Conclusion**

The project to rehabilitate degraded land in the Djibanar valley demonstrated that participatory communication methods can foster collaboration between researchers, technical experts, the local population and the development organisations working in a region. Strengthening the organisational and technical skills of local organisations can mobilise local populations to address problems of land degradation. Research and development projects in
rural areas must facilitate and mediate the local population's participation in the design, implementation and evaluation of the project. Finally, the local population must be able to continue applying participatory methods of resolving problems related to land degradation in their communities after the development project concludes.
PARTICIPATORY COMMUNICATION FOR IMPROVING CROP-LIVESTOCK PRODUCTION IN SENEGAL AND GAMBIA

S. Fall, Senegalese Institute of Agricultural Research, Dakar, Senegal
O. Smith, International Development Research Centre, Ottawa, Canada
O. Akinbamijo, International Trypanotolerance Centre, Banjul, Gambia
AUTHORS:

S. Fall
Senegalese Institute of Agricultural Research (SIAR)

Mailing address:
BP 2057 Dakar, Senegal
Email: dgisra@isra.sn

O. Smith
International Development Research Centre

Mailing address:
P.O. Box 8500 Ottawa, Ontario Canada K1G 3H9
Email: info@idrc.ca

O. Akinbarnijo
International Trypanotolerance Centre

Mailing Address:
P. M. B. 14, Banjul, Gambia
Email: enquiries@drylandresearch.org.uk

FUNDING AGENCY: International Development and Research Centre.
Program: City Feeding People, Ottawa. Canada

Mailing address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada
Tel: 1-613-236-6163

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Abstract

Senegal's population does not have adequate access to food. Meat and milk need to be imported because current levels of agricultural and livestock productivity cannot meet the population's basic food requirements. A lack of adequate animal feed constitutes one of the main reasons for poor livestock productivity. Therefore the Senegalese Institute of Agricultural Research (SIAR) and the International Trypanotolerance Center (ITC), with the financial support of the International Development Research Centre (IDRC), have been working in laboratories and on local farms to enhance scientific knowledge about improved agricultural and livestock methods of production.

Researchers from SIAR and ITC conducted two projects in three regions of Senegal within the nutrition research program of SIAR. The regions included the Niayes zone on the Atlantic coast, the Groundnut Basin located in the central region of Senegal, and the Senegalese River Valley close to the northern border of Mauritania. The objective of the first project was to integrate livestock feed with cereal crop production in order to improve meat production in the areas of Bambey, Dakar and Saint-Louis. The second project aimed to improve agricultural production by integrating horticultural and livestock production in and around the cities of Senegal and Gambia. This chapter presents the communication strategies the research project team used to disseminate the project's results.

The two projects allowed researchers to identify animal feed that improved beef production and then they trained selected farmers to disseminate the results to other farmers. The communication strategies to disseminate the project's results consisted of radio broadcasts, television documentaries, an international workshop and publication of the research results for both farmers and scientists.
Introduction

Various factors affect livestock productivity in Senegal, which is the most western sub-Saharan African country. A review of current literature reveals the diverse potential of certain methods of agricultural production, like milk and meat production in tropical areas that researchers have developed to improve food security for the population. Animal nutrition has been a priority of past development projects with the objective to evaluate the quality and biomass of animal feed in laboratories. Additionally, animal feeding techniques and methods have been tested on farms in sub-Saharan Africa. However, the effectiveness of past development projects has been questioned because of a changing socio-economic environment marked by drought and economic crises and the fact that African farmers most often have not had input into development projects within their communities (Fall and De Zeeuw 2001).

In addition, a lack of appropriate technology and an absence of effective strategies to communicate successful methods of improving crop and livestock productivity to other farmers contributed to poor crop and livestock productivity in semi-arid regions of Africa. Research results are easily accessible to scientists but their rate of transfer and adoption into rural communities remains low despite research extension programmes currently operating in West Africa.

To address this problem the Senegalese Institute of Agricultural Research (SIAR) and the International Trypanotolerance Center (ITC), with financial support from the International Development Research Centre (IDRC), have been working in the laboratory as well as with farmers directly in order to improve the dissemination of information about animal feed as well as methods of crop and livestock integration. Initially, participatory communication was not a component of the research design, but a review of past research activities revealed the
need for farmer participation in all levels of the research process, and hence the need for participatory communication. During the development stage of the project researchers also understood the need to involve farmers in order to improve the dissemination of information about appropriate animal feed as well as crop and livestock integration. Therefore researchers implemented participatory communication strategies at each stage of the research process because the success of the research and development objectives depended on the participation of the local population.

**Research Objectives**

The overall objective of the project was to develop animal feed that could help farmers improve meat production in different regions of Senegal and Gambia. This chapter provides detail about the two projects in order to illustrate the effectiveness of the communication strategies the research team implemented. The project occurred in Gambia and the following regions of Senegal: The Niayes zone, the Groundnut Basin, the central part of Senegal and the Senegalese River Valley.

The objective of the first project consisted of developing livestock feed that would integrate livestock and cereal crops in order to improve meat production in the Bambey, Dakar and Saint-Louis regions. Researchers produced animal feed from crop by-products and livestock manure to achieve this objective. The objective of the second project was to improve agricultural production in and around the cities of Senegal and Gambia through an integration of horticultural and livestock production. To achieve the second objective researchers suggested applying recycled crop by-products from animal feed and manure to farmer's land.

The purpose of this chapter is 1) to provide information about the on-station and on-farm experiments as well as the research results; 2) to evaluate the communication strategies used to improve the transfer of the agricultural technology and facilitate its adoption by the
local population. The researchers developed communication strategies that allowed them to collaborate with the local population in order to determine appropriate methods for improving meat production. The communication strategy then entailed sharing the research findings with the remainder of the local population. The researchers implemented the following activities in order to reach those objectives: first, they conducted a preliminary survey of the potential sites; then they set up experiments at research stations and on farm sites; lastly, they monitored and evaluated the experiments and disseminated the research results to the people who could benefit from information about ways to improve animal feed on the one hand and ways to integrate crop and livestock on the other hand.

Research Methods

The following paragraphs describe the methods used to examine the potential experimental sites, select the pilot farms for on-site experiments and experiment with animal feed.

Identification of Potential Sites

The researchers began by surveying various regions in order to determine the agricultural production methods used by the local population. They identified the positive aspects and drawbacks of current agricultural methods as well as the optimal feed required for the animals. They inquired about farmer's production priorities, whether it was milk, meat or both. They also analyzed the farmer's knowledge about livestock and feeding techniques as well as their recommendations for the project's objectives. The multidisciplinary project team consisted of agronomists, animal scientists, sociologists, soil and environmental scientists who conducted surveys with approximately 500 farmers in the three study sites. The project team used rapid rural appraisal methods for the surveys: multiple site visits to interview members of the local population such as farmers, both men and women, government agents, and young people. The research team consulted with various local
assemblies and social groups, such as women and young people, in order to obtain information about the region, the size of farms, the crop and livestock production methods, the crop types, the livestock products, the systems of ownership, the potential and drawbacks of the current agricultural production system.

**Pilot Farm Selection**

The research team identified potential farm sites to study in collaboration with the local population. The researchers visited the regions many times and held discussions with members of the local population in order to reach a consensus about the potential experimental farm sites. They presented their research objectives and methods at a general training session for the farmers. The training session was aimed at building a trusting relationship between the researchers and the farmers in order to promote collaboration between the two groups and ensure that the farmers had input into the selection of the pilot farms.

**Animal Feed Experiments**

The following paragraphs describe the methods used to experiment with animal feed technology both in the SIAR laboratories and on pilot farm sites. The research team conducted a series of experiments at the SIAR experimental station, Sangalcam, in order to test various forms of animal feed rations in terms of their safety and effectiveness. The rations consisted of locally available feed resources including *Leucaena leucocephala* tree leaves, cereal straw, rice, millet bran, molasses, cotton seeds as well as mineral supplements. The researchers conducted on-station experiments at the SIAR laboratories to test the effectiveness of different ration types. In the case of the *Leucaena leucocephala* tree leaves, the researchers had to experiment with various compositions in order to establish an
optimal feed level for cattle and sheep since an arbitrary inclusion of the leaves can lead to
toxicity in animals, caused by mimosine, a chemical substance that may be lethal.

The research team also conducted studies on farm sites in order to compare the research
results with the station controlled findings. They made minimal changes to the research
methods in order to reduce the number of measurements. For example, they monitored the
live weight changes monthly instead of weekly in order to adapt to the lack of research
facilities. They also conducted twenty feed trials on-site to test the various ration types,
consisting of cereal straw, tree forage and local agro-industrial by-products.

The research team developed several methods of ruminant feed preparation in order to
improve meat production and foster environmental protection around cities. The first
experiment focused on feed rations for cattle and sheep. The feed rations consisted of cereal
straw and were tested daily. The second experiment focused on feed consisting of a wider
mix of agro-industrial by-products such as groundnut cake, molasses, rice, millet bran, Acacia
leaves and fruit, Leucaena leaves as well as horticultural residues from green beans and
tomato crops. The researchers measured the animals' feed intake, their rate of growth and
general health as well as the animals' ability to digest the rations (Fali et al. 1997).

**Results**

**Experiment Results**

The results showed that the intake varied between 89.5 and 116 grams per kilogram of
metabolic body weight and the ingestion of the cereal straw-based diet was lower than the
mixed feed. The researchers analysed the rations consisting of Leucaena leucocephala
leaves very carefully in order to demonstrate to the farmers that they could help them
improve their livestock productivity: if they applied strict dietary restrictions, they could
improve the live body weight of the animals while preventing their exposure to mimosine. The
Researchers determined during the experiments that the optimal levels of *Leucaena* leaves in sheep and cattle rations were in the order of 30 and 50 per cent respectively. The researchers conducted twenty trials and each trial was completed with an economic analysis in order to demonstrate its profitability. They recorded an increase in body weight as well as high survival rates in the animals. They also performed a cost/benefit analysis, which demonstrated the effectiveness of the tested rations. Overall, the experiments demonstrated that the rations were not poisonous, that they had a positive effect on animal growth and finally they were ingested quite well by sheep and cattle (Fall et al. 1997; Fall et al. 2000). The experiment demonstrated the value of daily rations based on local resources available to farmers.

The researchers and the farmers learned to calibrate the rations for animal feed through a careful analysis of the diseases that the animals developed during the experiments. Stress constituted a major cause of mortality at the beginning of the experiments. The animals also suffered from digestive disorders due to rumen acidity. The researchers and farmers overcame those problems by including hydroxyquinoleine and straw in the rations in order to improve their digestibility.

Storage and management of organic matter constituted an additional concern for the farmers. The researchers measured the total faecal output at two farms, Keur Seck and Sebikotane, in order to determine the value of composting. In Sebikotane the output was 12.5 tons over 100 days from 12 cattle confined to a stable. The farmers spread the organic matter on the soil in order to improve the horticultural productivity of the land. They composted part of it before they spread it on the soil. The results proved that composting improved soil quality and horticultural production in Sebikotane. In Keur Seck, on the other hand, the total faecal output was 6.5 tons, under the same conditions. The farmers stored the faecal matter outside during
the dry season. At the beginning of the wet season they spread the faecal matter on their fields. The researchers determined that composting in Keur Seck improved the productivity of approximately 2 hectares of soil and that the millet yield increased by 75 percent.

**Monitoring and Evaluation**

The technicians, the researchers and the farmers used participatory communication methods in order to monitor the experiments. Weekly meetings constituted the participatory forum where technicians, farmers and researchers collectively analysed the research results in order to determine the impact of the rations on livestock productivity in specific regions. The weekly meetings allowed the researchers and the local populations to exchange information about the lessons learned from the experiments at the SIAR experimental station as well as on the pilot farm sites. The visits to the pilot farm sites allowed the research team to evaluate the strengths and weaknesses of the experiments. The visits involved farmer's organisations and were conducted as open air laboratories, which meant that the field classes introduced 'novel' technologies to potential end users as well as to field technicians.

**Dissemination of Results**

The research team developed a number of communication strategies in order to disseminate the results from the on-station and on-site experiments to the local farmers. The communication strategies included radio broadcasts, TV documentaries, an international workshop, focus groups as well as published reports. *Dissoo*, which means communication in the local language, was the name of a weekly radio program that broadcast the project's findings to the rural population. The radio program provided information to farmers about how to use crop residues and agro-industrial by-products for ruminant feed. The radio programme, *Dissoo*, proved to be a successful communication strategy because farmers liked the medium. Moreover, the operational costs
were quite low as most households owned a radio. The research team also collaborated with the farmers in order to produce four video documentaries, which could be viewed on national television, in order to disseminate information about the project results. The documentaries covered four topics: a method of animal feed based on cereal straw for cattle production in the three target regions; a discussion of the advantages of organic matter inputs for agricultural productivity; the advantages of tree cropping for urban farmers; and the importance of crossbred cattle for peri-urban dairy farming.

The researchers learned that the farming communities in urban and peri-urban areas appreciated the documentaries. The rural populations, on the other hand, had only limited access to the documentaries because of the poor reception of television signals in the countryside. Since a large proportion of the stakeholders were small-scale farmers with less than ten cattle, annual incomes of around two thousand U.S. dollars and very low literacy rates, the researchers designed their communication strategies accordingly. They initiated face to face meetings in the local language, for example, in order to foster the farmers’ participation in the project. The research team also organised two international workshops in order to evaluate the project’s results with researchers from 12 countries. The proceedings of the workshops were published in the SIAR Proceedings Series. The workshops gathered between 20 and 55 scientists from African countries in order to discuss the research results, which were published as books which were distributed worldwide and were also available on the internet (Fall and Faye 1999; Fall and Fall 2001; Akinbamijo, Fall et al. 2002). The participation of scientists from various African countries helped to disseminate the research results throughout Africa and allowed research teams from different geographic locations to collaborate on similar research topics.
The research team also organised focus groups, which assembled people from the regions and enabled them to identify and prioritise their problems as well as the potential solutions. The focus groups also allowed the participants to voice their disagreements as well as to discuss the impact of the project. The researchers organized larger meetings once or twice a year in order to present the project’s results to the entire community in a region. They invited the local authorities to attend the larger meetings. The presence of a wide spectrum of the population, including farmers and politicians, enabled the researchers to brainstorm about the project with different actors in a region and then make the necessary adjustments. Finally, the larger group meetings provided an opportunity to sensitise politicians, government officials and local authorities about the importance of the project in order to improve animal feed and agricultural productivity in Senegal and Gambia.

The research team utilised various tools to disseminate information among farmers and widen the scope of the project to other regions. Individual interviews facilitated direct exchanges between farmers and technicians. The researchers also conducted interviews to engage the people, such as women and young people, who might feel intimidated in a group setting. Moreover, in some villages women do not speak to men who are not part of their family. Consequently women researchers interviewed them separately from the men.

Researchers developed several written tools in order to disseminate the project’s results. They compiled technical sheets, which presented the research results in a simple format. The technical sheets were useful to farmers as they provided a description of the technologies to be applied by farmers in order to improve their agricultural productivity. The researchers also wrote articles and book chapters for scientific publications (Fall et al. 1997; Fall et al. 1998). The research team combined written text and audio-visual materials in order to compile a complete set of tools in order to foster effective communications with the farmers.
Researchers learned that they must select appropriate communication tools according to the groups who participate in a given research project. Focus groups, farmer's meetings, technical sheets and radio materials proved to be the most useful tools in order to disseminate information about the project's results to rural farmers. Experts in government departments as well as the urban populations preferred audiovisual materials, while scientists preferred scientific publications and workshops. The choice of communication tools and strategies depended not only on the research objectives but also on the participants. Therefore the researchers must adopt multiple participatory communication strategies in order to ensure success of the project.

**Discussion of Results**

This section emphasizes the importance of gathering preliminary data and identifying community needs in order to carry out a successful participatory communication research project. It also emphasizes the importance of participatory communication for development research in general.

**Key Factors in Participatory Communication**

The first stage of the research process entailed gathering information about the physical and socio-economic aspects of the agricultural production system through a preliminary survey. The preliminary survey provided the research team with specific information about the methods used for livestock production in the target areas, namely the Niayes zone, the Groundnut Basin and the Senegalese River Valley. The researchers also studied the soil and vegetation types in each region as well as the rainfall patterns. In addition, they collected data about the number of sheep, cattle and goats per household as well as the demography of the local population involved in livestock and horticultural production. Appraisal methods and tools were also used in order to evaluate the potential agricultural methods specific to the
region, the different types of weather patterns throughout the year as well as the general problems the local population faced. The researchers analysed the constraints as well as the potentials of the existing production methods and they made recommendations about how to improve livestock productivity by overcoming high mortality rates, increasing the animals’ weight and improving milk production.

The preliminary data collection confirmed that each of the regions where the experiments were carried out had a high population density. For example, there are approximately 140 inhabitants per square kilometre in Bambey and 1000 in Dakar (Fall and Faye 1999; Fall and Fall 2001). In addition, the information gathering phase of the project confirmed that eighty percent of the livestock farmers operated small-scale farms and that most of them had less than 1 hectare of land. In light of those facts, there seems to be an urgent need to produce food for large urban populations. The researchers employed participatory methods in order to reach a consensus with the farmers about the constraints they faced in agricultural and livestock production. Farmers and researchers ranked each constraint and then prepared a list of potential technologies that could overcome the constraints.

Importance of Participatory Communication

Participatory communication has become a priority for most development projects as researchers have demonstrated the necessity of involving the local population in any research endeavour. Farmers must be involved from the beginning of the research process in order to foster participatory development and successfully transfer appropriate technology for improving agricultural and livestock productivity. In this particular project, the research team demonstrated how to involve the local populations from the beginning of the research process; local farmers and researchers collaborated to analyse the problems in the communities and design appropriate solutions. The research project also illustrated the
importance of participatory communication strategies and appropriate forums, such as meetings and radio broadcasts, which provide an outlet for people's participation. Participatory communication allowed the farmers to learn about scientific methods in order to improve agricultural productivity whereas the researchers learned to appreciate the value of indigenous knowledge about agricultural production. Participation in needs assessment as well as research planning fostered a greater commitment to the project and ultimately a greater acceptance of the technology selected or method chosen. The project clearly demonstrated that participatory communication is an essential component of any development research project.

**Conclusion**

The research team successfully provided a framework for participatory communication in order to improve agricultural productivity in Senegal and Gambia, although there is still room for improvement. Development research initiatives need political support if they are to be successful and it is particularly important to gain the support of the local authorities in the region where the projects are undertaken. Finally, researchers need to establish permanent networks, which allow the local population to identify the main problems related to crop and livestock productivity and implement the appropriate solutions even after the development project finishes.
References


ADDRESSING DESERTIFICATION IN CHAD AND BURKINA FASO THROUGH PARTICIPATORY COMMUNICATION

Yacouba Konate
The Permanent Interstate Committee for Drought Control in the Sahel (CILSS)
Ouagadougou, Burkina Faso
AUTHOR:

Yacouba Konate
The Permanent Interstate Committee for Drought Control in the Sahel (CILSS)

Mailing address:
03 BP 7049
Ouagadougou Burkina Faso
Email Address: cilss@fasonet.bf

FUNDING AGENCY:
International Development Centre under the People, Land and Water Program (PLaW)

Mailing address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada
Tel: 1-613-236-6163

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Abstract
The Permanent Inter-State Committee on Drought Control in the Sahel (CILSS) is a regional intergovernmental organization composed of nine member countries, including Burkina Faso, Gambia, Cape Verde, Guinea Bissau, Mali, Mauritania, Niger, Senegal and Chad. The mandate of CILSS consists of seeking food security, improving natural resource management and controlling the effects of drought and desertification in the Sahel. The CILSS and the International Development Research Centre (IDRC) initiated a participatory research project in Chad in February 2000 and Burkina Faso in January 2001 for a period of 10 months. The main objective was to design and implement participatory communication strategies that supported local efforts to combat desertification. Therefore the research team determined the methods required in order to support local anti-desertification initiatives in Chad and Burkina Faso and then they implemented appropriate communication strategies in order to address problems of desertification. They also evaluated and monitored the strategies they selected and implemented in collaboration with the local population. Finally, they developed the participatory communication capabilities of other development groups working to combat desertification in each country and shared their research results with the agencies that implement the United Nations Convention to Combat Desertification in Sahelian countries.

The project was successful in the selected regions of Chad and Burkina Faso when the local population was able to participate in the design, selection, implementation and evaluation of the strategies to overcome their natural resource management problems.
Introduction

The Permanent Inter-State Committee on Drought Control in the Sahel (CILSS) is a regional intergovernmental organization composed of nine member countries, including Burkina Faso, Gambia, Cape Verde, Guinea Bissau, Mali, Mauritania, Niger, Senegal and Chad. The Sahel stretches in a band across Africa, north of the equator, from Senegal in the west to Somalia in the east. The CILSS countries cover an area of 5.5 million square kilometres in the western part of this band. During the past twenty years, these countries’ populations, approximately 40 million people, have suffered immensely from the effects of recurrent drought and progressive desertification. CILSS policy on drought and desertification has undergone significant changes since its formation in 1973. Initially, it organized and coordinated food aid, but then shifted its focus in 1976 in order to mobilize resources to implement programs at the national or regional levels that promoted socio-economic development in the following sectors: farming, livestock production, village water supply and forestry. In the mid 1980s CILSS recognized desertification as a significant problem influencing land degradation, food insecurity and human suffering in the Sahelian region and therefore organized action at the regional level to combat desertification.

The current mandate of CILSS consists of seeking food security, improving natural resource management and controlling the effects of drought and desertification in the Sahel. CILSS studies the climactic, environmental and demographic factors that influence sustainable development and economic growth in Sahelian countries. CILSS aims to develop and test participatory research approaches that help communities in the fight against desertification. In general their strategy includes: a global approach to the problems of desertification; voluntary support from local grassroots organizations; the integration of desertification control with land use planning; restructuring national institutions in order to support local initiatives to
combat desertification; ecological rehabilitation of degraded land; improving land tenure and credit opportunities for the local population, ensuring women’s participation; and creating forums to facilitate the exchange of information between rural farmers.

The CILSS and the International Development Research Centre (IDRC) decided to test a communication strategy that permitted the local population’s participation in efforts to control desertification. The project was called “Participatory Communication to Combat Desertification in the Sahel”. The project team set out to address the failures of past development projects that merely emphasized the dissemination of research results to a local population rather than soliciting their participation in the design, implementation and evaluation of an anti-desertification initiative.

Researchers initiated the project in Chad in February 2000 and Burkina Faso in January 2001 and the duration of each project was ten months. The main objective was to design and implement participatory communication strategies that supported local efforts to combat desertification. Therefore the research team determined the methods required in order to support local anti-desertification initiatives in Chad and Burkina Faso and then they implemented appropriate communication strategies in order to address problems of desertification. They also evaluated and monitored the strategies they selected and implemented in collaboration with the local population. Finally, they developed the participatory communication capabilities of other development groups working to combat desertification in each country and shared their research results with the agencies that implement the United Nations Convention to Combat Desertification in Sahelian countries.

Research Methods

The research team initiated the project by selecting local organizations within certain regions of Chad and Burkina Faso to support their on-going anti-desertification efforts and then
developing relationships with members of the groups. Then the research team facilitated training about participatory communication methods for the local groups they collaborated with. The research team and the local population organized meetings and planned effective communication strategies to combat desertification. Then the research team and members of the local population implemented the strategies and searched for other organizations to collaborate with, such as government departments or other grassroots organizations. The final step consisted of monitoring and evaluating the success of the project. The following section details the implementation of the site selections, the training session, the participatory communication strategies used, the meetings with the local population, the efforts to collaborate with other groups working to resolve problems related to desertification, monitoring and evaluation of the project, and the roundtable meeting to discuss the project's results.

**Site Selection**

The research team surveyed regions in Chad and Burkina Faso in order to determine which local organizations to support. The research team utilized the following criteria to evaluate the regions. They determined the accessibility of the site, if the region had development projects related to anti-desertification, the economic potential of the region, the system of agricultural and forestry production, the willingness of the local population and other organizations to contribute to the anti-desertification project and whether the natural resources in the region were degraded.

Researchers collected this data by conducting a literature review and holding discussions with the local population as well as the technical staff of development organizations working in the regions. The research team wanted to understand the social, economic and cultural conditions that influenced natural resource management practices in the region, learn about
the local methods of information exchange, identify local groups working on anti-desertification projects and the types of strategies they employed, and assess the level of land degradation in each region.

In Chad the research team selected the Doum-Doum region to address the problems associated with the degradation of their fertile valleys or streambeds that peasant used for small gardens; the Bol region to address women's need for irrigation; and the Darna region to focus on controlling deforestation and providing training for rural women about credit opportunities. The project team selected four regions in Burkina Faso to initiate the anti-desertification project. Each region required strategies to establish participatory management of the local natural resources: bushfire management in the Ouarkoye area; management of resources along the Mouhoun River in the Padema region; management of forest resources in the Toumousseni forest; and management of shared pasture resources in the Beli region.

The collection of preliminary data to select regions and local organizations to support their efforts to combat desertification prompted the research team to contemplate two questions: what strategies are most the effective to overcome problems related to desertification; and who should determine which strategies to implement, the grass-roots community, government officials or NGO workers? In addition, the importance of collaborating with local organizations that were attempting to overcome the problems associated with desertification was apparent to the research team. Although the question of how to foster collaboration between grassroots organizations and decision makers, such as government officials or development researchers, remained a challenge.

Training Sessions

After selecting the sites to study, the research team organized training sessions, which brought together the project's facilitators, representatives of the local population affected by
desertification and local authorities, in order to develop a communication strategy to deal with the problems of desertification. The objective of the training session was to establish the role of the project’s facilitators, allow the participants to exchange information about the problems related to desertification as well as propose potential solutions, foster a dialogue about other groups to collaborate with and sensitize the project team to the traditional methods of communication that the local population utilized.

**Participatory Communication Strategies**

The communication strategy emerged during the training session after the participants assessed the problems related to desertification. The distinctiveness of this project lies in the fact that the research team defined and planned communication strategies according to the local population’s needs, perspectives and traditional methods of communication. The research project team decided not to use the mass media, such as radio and television, to communicate with the local population. Instead they used the traditional methods of communication that the local populations utilized in the various villages because they were simple and inexpensive, but most importantly they facilitated the local population’s participation in the project. Moreover, it was a priority of the project team to ensure women’s participation in the project. For example, in the Bol region researchers attempted to convince the husbands that the women’s work on their plot was beneficial to the households. During the ten months the project team worked in Chad and Burkina Faso, the project team focused on the local population’s preferred methods of communication in order to develop an appropriate participatory communication strategy to combat desertification.

Therefore the research team decided to share information about desertification through the following methods of communication. They held discussions with traditional chiefs and village leaders as well as general meetings with the local population about desertification.
problems. In order to facilitate information exchange between the local authorities or
development technical experts and the local population, the research team organized group
meetings. They utilized storytelling, theatre, photographs, posters, demonstrations, and
videos during the group meetings to foster dialogue about desertification. In addition, in order
to demonstrate the appropriate methods to combat desertification the research team used
videos and organized visits to villages, which have successfully implemented anti-
desertification methods. Finally, the research team documented the planning and execution
of communication activities through checklists, reports, photographs and videos.
Since the research team only had ten months to implement the project in Chad and in
Burkina Faso, they contemplated whether the short time period would allow them to foster the
collaboration with as many groups as possible in the anti-desertification effort. The research
team did not resolve the following questions. Are the representatives of the local population
that participate in the project able to represent the concerns of the entire population of the
village or region? Does the research reflect the project researcher's views more than the
local population since the peasants may either lack training in anti-desertification activities or
they do not trust researchers enough to be completely honest during the meetings?

Local Meetings

The communication strategy devised during the training session involved the participation of
the rural population, government officials and other development partners. Initially the project
team contacted the village chiefs, the religious and traditional leaders, as well as the village
dignitaries in order to set out a detailed plan of action, seek input about the activities planned
and determine when it would be convenient to meet with members of the local population.
After these preliminary informal discussions the research team organized meetings that
included the village chief, religious and traditional leaders, village dignitaries, local
administrative authorities, NGOs and local farmer’s associations. The meetings established a forum to discuss the project’s objectives, the problems for each specific region and appropriate communication strategies to combat desertification. The objective of the meetings was two-fold. First, the research team wanted to develop a clear statement of the project’s objectives in collaboration with members of the local population. Second, the research team wanted to reach a consensus about an appropriate communication strategy that would foster the participation of various actors in the effort to combat desertification. Finally, the meetings also allowed for changes or modifications to the proposed communication strategy. Overall, the meetings fostered a commitment by all the participants to proceed with the implementation of the communication strategy.

Collaboration with Development Organizations

The research team discovered the range and complexity of the problems the local population faced in the various regions in Chad and Burkina Faso and they determined the need to partner with other development groups or government departments in order address the problems. For example, in the Kouloudia village of the Doum-Doum region in Chad, three months after the project work began, researchers learned about the villagers need for a well to supply drinking water as well as provide water for the seedlings the local farmers produced. Therefore the project researchers contacted the water utility department to initiate action to drill a well in this village. In the Toumoussénéni region the project team put representatives of lumbermen’s groups in contact with provincial rural credit institutions to meet their need for financing to acquire materials for their work. Finally, in the Padema region the project team developed a partnership with the Houet, Kossi and Mouhoun Integrated Rural Development Project (PDRI/HKM) and in the process supplied 6,000 seedlings to the Mouhoun Riverbank Management Committees.
Participatory Monitoring and Evaluation

The project team implemented three methods to monitor the project's results. First, researchers continuously monitored activities by comparing them to the original plan they developed at the training session and meetings with the community members to see if they were achieving their objectives. Second, the site coordinator monitored the project's progress monthly to determine if field workers required additional technical support and they wrote monthly reports about the project's progress. Finally, the research team conducted quarterly monitoring to check the progress of activities and provide any required technical support. The project team also established a steering committee, which consisted of representatives from the various organizations working to combat desertification in Chad and Burkina Faso.

Although continuous evaluation of the project's progress was a crucial element of the monitoring process, the research team also collaborated with the local population in a workshop at the mid-point and at the end of project's activities to evaluate its success. An outside consultant facilitated the workshop and also conducted research at the sites where the project occurred to determine the effectiveness of the strategies implemented.

Roundtable Meetings

The research team organized a round table conference to discuss the project's results. Representatives of CILSS member countries, the United Nations Convention to Combat Desertification coordination members, the project researchers, local NGOs and researchers from IDRC attended the roundtable meeting. After reviewing the project's results from regions in Burkina Faso and Chad, the round table participants noted that the project successfully increased awareness about desertification, allowed the research team to identify locally appropriate and inexpensive methods to communication information about
desertification, and overall the project contributed to local – and therefore national –
economic and social development.

Results

The following paragraphs outline the results of the project’s implementation in the Doum-
Doum, Bol and Darna regions of Chad as well as the Ouarkoye, Padema, Toumousseni and
Beli regions of Burkina Faso.

Chad

The participatory communication project to combat desertification successfully fostered the
participation of the local population in the Doum-Doum, Bol and Darna regions of Chad by
allowing them to define the problems related to natural resource management as well as
identify and implement locally appropriate solutions. For example, the peasants in the Doum-
Doum region increased their awareness about the degradation of the wadis, which are the
fertile valleys or streambeds where farmers keep small gardens and the polders, which is
wadis that has been artificially created by damming a small inlet of a lake. After discussing
the problems related to the degradation of the wadis and polders in the Doum-Doum region
the peasants took action to rehabilitate and preserve the land in order to improve agricultural
production. The peasants also designed and implemented rilles in order to protect the wadis
and polders. In addition, the project team also offered training to women in the management
of rural credit in this region. Finally, the project enabled the women of Bol to organize
themselves into groups and contribute to the harvesting of the plots prepared by a
development corporation Société de développement du lac (SODELAC).

Burkina Faso

The project team successfully fostered the local population’s participation in the Ouarkoye,
Padema and Toumousseni regions, but the project team’s efforts were less successful in the
The Beli region of Burkina Faso. The land in eight villages of the Ouarkoye region was spared from brushfires, while the land of ten villages was less than 50 percent burned, and no village’s land in the region was 100 percent burned. In addition, 53.5 hectares of land was cleared according to technical experts’ recommended methods of how to clear land. Finally, the project created one local group, called the “Troupe Sininyasigi de Ouarkoye”, and established four activity centres, which both functioned to ensure that the local population could continue anti-desertification measures.

In the Padema region the Village Riverbank Committee planted trees along the Mouhoun riverbanks and provided cattle access to the river. In addition, the village committee also formed a union, which functioned as a forum for villagers to discuss the management of river resources.

In the Toumousseni region the research team successfully rebuilt trust between the villagers as well as the technical staff of development organizations and organized local groups to sustain action related to anti-desertification measures after the project finished. In addition, they organized the wood merchants from the town of Banfora to remove the wood and reach a consensus about the price for wood. The research team created a forum for farmers and merchants to meet with each other and finally they organized women to engage in beekeeping and fruit harvesting from the forest in order to generate additional income. After six months the revenue generated from lumber operations was approximately one million francs for the villages along the river. The local population used the revenue they generated to purchase school supplies, mineral fertilizers for their soil, clothing and kitchen utensils.

The project’s success in the Beli region was limited to the formation of local organizations, which would serve as a forum for the local population to discuss problems of land degradation or natural resource management as well as devise potential solutions. For
example, researchers established a forum to facilitate communication between crop and livestock farmers, women’s and young people’s groups, and fishery and wildlife management groups in eight different villages.

The research team demonstrated that the project’s success depended on the participation of the local population in the selection of appropriate communication strategies to address desertification. Since the local population participated in the decision making and implementation of the anti-desertification activities in the Toumousseni and Ouarkoye regions of Burkina Faso the results were successful. However, in the Beli region of Burkina Faso the project was less successful because the local authorities did not involve the local population in decision making about action to address desertification.

**Conclusion**

Initially people were suspicious that participatory communication research was just like past development research approaches. The research team demonstrated within a few months that if people can participate in the research process and if they have the information and skills required, they can implement action to combat desertification. Despite the project’s success the research team noted one challenge that remains. Researchers need to devise a participatory approach that works more quickly and allows them to respond to people’s urgent and immediate needs.
RESOLVING WATER CONFLICTS IN THE NAKANBE RIVER BASIN OF BURKINA FASO:
PARTICIPATORY COMMUNICATION AS A VIABLE SOLUTION

Nlombi Kibi,
Centre d'Études, de Documentation et de Recherches Économiques et Sociales (CEDRES)
University of Ouagadougou, Burkina Faso
AUTHOR:

Nlombi Kibi,
Principal Researcher of the Project "GUCRE"
Centre d’Études, de Documentation et de Recherches Économiques et Sociales (CEDRES),

Mailing address: University of Ouagadougou, 03 B.P. 7164, Ouagadougou Burkina Faso
E-mail: nlombi.kibi@bf.refer.org and nlombi_kibi@hotmail.com

FUNDING AGENCY: International Development Research Centre (IDRC)

Mailing address:
IDRC
PO Box 8500,
Ottawa, Ontario, K1G 3H9
Canada
Tel: 1-613-236-6163

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Abstract

This chapter describes a study that used a participatory communication approach to resolve water conflicts in six villages of the Nakanbe River Basin in Burkina Faso. The project involved all community stakeholders, such as women, girls, young men, farmers, stockbreeders, and merchants, in the identification and definition of the types of conflicts that exist around water sources, mainly hand-pumps and modern wells, as well as in the design and implementation of solutions to resolve the conflicts. The participatory communication method relied on communication activities, such as informal discussions, roundtable discussions, and meetings involving all stakeholders. Communication strategies also included theatrical representations, video documentaries as well as Village Council and Village General Assembly meetings to elect members of the water management committee (WMC), which is a framework to manage water use at hand-pumps in the village setting.

Researchers identified a range of different conflicts that related to technical problems, such as insufficient resources and malfunctions of hand-pumps, social problems, such as ethnic conflict, or sanitation problems, which related to the presence of water-borne diseases. Therefore the proposed solutions included technical solutions, such as fixing hand-pumps or building new ones; solutions aimed at changing mentalities, behaviours and taboos of the local population about water use and water conflicts; and solutions to make the village water management committee more participatory.
Introduction

In Burkina Faso water has a variety of uses; it supplies the population with a source of drinking water, irrigates farm land, and is required for mining production, hydroelectric power, and small-scale production in villages, such as flour-milling, production of local drinks, and brick-making. Burkina Faso's water supply comes from four large basins; the Niger River Basin, the Nakanbe River Basin, the Mouhoun River Basin, and the Comoe River Basin. A workshop about water conflict, held in Ouagadougou between July 7th and 9th, 1998, revealed that conflicts over water occur mostly in the Nakanbe River Basin. The Nakanbe River Basin covers an area of approximately 33,000 square kilometers and provides water to approximately twenty-two of the forty-five provinces in Burkina Faso, including the city of Ouagadougou. The areas surrounding the Nakanbe Basin have a population of about 3,723,627 people, or 33% of the entire population of Burkina Faso. Conflict over water exists in the villages surrounding the Nakanbe Basin because of the multiple competing water usages in the region and an absence of rules at the village level governing appropriate water resource management.

The Centre d'Etudes, de Documentation et de Recherches Économique et Sociale (CEDRES) at the University of Ouagadougou in Burkina Faso and L'Industrielle de l'Environnement (IE), a branch of the Institut National Recherche Scientifique (INRS-EAU) at the University of Quebec in Canada initiated the project Resolving Water Conflict through Participatory Communication in the Nakanbe River Basin, Burkina Faso. The project received funding from the International Development Research Centre (IDRC) between 1999 and 2003. The project's objective was twofold. First, researchers wanted to involve all stakeholders in the identification of the types of water conflicts that exist at village hand-pumps between women, girls, young men, farmers, stockbreeders,
and merchant women. Second, they wanted to design and implement solutions to resolve water conflicts through a participatory communication approach as well as transfer successful methods of conflict resolution to villages throughout Burkina Faso. The remainder of this chapter outlines the participatory methods researchers selected and implemented in order to resolve water conflict in the six villages of the Nakanbe River Basin.

**Research Methods**

The research team designed a sampling plan to select the villages to study. The plan divided the Nakanbe River Basin into three zones: Bam Lake, Babre Dam and Loumbila Dam. The research team then selected six villages according to available water sources, the distance to water sources, the types of production activities, such as farming or animal breeding as well as the existence of women's associations since women collect drinking water in the rural villages. In addition, the researchers calculated the distance from a village to its water source because they wanted to evaluate if water-related conflicts correlated with the proximity of a village to its water source. Researchers selected villages according to three ranges of proximity to a water source: villages located within 5 kilometers of a water source; villages located within 10 to 15 kilometers of a source of water; and villages located within 25 kilometers of a water source.

Researchers then conducted informal discussions and meetings in the six villages of the Nakanbe River Basin and they organized a two-day roundtable discussion in Ouagadougou in September 2000. The roundtable discussions brought together for the first time community stakeholders and stakeholders from the government, private sector and academic circles. The discussions fostered a participatory process to explore the viewpoints, concerns and reasoning of the stakeholders in an effort to identify the main problems related to water conflicts and reach a consensus about how to solve the conflicts in the rural villages.
researchers identified four general problems that are at the source of water-related conflicts in Burkina Faso: one, there are insufficient supplies of water resources; two, existing water resources are poorly managed; three, there is a lack of communication about water use, management and conflict; and lastly, the rural populations have not always adopted methods from past development projects to address the problems related to village water resources.

The researchers also classified a range of different conflicts that related to technical problems, such as insufficient resources and malfunctioning of hand-pumps, social problems, such as ethnic conflict, or sanitation problems, which related to the presence of water-borne diseases.

Researchers then designed the participatory communication approach they would implement to resolve water conflicts in the Nakanbe River Basin, especially conflicts that occurred at the village hand-pumps. The research process began by selecting a project facilitator who was the official decision-maker guiding the project and decided when to share his decision making power with other participants (Bessette 2001). The facilitator sometimes took a neutral role where he merely assisted with the co-ordination of meetings and ensured compliance with the rules, although the facilitator also played a more active role by suggesting compromise or searching for consensus during various meetings to resolve water conflicts (Roy 1985; Keeney 1992). The role of the facilitator was to foster dialogue and information sharing among different stakeholder groups, stimulate thought about local water management problems as well as possible solutions; and support the preparation and implementation of concrete action to overcome water conflicts (Bessette 2001).

The next stage of the research process involved the identification of stakeholders who would participate in the research project. Researchers brainstormed about how to identify the different stakeholders in a village, how to ensure that each stakeholder could participate in
the project, and how to initiate consultation with the various stakeholders. Researchers began this project from the premise that if all stakeholders had input into defining the problems they face, it would be easier to find solutions that were acceptable to everyone. Once researchers identified the stakeholders who would participate in the project, they determined the decision making methods and what level of consensus was acceptable.

The researchers collaborated with the selected stakeholders to identify and define the types of water conflicts in the villages and propose solutions. The project's participants then defined the types water conflicts, proposed solutions, evaluated the feasibility of proposed solutions in order to select the appropriate ones, and implemented solutions to resolve water conflicts. Finally, the research team consistently monitored the research process and made adjustments if necessary.

Project Implementation

From meetings with the Ministry in charge of water resources held in December 1999, the preliminary fieldwork, and discussions with the local populations in various villages the research team identified two categories of stakeholders: community stakeholders and decision making stakeholders. The community stakeholders included farmers, stockbreeders, fishermen, women, girls, men, boys, merchants, village construction workers, administrative and local village authorities, such as the administrative delegate, the chief of the village, or the chief of a clan. The decision making stakeholders included government managers who were in charge of hand-pump maintenance, local and regional public authorities and development partners such as organizations providing financial support as well as technical experts and researchers who work for development organizations.
Identification of Water Conflicts

The participatory communication strategy to resolve water conflicts that the research team implemented consisted of matching the needs that the various stakeholders identified with the objectives of the project and then choosing appropriate communication activities to disseminate information about resolving water conflicts. The project team used two communication strategies, participatory investigations at the local level and meetings with all stakeholders, to identify current and potential water conflicts at village hand-pumps. Researchers sought the participation of different people within the villages by targeting stakeholders according to factors like age, sex, socio-economic activities, occupational and social status, influence in the community, and commonalities or differences between stakeholders. For example, women and girls may have a common interest related to gathering water for household use, but may have divergent opinions about the favours, such as passing to the front of the line, granted to some people in the community at the hand-pump. The communication strategies allowed the involvement of all community stakeholders in most circumstances and established a forum to assess and understand the dimensions of water conflict in each village. The communication strategies also ensured that the stakeholders had an opportunity to participate in the decision making process about the solutions to implement in order to resolve water conflicts at the hand-pumps.

The participatory communication strategies the researchers implemented also involved circulating information among the community stakeholders through communication strategies that were appropriate to the local context in each village. The communication strategies consisted of the research team facilitating informal discussions with small groups; formal roundtable discussions involving all the stakeholders; producing theatrical representations, radio broadcasts as well as video documentaries about resolving water conflicts; organizing
meetings at the village and regional levels; and holding a Village General Assembly meeting to elect members of the water management committee. The research team pre-tested the communication strategies before their implementation since methods of communication differed between villages. In addition, sometimes the topics of discussion differed since the priorities related to water use in each village varied. Pre-testing allowed community stakeholders to inform researchers whether the communication strategies were appropriate.

**Participation of Community Stakeholders**

The research team grouped all stakeholders into small groups according to their diverse characteristics, such as age, sex, ethnic group or cultural traditions and beliefs, as well as their level of education to facilitate the participation of diverse groups within each village in the research process. The researcher team aimed to capture the heterogeneity of stakeholder perspectives about problems related to water conflict as well as any potential solutions. In addition to identifying problems related to water use and conflicts stakeholders needed to justify why they identified certain problems and solutions. If the views of the stakeholders in each group were completely different the research team divided the stakeholder group into two or three groups according to their common interests. For certain stages, it was necessary to set up a group of stakeholder representatives, which then formed a Village Assembly. Lastly, researchers established a procedure for decision-making, which was flexible so that it could adapt to the needs of the stakeholders. This procedure aimed to improve the quality of the contribution of stakeholders, the communication between stakeholders, the confidence in the process as well as determine methods to facilitate the implementation of solutions.
Types of Water Conflicts

Researchers and stakeholders classified three types of conflicts that occur in villages at the hand-pumps: social, technical and sanitation conflicts. Social conflicts occurred due to cultural background or religious beliefs that influence divergent water uses between different ethnic groups in a village. For example, at one village near Lake Bam members of one ethnic group caused friction with two other ethnic groups in the village because they arrived at the village hand-pump with their livestock. In addition, one ethnic group considered certain wells sacred and therefore restricted its use to the preparation of traditional medicines, while another ethnic group did not view the well as sacred and attempted to use it for other purposes thereby causing conflict. For example, in Gogninga, a village in the Bagre Dam region, a conflict occurred because the Mossi ethnic group used black pots for water collection, which is taboo for the Bissa ethnic group.

Technical conflicts related to water availability, water quality and the infrastructure of the village hand-pumps, for example the number of functional hand-pumps or modern wells per inhabitant. Water scarcity caused many conflicts at the hand-pumps in each village.

Sanitation conflicts occurred due to poor hygiene practices, such as allowing animals to drink water directly from the village's water source, which led to the transmission of water borne diseases in the villages.

Water conflicts related to the disagreement about mobilizing massive amounts of water for irrigation due to the fact that irrigation strained a village's water source and decreased people's access to potable water. Water conflicts also occurred between users at the village hand-pumps because some people did not respect the water collection schedule. For example, during the dry season in the Gogninga, Goue, and Silmiougou villages some
women did not respect the water collection schedule and therefore caused conflict among the
other users who did respect the schedule.

Conflict also occurred because some users refused to pay for the hand-pump's maintenance.
In the Goue village some people refused to pay for the maintenance of the hand-pump
because the wife of the treasurer of the water management committee did not pay. In
addition, in the same village some people refused to pay for the costs of hand-pump
maintenance because they did not provide input into the selection of the site for the hand-
pump.

Finally, many conflicts occurred when people jumped to the front of the line-up at the hand-
pump. Sometimes people responded by smashing the clay jugs of those who jumped the
line, started shoving each other, or did not respond but felt resentful if the village chief's wife
jumped the line. Researchers learned that the wife of the village chief in Kora, a village in the
Bam Lake region, caused conflict by moving to the front of a line at the hand-pump.

An additional emerging social problem, related to water scarcity and the inadequate
infrastructure of existing hand-pumps in rural Burkina Faso, is that young men are viewed as
unsuitable husbands. For example, young men in Silmiougou would like to marry a young
woman from a nearby village but their village only has one hand-pump. Women know that
their lives would be filled with a daily drudgery of spending hours fetching water and therefore
they dread the idea of marrying a man from there.

Solutions to Water Conflicts

The solutions to address the types of water-related conflicts that researchers and community
stakeholders identified emerged at village meetings, the roundtable discussion in
Ouagadougou in September 2000 and the meetings that were organized after the roundtable
meeting. Researchers facilitated participation in the proposal of solutions to water conflict by
arbitrating divergent viewpoints and promoting consensus among the various stakeholders. The research team also ensured that the various stakeholders had an opportunity to express their opinions. For example, researchers specifically asked women how to overcome the problem of people not respecting the water collection schedule at the village hand-pump. Women suggested building additional hand-pumps in the village and requested that the water management committee create a new schedule of water collection.

The research team and the community stakeholders devised three solutions to overcome water conflict. First, they suggested the need to change the mentality, habits and behavior of water users in a village. Second, the water management committee required reorganization and restructuring to improve water management and prevent conflicts at village hand-pumps. Finally, researchers and the participating stakeholders suggested fixing hand-pumps that existed but did not function and constructing more hand-pumps in each village.

As the research team and the various stakeholders discussed potential solutions additional issues emerged that they needed to address. For example, if stakeholders wanted to build more hand-pumps, they needed to determine how to cover the costs. In addition, the suggestion to establish a new water collection schedule raised the issue of how to ensure compliance among water users. After various solutions were proposed the researchers and the community stakeholders evaluated the feasibility of each solution.

Viable Solutions

As a first step to evaluate the feasibility of the solutions, the researchers and stakeholders proposed to compile a list of all the solutions discussed at village meetings, the roundtable discussion, and the village meetings after the roundtable discussion. The second step involved calculating the number of conflicts each solution would resolve in each village. Finally, researchers and community stakeholders evaluated proposed solutions according to
the acceptability of the solution to the village population and the costs to implement each solution.

**Implementation of Solutions**

Researchers and community stakeholders held 103 meetings between December 2001 and June 2002 in the six selected villages of the Nakanbe River Basin to implement the solutions aimed at changing mentalities, behaviours, habits of the population related to water use and water conflicts. They held twenty-five meetings in the Bagré Centre village, twenty-two in the Gogninga village, twenty in the Goué village, eighteen in the Silmiougou village, ten in the Kora village and eight in the Loaga village.

The purpose of the meetings was to exchange information about problems related to hand-pumps. Researchers began by holding meetings with traditional village chiefs, village administrative delegates, village leaders and members of the water management committee prior to meeting with other community stakeholders. The discussion included women’s role in decision making about water resources in the village and the importance of maintaining the infrastructure of the village hand-pump.

After the meetings to exchange information about conflicts at the village hand-pumps researchers and community stakeholders collaborated in July 2002 to implement the next phase. Researchers and community stakeholders implemented communication strategies, such as theatrical performances in the six villages and videos to circulate information about participating in the resolution of water conflicts. Researchers continue to disseminate knowledge about resolving water conflicts to a greater number of villages researchers in Burkina Faso through village meetings, videos and theatrical performances.

Researchers and the Ministry of Water Resources developed and implemented a new model of water management based on a participatory approach in June 2002 during a meeting.
Researchers demonstrated that improved water resource management in a rural setting occurred with better management of the water management committee. If the water management committee in a village functions well there is better access to drinking water for the population, especially for women and children, more equitable access for all people in the community, improved communication between water users and consequently fewer conflicts.

The implementation of a new water management committee consisted of three stages. The first stage consisted of establishing a water management committee for each water source in a village. Establishing a water management committee required the local population to determine the number of staff necessary for the committee, the village authorities to nominate and elect members of the committee and provide training for the staff of a water management committee.

The second stage involved establishing a Management Cell of Water Sources for Village District (MCWSD), which was an ad-hoc committee consisting of contact persons from the villages, members of the water management committee, the local administrative representatives, and notables such as the village chief. The objective of the committee was twofold; first, to give a progress report about the operation of the new water management committee and second, to allow the integration of each water management committee into the village general meetings where the entire village can participate in decision making about water management.

The third stage consisted of installing a Permanent Village Framework of Dialogue (PVFD). A village meeting defined the framework to implement a Village Water Users Association (VWUA), which had the objective of allowing the entire village to participate in the management of water resources. The VWUA consisted of water management committee
members from all of the village’s water sources. The VWUA constitutes a permanent method to monitor water management in the villages and it has legal government recognition.

The research team also produced a guide and video documentary about how to establish a participatory water management committee. Each will be disseminated to NGOs and development organizations working on water resource management in rural areas in Burkina Faso.

**Project Results**

After two years the project team has resolved some disputes around village hand-pumps. Three years ago in the villages of Goue, Silmiougou, Kora, Loaga, Bagré Centre and Gogninga more conflicts over water existed than at present and the local populations were happy to participate in the process of conflict resolution. In the Silmiougou and Goue villages the solution devised by women and girls to establish a new water collection schedule functions well, although a water collection schedule has not been as successful in Kora, a village in the Bam Lake region. Overall, the project resulted in the restoration of two hand-pumps, the construction of five protection walls around hand-pumps and the construction of new hand-pumps in the six villages between the months of July 2001 and March 2002.

The research team learned that the functioning of a water management committee in a village directly relates to water conflicts at hand-pumps. Researchers learned that water management committee members had difficulty managing the village population’s participation in the decision-making process about water management, the nomination procedure to select committee members, and negotiating conflicting views between men and women, women and girls, girls and young boys. Therefore researchers determined the need to reorganize and restructure the village water management committees. In December 1999 in the Goué village conflicts, such as some users refusing to pay maintenance costs, existed
at the two village hand-pumps. Researchers organized a meeting on February 22, 2002 to facilitate a discussion about the conflicts and then the local population decided to establish a new water management committee. The new water management committee consisted of 70% of women and it resolved many conflicts. The local population ensures proper hygiene around the hand-pumps and the end-users, mainly women, meet once by month to communicate about water management in Goué.

The project team demonstrated that meetings are an effective strategy to foster communication among people in rural villages because they are easy to organize and they allow members of the local population to participate in water management. In addition, the meetings attracted attention from authorities in Nabdogo, Ramitenga and Bogdogo, other rural villages in Burkina Faso, who contacted members of the research team to learn about the project to resolve water conflict. Some people in Nabdogo decided to restore two hand-pumps that had not been functional for three years in their village and established a new water management committee after attending two meetings related to water management.

The project also demonstrated that theatrical presentations are useful to resolve water conflicts. In the Goué village the fishermen repaired a hand-pump on their own initiative after seeing a theatrical presentation about resolving water conflicts. In the Kora village, Peuhls, Mossi and Yarce people organized themselves to exchange their perspectives about the problems related to water management after seeing a theatrical presentation.

The project demonstrated that to successfully resolve water conflict the local population must play a significant role in the process. During meetings about problems related to hand-pumps in Loaga, a village in the Bam Lake Zone, women and girls came to an agreement about water intake rules. Although overcoming certain conflicts, such as the priority of the
chief's wife in water collection line, requires a longer term commitment beyond organizing two or three meetings to discuss water management issues.

The research team focused on building the administrative and technical capacity of local organizations to ensure that management of water resources continued after the project work was completed. Since the project work is ongoing, it remains to be seen if the project team achieves this goal.

**Conclusion**

Despite the successes of the project the following questions remain. How can researchers determine if communication strategies change certain behaviours, such as the acceptance of women as members of a village water management committee? How do the solutions implemented affect future generations? The experience in the field demonstrated that changing mentalities, habits and behaviours in the villages has not been easy. A long-term commitment is required to adjust certain behaviors as it does not occur quickly. The research team did not resolve the conflict over the village chief's wife refusing to wait in line with other women at a village hand-pump, nor did they resolve the conflict about women's participation in decisions about water management. Most men and village chiefs are resistant to allow women’s participation in the water management committee and at present women still cannot occupy the president’s position on the committee.

In addition, researchers learned that village meetings and theatrical presentations did not completely resolve conflicts related to ancestral beliefs or taboos about water collection, the necessity to pay for hand-pump maintenance, or implementing proper hygiene practices to avoid water-born diseases and ensure safe drinking water in every village. Researchers thought that perhaps a Village Water Users Association (VWUA), instead of a water management committee, could ensure a permanent forum for members of the local
population to discuss problems related to water management and agree on solutions to overcome water-related conflicts.

In conclusion, although not all water conflicts have been resolved in the Nakanbe River Basin of Burkina Faso the project team had some success. Researchers collaborated with the local population in the six villages to classify the typical water conflicts into three categories, technical conflicts, social conflicts and sanitation conflicts, and then proposed solutions to resolve water conflicts in the villages. The research team demonstrated the importance of a water management committee and then designed and implemented a participatory water management committee, which facilitated the participation of women and girls in the six villages. Finally, the research team demonstrated that successful methods of resolving water conflict can be transferred to other villages in the Nakanbe River Basin, other river basins in Burkina Faso, or even in other Saharan countries where the water conflicts exist.
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PARTICIPATORY COMMUNICATION TO IMPROVE NATURAL RESOURCE MANAGEMENT IN PERI-URBAN KUMASI, GHANA

Charles Quansah, Faculty of Agriculture, Kumasi Kwame Nkrumah University of Science and Technology (KNUST)
Pay Drechsel, International Water Management Institute (IWMI) Kumasi, Ghana
John A. Bakang, Faculty of Agriculture, Kumasi Kwame Nkrumah University of Science and Technology (KNUST)
AUTHORS:

Charles Quansah, Senior Lecturer
Department of Crop Science, Kumasi Kwame Nkrumah University of Science and Technology (KNUST)

Mailing Address:
c/o KNUST
Faculty of Agriculture
Ghana, West Africa
Email: crop-ust@africaonline.com.gh

Pay Drechsel, Head of West Africa Office
International Water Management Institute (IWMI) Kumasi, Ghana

Mailing Address:
IWMI Ghana
PMB CT112
Cantonment, Accra
Ghana
Email: iwmi-ghana@cgiar.org

John A. Bakang, Head & Senior Lecturer
Department of Agricultural Economics and Farm Management, Kumasi Kwame Nkrumah University of Science and Technology (KNUST)

Mailing Address:
c/o KNUST
Faculty of Agriculture
Ghana, West Africa
Email: crop-ust@africaonline.com.gh
Abstract

In the last decade, the concept of Participatory Technology Development (PTD) stressed the importance of appropriate communication strategies between researchers and farmers. For too long, researchers developed technologies without sufficient involvement of their target group resulting in low adoption rates. This paper describes the required communication skills as well as communication strategies used in participatory technology development and monitoring and evaluation exercises related to agricultural innovations developed in peri-urban Kumasi, Ghana. Also communication strategies used for further technology dissemination are described. Strategies discussed comprise interviews, group meetings, field days to evaluate on-farm trials, local radio broadcasts, and indirect communication between researchers and farmers through training of agricultural extension staff.
Introduction

In the face of dwindling agricultural land and threats to livelihood security, sustainable food production on intensive basis can only be achieved through the development and adoption of improved land management technologies (Quansah and Asante-Mensah, 2001). Participatory Technology Development (PTD) has been found to be of relevance both in the development and selection of appropriate technologies and the achievement of greater adoption (Gyiele and Drechsel, 1998; Bechstedt, 1996). The most crucial pillar for a successful PTD is the use of appropriate communication strategies to enhance the active participation of the target beneficiaries in all its component activities. These essentially consist of building and maintaining relationships with the target beneficiaries, situation analysis to fully understand their bio-physical and socio-economic circumstances, needs assessment, identification and ranking of problems, research priority setting and planning, development of solutions, testing and implementing available promising technologies. Of particular importance is participatory monitoring and evaluation (PME), which provides the target beneficiaries' feedback on the technologies under test for the analysis of shortcomings and testing and disseminating appropriate improved practices.

Within the framework of the agricultural research programmes supported by the International Board for Soil Research and Management (IBSRAM) which are now part of the International Water Management Institute (IWMI) - the national research partners at the Kwame Nkrumah University of Science and Technology, (KNUST), Kumasi Ghana were trained in appropriate communication skills and strategies for PTD and PME with farmers. Emphasis was given to bottom-up approaches aimed at shifting the attitudes and perception of scientists towards the advantages of a continuous interaction with end-users. In this paper, the communication
strategies and skills used in the PTD process and PME field studies are presented along with some of the results and conclusions of the case study.

**Methodology**

**Context**

Land availability is a major constraint to farmers' production systems in peri-urban areas. This has led to the shortening of the traditional long fallow periods used for replenishing soil fertility with a consequent reduction in crop yields. To compensate for the shortened fallow periods and to ensure sustained high crop yields, there is the need for alternative means of soil fertility replenishment. The pathways for soil fertility replenishment include mineral fertiliser application, maintenance of soil organic matter (animal manure, plant residues, compost, etc) and accompanying technologies (soil conservation and sound agronomic practices).

Whilst mineral fertilisers are generally expensive, there is abundance of poultry manure in peri-urban Kumasi, which is cheap but used only by vegetable farmers. It was envisaged that the usage of poultry manure could be extended to improve the yields of other crops for enhancing the livelihoods of farmers. It is in this context that this study promoted PTD in the use of poultry manure and plant residues in a maize-cassava intercrop in two peri-urban villages, Afari and Akrofuom. The treatments tested on-farm comprised residues left + no external input, residues left + 4 t ha\(^{-1}\) poultry manure (PM), and residues left + 4 t ha\(^{-1}\) PM + low NPK fertiliser (30 - 20 - 20 kg NPK ha\(^{-1}\)). These treatments facilitated a comparison of poultry manure with integrated nutrient management and the practice of maintaining residues on the field. The agronomic results are presented in Quansah et al. (1998a). This paper focuses on the communication strategies used.
Process

The beneficiary target group comprised smallholder farm families within peri-urban Kumasi. The KNUST-IBSRAM team that conducted the research consisted of an agronomist, a soil scientist, two rural sociologists, an extensionist and an agro-economist reflecting the multidisciplinary team required for any serious participatory on-farm research.

Before project inception, the general situation and needs of the farmers in the target villages were assessed through socio-economic surveys and participatory rural appraisal (PRA) studies. This was to initiate the first stage of participatory planning of project activities.

Local protocol and procedures for community entry and communication channels were used in seeking permission from the chief and his elders to carry out the research in the target village and in reaching the target group for the PTD and PME exercises. These included paying a courtesy call on the chief and his elders, communication with the chief through his linguist, communicating respect through appropriate body language and posture (e.g. bowing, standing with hands at the back, etc) and punctuating the address by the appropriate title of the chief (e.g. “Nana”), explicit expression of the purpose and scope of the project, the motives of the research team and the expected roles of and benefits for the community and the project. In general, the local language (Akan) was used to facilitate effective communication and free self-expression by the participants.

The following communication channels were used:

- Village meetings and group discussions
- Field days to evaluate field trials
- Unstructured interviews with the aid of an interview schedule
- Local radio broadcasts
• Indirect communication between researchers and farmers through training of Agricultural Extension Agents (AEAs).

The first three activities were recorded on videotape. This enhanced individual participation since most of the participants wanted to see themselves on television or on the playback.

The group meetings and field days were held on taboo/communal workdays after permission had been earlier sought from the local community leaders (either the chief or the assemblyman). The taboo/communal workdays were days on which most people were available and could therefore attend ('respect for farmers' time). People were summoned by traditional beating of a gong. Whenever the duration of an event lasted more than two hours (e.g. group discussion meetings and field days), participants were provided with soft drinks and snacks.

Communication Strategies Used

The communication strategies used for the various stages of the PTD and PME are presented in this section.

(a.) Participatory needs assessment and research priority setting.

SWAP (Successes, Weaknesses, Aims and Problems) analysis, which elsewhere is referred to as SWOT (Successes, Weaknesses, Opportunities and Threats), was the main tool applied in the participatory needs assessment and research priority setting. SWAP is a participatory rapid appraisal method suitable for assessment and self-evaluation. The steps involved are elaborated at www.ruaf.org and Quansah and Asante-Mensah (2001). In the main the SWAP, exercise commenced with pairs of interviewers holding discussions with the villagers (individuals or groups) in their work places to get first impression of the situation in the village. This was followed by a workshop with the target group (farmers) at which
interviews and discussions were held to bring out information about the general situation in the village, farming activities, needs, common problems and possible solutions.

At the beginning of the workshop, the Project Coordinator, who acted as the moderator with the assistance of two other researchers (an extensionist and a rural sociologist), introduced the research team to the participants. He then presented an overview of the on-farm research project emphasising the purpose and scope as that of mutual learning in search of appropriate solutions (with available resources) for problems identified. This was necessary to clarify the expectations of the beneficiaries which, in most cases, are directed at credit or other input supplies.

Semi-structured interviews with open-ended questions in contrast to formal questionnaire were used to elicit information from the participants. This provided an opportunity for the researchers to:

- Exchange ideas with the participants;
- Communicate respect for and lively interest in farmers' ideas;
- Create an opportunity for farmers to express honest opinions;
- Elicit and understand the reasoning behind these opinions through probing questions;
- Establish their neutrality with respect to positive or negative comments; and
- Avoid giving clues about their own opinions, which may bias farmers' response.

The good command of the local language (Akan) and the use of appropriate local expressions for technical terms by the moderator made the issues discussed more comprehensible to the farmers. This facilitated active participation of the farmers in the workshop proceedings through the flow and free expression of their ideas. In order to communicate receptivity of and respect for farmers' contributions during the discussions, the information provided by the participants regarding their successful farming activities,
constraints and problems and needs were recorded on cards and read aloud to them for confirmation or alterations. The problems that were within the influence of the participants were ranked and prioritised to serve as a basis for research. This revealed soil fertility depletion as a major problem in the farming community.

(b.) Participatory technology generation and testing

Following the recognition of soil fertility depletion as a major problem by the target group, field trials of mutual interest were discussed. Farmers reported their experiences with applying poultry manure on vegetables and the yield increasing effect and the enhancement of crop performance in general when plant residues were left on the soil. Trials with poultry manure and (for comparison) mineral fertilizers were then recommended with plant residues as an initial input. Farmer collaborators were identified during the SWAP analysis and the field trials subsequently implemented.

The communication strategy adopted at this stage of the PTD process involved making use of:

- The interests of the target group in selecting the technology to be tested;
- Past experiences or prior knowledge of the use of poultry manure and plant residues on vegetables as the basis of the trials; and
- The traditional respect for knowledge and value of experience to challenge other farmers to try out poultry manure on crops other than vegetables (especially the prevailing maize-cassava intercrop). Indeed subsequent monitoring and evaluation as well as beneficiary assessment exercises revealed that many non-collaborating farmers had applied poultry manure on crops other than the maize-cassava intercrop that the project concentrated on. To further increase awareness of the community of the project and also direct attention to the field trials, signboards were erected on the fields of farmer-collaborators.
(c.) Participatory Monitoring and Evaluation of Technology

The focus of the participatory monitoring and evaluation was on farmers' feedback concerning the introduction of poultry manure, among other innovations, for a maize-cassava intercropping system with two different intensity levels of the innovations and farmers' traditional practice as control. The following communication strategies were used to retrieve feedback information from collaborating and non-collaborating farmers, and to further disseminate the technology:

Community Group Meetings

Group meetings were organized as a prelude to the farm visit and the unstructured interviews. The project Co-ordinator again presented an overview of the on-farm research project. The importance of farmers evaluating the effects of the different treatments was explained (in contrast to researchers' evaluation). Participants were interested in visiting the experimental sites to "see things for themselves". A bus was arranged for the farm visit.

Table 1 indicates that nearly equal numbers of participants attended the group meetings in all the three communities. There were slightly more males (57.4%) attending than females (42.6%) which corresponds with the traditional work share for the cropping system under study.

Table 1: Number of Participants Attending the Group Meeting (n = 101)

<table>
<thead>
<tr>
<th>Community in peri-urban Kumasi</th>
<th>No. of farmers attending</th>
<th>Gender distribution</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afari</td>
<td>34</td>
<td>28</td>
<td>82.4</td>
<td>6</td>
</tr>
<tr>
<td>Saamanso</td>
<td>33</td>
<td>10</td>
<td>30.3</td>
<td>23</td>
</tr>
<tr>
<td>Akrofuom</td>
<td>34</td>
<td>20</td>
<td>58.8</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>58</td>
<td>57.4</td>
<td>43</td>
</tr>
</tbody>
</table>
Field Days to Evaluate Field Trials by Collaborating and Non-Collaborating Farmers.

(a.) Evaluation by Non-Collaborating Farmers

To avoid influencing farmers' evaluation of the effects of the treatments under study, the plots were marked out and simply labelled as plots 1, 2 and 3. Farmers were not told what treatments had been applied to these plots. The participants were asked to use their experience and careful observations to pinpoint the treatments and their respective plots.

Participants gave their comments on their observations on the different plots. All observations were recorded. Participants' explanations as to the reasons for the differences observed were also recorded. Each farm visit took about two hours and sufficient time was given for as many participants who were willing to make comments to do so.

(b.) Evaluation by Farmer-Collaborators

After recording the observations of the non-collaborating farmers, the participating farmer in charge of the experiment was asked to present the treatment imposed on each plot, his or her observations of the effect of the treatment on the vegetative growth phase as well as the yield of the two crops - maize and cassava. Other observations on the soil, weed growth, etc. were also presented. Conclusions were jointly drawn with the non-collaborating farmers.

The nondisclosure of the treatments imposed, and allowing participants to assess and comment on each plot stimulated participation in the discussions. It is probable that participation would not have been to the extent observed if participants had been immediately informed about the treatments applied.

(c.) Unstructured Interview

This was conducted after the visit to the experimental site. The purpose was to capture the impact the experiment had made on the participants and also other information with respect to the adoption of the tested innovation in the locality.
To ensure that the exercise was of a participatory nature, the study emphasised the use of open-ended questions during the farm visit, and the unstructured interviewing and discussions that followed.

The interviews covered the following areas:

- Farmers' awareness of the existence of the trial.
- Sources of information on the trial (diffusion pathway of the technology)
- Attempts at diffusing information on the trial
- Farmers' indigenous knowledge related to the innovation
- Specific knowledge gained from the trial after the farm visits.
- Farmers' assessment of attributes of the innovation (relative advantage, compatibility, complexity, trialability, observability).
- Perceptions of difficulties/problems associated with adoption of the technology
- Farmer's interest to adopt poultry manure in the coming planting season and changes in their knowledge, attitudes, skills, and aspirations (KASA) with respect to the use of PM (Asante-Mensah et al., 1998).

(d.) Local Radio Broadcasts

Local radio broadcasts, made fortnightly for six months, were also used to disseminate improved land management technologies (poultry manure and compost management) in the Akan language to a wider audience of peri-urban farmers. The programme was sponsored by the Natural Resources Institute (NRI) of the United Kingdom through the Ghana Organic Agriculture Network, with some members of the KNUST/IBSRAM team as resource persons. Before each broadcast, local radio announcements were made to indicate the schedule of broadcasts so that farmers could tune-in and also phone-in. The latter promoted dialogue and discussions between the presenter and the farmers.
Indirect Communication Between Researchers and Farmers

Apart from using the above channels to communicate directly to farmers, agricultural extension staff was trained to reach more farmers than researchers could do. The dissemination of some of the results of the field trials, for example, on the use of PM to farmers in peri-urban Kumasi was carried out through the Directorate of Extension Services, Ministry of Agriculture (MOFA). This was facilitated through the training of 49 technical extension staff of MOFA, the production and distribution of fact sheets on the use of PM, training of farmers, field days and meetings at which farmers presented their own achievements with others. The fact sheets were targeted at the agricultural extension staff and literate farmers. A typical fact sheet on poultry manure covered the following areas: what it is, uses, (advantages and constraints), nutrient value, handling, storage, methods of application, when and where to apply, and rates of application (converted to a local measure). These activities were carried out within the context of the Kumasi Natural Resources Management Project (KNRMP – 1997-2000) sponsored by Department of International Development (DFID) and active participation of some members of the KNUST/IBSRAM team of researchers.

Results

(a.) Information Gained From the Farmers

The following section summarises some of the results of the communication strategies used highlighting also unexpected feedback from the farmers including those cases where researchers learned from them.

(b.) The SWAP Analysis and Participatory Communication

The SWAP analysis and its accompanying participatory communication strategy proved to be an effective tool for:
- Assessing the general situation of the locality and prioritising farmer felt needs in the shortest possible time;
- Identifying the complex constraints to farming and other activities of the target group to serve as the basic input to problem-solving research;
- Using past mistakes or weaknesses constructively as learning processes;
- Promoting participation by the target group in the discussion of their common problems with the aim of finding solutions to them; and
- Promoting the self-help spirit and initiative of the target group and affording them the opportunity to participate in the planning, execution and monitoring of research activities.

(c.) Field Days

The field days proved to be an excellent communication facilitator. About 100 non-project participating farmers took part. The farmers easily and correctly identified plots with different treatment because of the bigger cassava stems, larger and greener leaves etc. Also the control plot was unanimously identified. Here, cassava plants had poorer vegetative growth with thinner stems, smaller leaf area, and lighter green leaves. Farmers assessed the growth of the maize by observing the stalks on the plots. The parameter used was size of the maize stalks. Also here, farmers unanimously and correctly identified any visible difference.

After identification of the actual treatments, farmers concluded that in the light of high cost of fertilisers and the extra cost of application, it would be more economical to apply only PM.

Researchers Learn From Farmers

- Researchers usually follow standardised parameters during their fieldwork. Records are taken on crop height and related agronomic parameters. Farmers, on the other hand, observed more than researchers basing their judgement also, for example, on the cracking and uplift of the soil over tubers.
• Farmers observed also that during growth of maize, PM helped to preserve soil moisture because the leaves of plants on the manured plots were turgid during the day whilst those on the control plot had flaccid leaves. Also soil structure was more friable under PM treatment.

• Though researchers noticed that manured plots had heavier weed growth than the control, farmers observed that the weeds were herbaceous and softer and therefore easier to weed than the weeds on the control plot, which were shrubby and tougher.

Unstructured Interviews

Of the about 100 non-collaborating farmers who took part in the PME exercises, only half of them were aware of the trials in their community. The relatively low percentage of awareness is attributed to the failure of the project team to organise earlier field days for the farmers immediately after the introductory meetings and start of the on-farm work. Table 2 shows sources of information for the participants who were aware of the project trials

Table 2  

<table>
<thead>
<tr>
<th>Sources of information</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBSRAM introductory group meeting</td>
<td>34</td>
<td>62</td>
</tr>
<tr>
<td>Agric. Extension officers</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Friends and relatives</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Visit to experimental sites/fields</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100</td>
</tr>
</tbody>
</table>

The findings indicated that the project itself was the most important source of information.

This was expected since the project was still at an early stage. However, extension officers
and friends/relatives were the next important source of information. These two sources would be more important pathways for diffusion of information in subsequent trials, seasons and other communities.

**Diffusion of Innovation**

In addition to the collaborating farmers, a few non-collaborating farmers had engaged in spreading the innovation of PM use to other farmers. A total of 215 farmers were estimated at the time of the PME to have been reached with the innovation. This indicates that poultry manure could have a high rate of diffusion based on farmers' interest and conviction of its beneficial attributes such as the high observability (see below) of its effects on crop growth and yield coupled with its current low cost of acquisition and application.

**Assessment of Attributes of the Innovation**

Most farmers agreed that the innovation showed the main characteristics of innovations (cf. Adams, 1983; Blackburn, 1984):

- **Relative Advantage** – the increased crop growth is convincing
- **Compatibility** – the innovation is compatible with current practice
- **Complexity** – the innovation is very simple thus easy to apply
- **Trialability** – the innovation is easy to try on small plots
- **Observability** – the effects of the innovation are clearly observable

**Perceptions of Difficulties**

Participants expressed in group meetings as well as individual interviews concerns, for example:

- The main difficulty related to the innovation was that of PM transporting from the roadside to the farm. The trucks usually dump the manure at the roadside, and only...
by bush paths can most farms be reached. This necessitates carrying the manure to the farm by head loads (women task).

- The majority did not perceive any health hazard with handling the manure though a few people mentioned the likelihood of PM being a possible source of worm-eggs and the general bad odour, especially when wet.

**Sustainability of PM Technology**

The PME study also tried to assess the sustainability of the use of PM in the study area. Several sustainability indicators based on farmers’ statements were identified. These included: availability, low cost, easy application and higher yields.

**Support of Local Leaders**

The support of local leaders is essential for adoption and sustained use of introduced innovations. Local leaders’ support for the project was observed in the following ways:

- Chiefs/assemblymen gave the IBSRAM team permission to meet and talk with the people.
- Some assisted in the rallying of their people for the programme.
- Some, such as the Chief of Akrofuom attended the group meeting, and unstructured interviews with his elders.
- Some (e.g. Chief of Akrofuom) contributed to the discussions and encouraged their people to adopt.

Such open support by the community leaders enhances wider diffusion and adoption of the innovation. Such support is likely to enhance sustainability of the use of the PM technology.
Conclusion

The use of local languages in farming communities enhance a better mutual understanding of issues discussed and facilitates communication towards free expression and explicit articulation of views.

- Unstructured interviews with an interview guide stimulate participation and discussions on a wide range of issues.
- The use of appropriate communication strategies, such as joint field work/visits, is very pertinent to getting the requisite feedback information on on-farm trials.
- Identifying farmer felt needs through the SWAP analysis may not be a problem in farming communities. However, their priority setting may be different from what the Project seeks to promote. For example, credit provision, potable water, roads etc. may be ranked higher than or at the same level as the Project's soil fertility improvement objective. In such a situation, linking the community to the relevant agencies dealing with those areas other than that of the Project is a prerequisite to the smooth implementation of the project's objective.
- Active participation of the community in the selection of collaborating farmers to pilot project activities enhances the dissemination and adoption of improved technologies.
References


PARTICIPATORY COMMUNICATION FOR SUSTAINABLE DEVELOPMENT IN BURKINA FASO AND MALI

Souleymane Ouattara
Réseau de Journalistes en Afrique pour le Développement (JADE)
Burkina Faso, Africa
AUTHORS

Souleymane Outtara, Bulletin editor

Mailing Address:
Résseau de Journalistes en Afrique pour le Développement (JADE)
01 B.P. 6624 Ouagadougou 01
Burkina Faso

Email: jade.Comdev@liptinfor.bf

FUNDING AGENCY: International Development Research Centre (IDRC)

Mailing Address:
IDRC
PO Box 8500
Ottawa, ON, K1G 3H9
Canada

Tel: 1-613-236-6163

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Introduction

Can you make water spring from the earth and turn dry, compacted soil green with your bare hands. It is possible. What is the secret? Bring people together who self-sufficient; use the radio & town hall meetings to share their local knowledge. This is the story of forestry workers, agricultural technicians, media professionals, and villagers in Nagréongo and Kriollo in Burkina Faso and Kafêla in Mali. It was an experiment marked with both successes and failures, but most importantly valuable lessons. The initiative originated with the network of African Journalists for Development (Journalistes en Afrique pour le développement - JADE), who were convinced that rural media was missing the opportunity to support development because they lacked resources and participatory tools.

Each Village's Unique Problems

Nagréongo

In Mooré, one of the 60 languages spoken in Burkina Faso, the clearings of land where nothing grows are called "zippelé". Exhausted, overexploited, eroded by violent winds and rainstorms and compacted by animals, the earth has hardened into a sterile crust. The inhabitants of Nagréongo, a village in central Burkina Faso, are well acquainted with the "zippelé", which are synonymous with famine and thirst.

In March 2001, at the beginning of the research project in Nagréongo, the village had 18,946 inhabitants and four wells. The water supply of all the wells was insufficient, and two of them did not work consistently because there was no water management committee. Since a famous healer lives in the village, many people come to the region for medical treatment, which requires water and medicinal plants. It is important to note that the village is also located within the area covered by Radio Vénégré; community radio that provides people with
information about farming techniques, the history of the villages as well as stories and legends.

Kriollo

Further north in Burkina lies the village of Kriollo, a large village with 2000 people. When asked how the village could be bereft of water for humans and animals, Dicko Issa Boureima, a woman in her 60s, draws on memories of her youth: "I remember, when I was a teenager, about 40 years ago, the water stretched from here to Taaka, a village about 5 km away. It was like a lake."

Yet, today there is a shortage of arable land, while the soil deteriorates a little more each day, and firewood is scarce. Additional problems include illiteracy and women’s inability to speak in public.

Kafèla

In Kafèla, a Senoufo village with 510 inhabitants located at the edge of the urban community of Sikasso in Southern Mali, intensive logging has taken a heavy toll on forest resources (75% of the total volume of wood comes from natural vegetation). The southern part of Mali alone provides almost 55% of the country's wood. In order to meet the high demand for wood in Sikasso, the inhabitants plunder the forest resources. The local population relies on this production as their primary source of income. "The commercial cutting of firewood in particular, to supply the urban centres is an important factor in deforestation, which frequently leads to the creation of rings of desert around the towns" (1). But the search for profit does not explain everything. N'Golo Coulibaly, a sociologist and researcher with the Sikasso production systems/natural resource management team (ESPG/RN) speaks of "socio-cultural baggage". He explains: "In Senoufo country, a wife’s femininity is measured by the quantity of
wood she piles up." Therefore, women desire to stack wood in front of their houses to enhance their social standing further compounds the stress on forest resources.

The Context of Communication: Priority to the Elders and the Powerful

These three villages use traditional means of communication. Communication occurs in religious settings (church, mosque), around the wells, in the market, at the village square, or in places where young people gather (kiosks, tea shops, public festivals). Radio is also increasing in importance as a method of communication in the villages. Although since it is relatively new and communities lack resources and skills, its effectiveness in supporting development is somewhat limited. In other words, an increase of technology does not guarantee universal involvement, especially of women and young people, in the community decision-making process. Community debates remain heavily influenced by powerful people in the community, such as the traditional chiefs, the healer (Nagréongo), the Iman (Kriollo), and the Council of Elders (Kaféla).

Supporting Agencies: Imposed Decisions

NGOs and government technical services are concerned about the problems of infertile soil, inadequate water resources, and deforestation. However, the solutions that development organizations implement are sometimes limited in their effectiveness. Too often, they impose programs that have been pre-packaged by their headquarters, which do not the participation of the local population.

Difficult Beginnings

Following a meeting among the various participants involved with the project about its start-up, in June 2000, JADE organized a workshop in Nomgana, a village about 20 kilometres from Ouagadougou. The meeting covered planning activities for the implementation of the action research, and the organizations in Burkina that had been contacted prior to the
formulation of the project attended. The participants came from Dori in the north, Ziniaré in the centre, and Fada in the east. Each area suffers from water shortages and from the destruction of vegetation and wildlife. Yet, they have many viable and experienced farmers' organizations or supporting agencies receptive to innovation. The Nomgana meeting was crucial to avoid any misunderstandings that could arise during the project implementation, which most often stem from poor preparation at the preliminary stage. The first meeting did not make any progress due to a disagreement about daily monetary compensation. JADE decided that the people of the Eastern region, who made their participation conditional on an increase in the per diem rate, could no longer participate in the research project. The organizations in the Ziniaré area of the Central region and Dori in the North for Burkina Faso agreed to continue the project.

In Mali, after the profile analysis stage of the project, the potato producers associations, processors of local products, and livestock exporters also left the project team. Their objectives were no longer consistent with the research action, even though in the initial phase their goals seemed compatible. Potato producers needed information on potato seeds, while livestock exporters needed information about the export price of cattle in the Ivory Coast market. Finally, new partners joined the project, such as the Nature Conservation Division.

**From a Media to a Participatory Approach**

The degradation of natural resources and the limitations of current natural resource management practices prompted the research team to experiment with participatory communication as a way of resolving problems related to natural resource management. We proposed two methods of communication to resolve problems related to natural resource management: the media approach and the participatory approach.
The Media Approach: Using Radio in Other Ways

The research team launches the project through radio, which is a powerful tool to disseminate information and educate, especially in rural areas where oral communication traditions dominate. The responsibility for radio content and production lies with editorial committees, which were established in each of the three areas, Sikasso, Ziniaré, and Dori. Editorial committees operate like a typical editorial board, except that in addition to the radio producers they also include representatives of the communities and the development agencies.

Box 1: Radio for all

A workshop was held between September 25 to 30, 2000 in Dori and Sikasso to provide education to local populations about radio for community development. The workshop discussed the following:

1) identification of important topics to cover and broadcast
2) determining the needs of the audience
3) organizing teams for the fieldwork to make contact with communities
4) training sessions on sound recording techniques
5) interview techniques
6) developing a ‘radio play’ from issues the local population identify as important
7) field trips to cover a variety of topics (livestock trails, anti-erosion sites and fallow land, mulching, organic manure, threatened medicinal plants)
8) analysis of the field trips in a plenary session to draw out lessons
9) produce radio broadcasts
The synergy between all the actors is important to enrich the content of the magazines (reporting, investigations, technical information ...) and to find a genuine partnership model. For example, in Sikasso, the people discussed whether to use "griots" (village chroniclers and musicians) to broadcast radio programs since they have already had an important role in social communication. The people decided that using griots, as hosts for stories would be appropriate, but not for technical messages. The main reason was there was a danger of the information distortion in the latter case. Some radio hosts are real stars in their own communities, and are credible sources of information for radio audiences. Therefore their voice is the best guarantee of getting the technical messages across.

Unfortunately, development officers frequently steered the discussion toward their own concerns. As a result, the primary audience for the message, namely the village communities, was not sufficiently involved in the choice of the topics to be covered. In order to overcome the local population's lack of input into community development decisions, a network of 'local communicators' was established in all the communities. The local communicators identify the subjects at the initial stage, prepare radio field trips, help produce radio broadcasts, and provide feedback to the radio stations about programs. They are also members of the Village Communication Committee (known by its French initials CVC).

Involving the local population fully in development projects is necessary for a participatory research approach.

The Participatory Approach: The Community at the Centre of the Process

There were a series of exchanges between the research team and the IDRC administrator. During one exchange, the IDRC administrator drew JADE's attention to the limitations of a media approach for implementing a participatory communication project. The IDRC administrator insisted on allowing members of the communities to speak in order to identify
relevant and realistic responses to the problems of environmental degradation. The subsequent approach that emerged from these discussions is based on the following four points.

**The Definition of a New Approach to Involvement**

At the workshop organized in Ziniaré in January 2001, agricultural, livestock, and environmental officers presented their teaching techniques. Members of the Village Communication Committees provided feedback about their teaching approaches. For example, they stressed the importance of the introductory greeting phase of research projects, which was too often cut short. They also recommended that priority be given to open discussions so that the local population has input into solutions to the problems under discussion. The meeting illustrate the importance of knowledge about the local context, which can only be learned by listening to people in the community. This contact is commonly known as "diatigitiè" or "lodger" in Jula, a West African vernacular language. The "lodger" is the one who opens your eyes, teaches you what has to be done and what has to be avoided in the village. For as the proverb says, "the stranger has big eyes but cannot see."
Box 2: A radio broadcast to resolve a "communications" gaffe

In Ziniaré, a team that came for to meet with people in the village and establish the groundwork for co-operation, was surprised to see that the entire population came greet them. Yet, this is common practice. The communities want to make a good impression on the development agencies. How should this type of situation be handled? Our lack of awareness about the local context was potentially an embarrassing situation. Yet, during the initial encounter, we set aside our aims and instead we broadcast the history of the village on the radio, which pleased everyone. We then interviewed the healer, the master of ceremonies, and an influential person in the village. These broadcasts were aired that evening by Radio Vénégré.

The project coordinators, who were reluctant to accept any gestures on the part of the villagers, changed their minds after hearing the advice of the field officers. "You will make them angry if you refuse the sheep and chicken that they offer you in welcome, explained an agricultural officer.

Prior knowledge of the local environment would have enabled us to anticipate a mass greeting by the villagers and therefore organize the meeting differently. Since it is difficult to anticipate all situations, we must also find ways to adapt to spontaneous situations. In this case, the team succeeded in turning a constraint into an asset by producing a radio broadcast on the spot. In the end, the radio broadcast helped the researchers gain the trust of the local population and access members in the community, especially the women, young people, and the elderly.
Identifying Natural Resource Management Problems

"Which problem involving water, wood, the fields and land keeps me awake at night and which I can help solve?" This was the first question debated by four groups (young people, women, adults, the elderly), and then in a plenary session. The aim was to emphasize the community's ability to find the resources on their own to solve problems before turning to other sources of assistance.

Three themes emerged from the discussion in Nagréongo: water shortages, soil degradation, and shortages of wood. Water shortages received the most votes in a direct ballot, which ranked first among the priority problems requiring attention.

The research team then identified the problem of polluted water and the need for simple techniques to make it drinkable.

The villagers noted various reasons for water shortages, such as an insufficient number of wells, the poor depth of the water table, shortage of erosion-resistant sites, and the lack of dams. The consequences of shortages in drinking water relates to public health issues. For example, the presence of Guinea worm disease, diarrhoea among children.

The water shortage has other negative effects, such as migration out of the community and the negative impact on livestock.
Box 3: The joking relationship, a way of circumventing tension

During a session to identify problems and analyze their causes and consequences, the women noted the village leader's influence on them. In order to relieve tension arising from conflicts, in this case between women and village leaders, a traditional method of joking was used. It typically involves two ethnic groups who are able to make fun of each other without becoming hostile. For example, the research team included an agricultural technician from the San tribe, and the Mossi, who live in Nagréongo. They used jokes to tell the Mossi tribe not to prevent the women from expressing their views. "I am your chief. I alone can decide who can do this or that. So I've made my decision: the women will speak." This amused everyone in the meeting, and the other leader just replied: "This Samo's crazy!". Without a joking relationship, it would have been difficult to address the problem of women's inability to contribute to research projects, as well as create tension and conflict that would have derailed the project's objectives.

The Search to Gain Additional Information from Technical Services

Additional research was done with the technical services relating to water supplies in each village, the condition of the infrastructure, and existing support programs. The aim was to accurately document the strategies to be implemented and identify people or institutions capable of providing technical or financial support to the communities. One case involved the health officer of the Ziniaré health division, on the topic of drinking water, with his counterpart in Kriollo on funding for a cistern.

Participatory Models for Village Committees

Each of the three zones constitutes an entity, and incorporates all the local partners involved in natural resource management. Therefore a zone committee was established in each
locality, which is responsible for the local coordination of the project's implementation, follow-
up and evaluation.

In Ziniaré, Dori and Sikasso, the committee consists of seven (07) members from the
provincial agriculture division, Patecore (a water and soil conservation project), the provincial
Environment Division, Radio Kaoaad Yamm Vénégré, the Wend Yam Federation (a farmers'
organization), local communicators, and the "Boe-n-zem Wendé" theatre company.

To implement the project smoothly, a "relais" or go-between was designated for each of the
three target areas. The relais is a local institution that is responsible for implementing
activities identified by the zone committee, which allows all participants representation. The
relais assigns responsibility to an individual to implement routine tasks for the project, which
are listed in an agreement signed with JADE. In Ziniaré and Sikasso, the leaders of the zone
committee were also the radio managers, and for the community of Dori this role was played
by an association, Noddé Nooto.

The Village Communications Committee (known by its French initials CVC) implements and
monitors the project in their area. The CVC is composed of six members, two of whom are
women. The committee shares all the information first shared with the village chief and the
healer before they choose a method to disseminate it to the entire population of their
community.

For example, after each meeting with the zone committee the CVC reports to the village chief
and then to the general public. The population strongly supported the project because they
were regularly informed of the project's progress.

In Nagréongo the community initiated the establishment of the CVC's, but it was the zone
committee that provided its impetus in Kriollo. The zone committee asserted that it was not
appropriate to create a village communications committee, on the pretext that the Ministry of
Agriculture announced the creation at the national level of Village Land Management Committees (comité village de gestion des territoires - CVGT). This organization, in addition to its official responsibilities, was suppose to undertake communications activities and act as a facilitator in the transmission of the village concerns and priorities to the National Land Management Program (Programme national de gestion des terroirs - PNGT). The institution's limitations are evident. Not only was it difficult for the CVGT to reconcile its two mandates, but the CVC had also defined criteria for designating its members that differed from those of the CVGT. The villagers chose their own leaders on the basis of their seriousness of purpose, audience, and ability. Ten (10) individuals, including two women, made-up the Village Communications Committee. Within it, the Imam publicizes information during prayers at the Mosque, the women do so around the wells and water outlets, and the young people do so at their meetings. Most importantly, the responsibility for implementing project activities falls on the CVC, which is responsible for mobilizing the entire village.

The Elements of a Communications Strategy

The communications strategy is based essentially on synergy, or gathering people together with diverse expertise to solve natural resource management problems; radio; workshops and discussion groups; voting procedures to help make decisions; the involvement of the local population and a consideration of the local knowledge.

Synergy

For the partners in the project, it consists of harnessing the pool of human-power, skills, and resources to address the NRM issues within a community. The multidisciplinary nature of the group appeals to the local people. "Before these arrangements existed, the members of this zone committee came separately to our village. That took up our time and it was difficult for people to attend these meetings, but they never said so in front of the technicians. Some of
our questions, moreover, went unanswered. With this group now, we get answers to all our concerns and we also save time," said one farmer.

The committees allowed for the chance to successfully address problems in communities, but they also could make further improvements through follow-up activities. This new partnership goes beyond the old working relationships that responded mainly to institutional obligations and were not motivated by a common approach, which was inclusive of the local population's needs.

The Radio

It is a voice, or method of disseminating information, for the project's participants and a tool for highlighting local knowledge. Moreover, the radio facilitated everyone's involvement in disseminating strategies and action to resolve NRM issues.

Workshops

These are forums that bring together all the project's participants to focus on common concerns. The meetings occur throughout the process of experimentation with participatory communication. The workshops provide an opportunity for the project participants to improve their skills, summarize the activities that have been carried out, and develop training modules. Furthermore, they substitute a cooperative approach for competition, which undermines development agencies.

Discussion Groups

The methods to approach a problem at the village level are worked out in these groups. Conflicts of interest became apparent and solutions were found that respected the positions of all the parties involved. The groups allow everyone to speak, and this is especially important for women and young people, as they are not normally able to express themselves in public.
Voting

Direct voting is used to identify issues of priority. Voting consists of compiling a list of all the problems that are considered important by the community and then agreeing on criteria to rank them in order of their importance. The ranking is done by voting for an issue represented by a candidate. This voting technique, which does not require screened voting booths, enables individuals to express their views. Adopting criteria facilitated the acceptance by all of the majority's choice. Despite certain shortcomings, such as the lack of confidentiality in voting, it appears that this method was useful overall. Direct voting allowed local democracy and consensus decision-making in communities where decisions were normally made by the elites on behalf of everyone.

Indispensable Actors

Knowledge of the community allows essential participants to be identified. It is important to identify them within the community as their influence enables them to deflect a project from its objectives, or even prevent it altogether. The profile of the essential participants varies and depends on the areas of intervention. They may be a healer, an Imam, the hereditary chief, or a simple farmer.

The Value of Local Knowledge

The research team decided to emphasize local knowledge in the field of NRM to reach solutions related to problems of environmental degradation. Local knowledge is disappearing in communities. The incorporation of local knowledge is not something that can be imposed by decree. It is not like gathering other kinds of information: it resides in the realm of knowledge, of the sacred. This is why it is important to really involve communities and, above all, to develop an appropriate approach, including the identification of NRM issues and the people who have tradition knowledge, which is useful to overcome these problems. There is
an urgent need to incorporate traditional knowledge in the development projects, and it must also be disseminated to the community at large. We must avoid the paradox of using outside knowledge when local solutions exist, which is often cumbersome and inappropriate to resolve NRM issues. Local knowledge must be regarded as a genetic heritage to be preserved by all possible means. This does not prevent scientific and technical validation of this knowledge prior to its dissemination on a large scale.

Box 4: An outside solution: the financing of a boulis or cistern in Kriollo

In Dori, water problems are the major concern of the inhabitants. "Our priorities include access to water. We initially decided to build a boulis (a kind of cistern to collect and retain rainwater) that would be useful to humans as well as to animals. Secondly, we included a well for the second neighbourhood, as the first already has one. We are already dealing with ADRAFIL, a local investment fund responsible for funding micro-projects, regarding the construction of our boulis, says Issa Boureima, a member of the CVC.

Following a feasibility study, ADRAFIL asked the village for a contribution amounting to around 10% of the total cost of the project. The two neighbourhoods once more got together to decide on the next stage. Each household head was assessed CFA 7,500. "We began to collect contributions, which we put in a safe place and we hope that we will soon have the amount requested so that we can complete out," continued Issa Boureima.

Participatory communication facilitates discussion and the implementation of a joint project involving neighbourhoods that were no longer talking to each other. Because of the synergy between all the actors, Kriollo was able to negotiate support with one of the members of the Dori zone committee for resolving the water problem.
Constraints and Lessons

Research Action

The concept of research-action is not easy to define, especially in communities that do not use these methods to analyze problems or make decisions. A pre-condition for the effective implementation of any rural development project is that the research team must devote sufficient time to explaining the concept and implement strategies in the local languages and by analogy.

The Information Session

The limited appreciation of the need to conduct an on-going process of evaluation about the activities carried out has proven detrimental to research action. The information evening allows key questions to be analyzed, which must be the subject of discussions with all the parties involved in the project. It also, and most importantly, allows the approaches to be identified for improved capitalization and impact.

The Pressure of Expectations

While the research action project has proved capable of chalking up some progress, it had an equal amount of limitation. Despite the multiple explanations of the nature of the project, the expectations of the communities and partners in terms of concrete achievements to resolve problems of survival take precedence over research action.

“Relais” Zone

The success of the synergy depends on the leader, namely the zone “relais”. They must be available, capable of facilitating the information flow, and be tuned in to the other members of the zone committee -- and particularly the village. They must also be capable of taking the initiative and avoid expecting everything from the project coordination. The leader must also be in constant contact with those in charge of the project's partner institutions and services in
order to ensure constant review of the project. This activity supports the reporting by the institution representative on the research team. This process is important as it facilitates participation by the representative of the departments involved in research.

**Technical Coordination**

The choice of senior researcher is crucial for the success of the project. The person chosen must not only have the required technical skills, but must be available, and develop empathy with the communities and technical partners.

**Conclusion**

Wherever communications problems existed within the communities, the synergy between the actors, the use of discussion groups to identify, analyze, and seek out solutions to NRM problems has been conducive to dialogue, decision-making with a broad consensus, and community commitment. The participatory approach of the project is also conducive to ongoing consultation between the participants in development, in contrast to the spirit of competition that previously characterized them.
Glossary

1 – Participatory communication

A process of establishing communication within a community with a view to identifying, analyzing, and solving its problems (e.g., NRM), without excluding any of its members because of their social status, gender, or any other discriminatory considerations.

2 – Research action

A process of learning through action and analysis with a view to the continuous upgrading of knowledge about an issue.

3 – Natural resources management

The rational use of a community's resources such as soil, water, fauna, flora, etc. to ensure its preservation or restoration.

4 – Local knowledge

Local knowledge is the sum total of traditional practices, techniques, and knowledge focused on resolving NRM problems.

5 – Project technical coordination

Technical coordination comprises the senior researcher among the JADE personnel involved in day-to-day implementation of the project.

6 – The Village Communication Committee (CVC)

The Village Communication Committee comprises members of the community chosen by the village to implement and monitor the project on their land.

7 – The local communicator

This is a communicator from the village, who comes from a farmer’s organization or a traditional organization. He will be a member of the CVC, on which he is involved in implementing activities.
8 – Synergy

A result of the process designed at pooling people, skills, resources, etc of the project partners with the aim of resolving NRM problems in a community.