

Transforming knowledge to enhance integrated natural resource management research, development and advocacy in the highlands of Eastern Africa

Jeremias Mowo, Joseph Tanui, Kenneth Masuki,
Charles Lyamchai and Zenebe Adimassu

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United Nations Avenue
PO Box 30677, GPO 00100
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Tel: +254(0)20 7224000, via USA +1 650 833 6645
Fax: +254(0)20 7224001, via USA +1 650 833 6646
Email: worldagroforestry@cgiar.org
Internet: www.worldagroforestry.org

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ABOUT THE AUTHORS



Jeremias Mowo holds a PhD in Soil Science from Wageningen University, Netherlands. He has wide experience in integrated natural resource management research for development and is currently the Regional Representative for the World Agroforestry Centre's Eastern Africa Programme and Regional Coordinator for the African Highlands Initiative (AHI). **Box 30677-00100 Nairobi, Kenya;** j.mowo@cgiar.org



Joseph Tanui is an agricultural economist and coordinates work on grassroots institutional development for sustainable management at the World Agroforestry Centre, under the Landcare programme. Joseph has extensive experience in smallholder collective action and grassroots institutional development, from a research, policy and extension perspective. He is currently doing a PhD research on institutional economics of sustainable land management at Wageningen University, Netherlands. j.tanui@cgiar.org



Kenneth Masuki has a PhD in Agricultural Education and Extension, from Sokoine University of Agriculture, Morogoro, Tanzania. His research experience spans over 19 years in the areas of soil and water management, integrated natural resource management and knowledge management for natural resource management. He is currently based at the Uganda office, **Box 26416, Kampala, Uganda.** k.masuki@cgiar.org



Charles Lyamchai is a Principal Agricultural Research Officer at Selian Agricultural Research Institute, Arusha Tanzania. His current work focuses on improving natural resource governance at community level and mainstreaming Integrated Natural Resource Management in R&D institutions to foster sustainable management of natural resources, increased income and alleviate poverty. He holds an MSc in Agro-meteorology.



Zenebe Adimassu is a Senior Researcher with the Ethiopia Institute of Agricultural Research and has an MSc (Erosion and Soil and Water Conservation) from Wageningen University, Netherlands. He is currently doctorate student at the same University. **Box 2003, Addis Ababa, Ethiopia.** zenebeteferi@yahoo.com

ABSTRACT

Progressive and alarming degradation of the natural resource base interlinked with increasing rural poverty in the highlands of east and central Africa led to the establishment of the African Highlands Initiative (AHI) by research and development stakeholders in 1995. AHI was mandated to develop methodologies for integrated natural resource management (INRM) and institutionalize them in partner organizations. Many important lessons and experiences have been generated from INRM work in five pilot sites scattered in Uganda, Tanzania, and Ethiopia. However, the impact of these lessons on wider INRM discourse and practice has been limited. This is attributed to limited documentation and dissemination of knowledge products and failure by current formats of documentation that exclude dimensions that are useful to various users or practitioners. In recognition of this, AHI during the third phase (2002-2004) established a knowledge management system for enhancing the programmes' capability in reaching out key partners to influence their behavior and work, and align them with the mandate of AHI. This was done under the project, "Enhancing Knowledge Management to Advance Integrated Natural Resource Management (INRM) Research, Development and Advocacy" funded by the International Development Research Centre (IDRC) which ended in February 2008. The overall objective of the initiative was to enhance the knowledge base on INRM for improved livelihoods in the highlands of East and Central Africa. This objective was achieved by engaging the AHI multidisciplinary teams at site and regional levels to document and share tested methods from the INRM work. The research teams experimented with methods that brought together local and "scientific" knowledge to understand and solve NRM problems while at the same time enhancing local capacity to capture and share knowledge products. The project provided AHI the opportunity to systematically document, synthesize, produce and share public goods (methods, tools, lessons) with various target groups thereby advancing AHI's entire impact pathway. Access to and use of the different knowledge products will contribute towards positive change in institutions (research organizations, development agencies, government planning and policy making) so that they can provide more effective support and incentives to local initiatives. Eventually, this should lead to better managed landscapes and agro-ecosystem productivity.

KEYWORDS:

Impact pathway, information needs, knowledge products

TABLE OF CONTENTS

Abstract	iv
Acknowledgements	v
1.0 Introduction	1
2.0 Objectives	3
3.0 Study sites and their characteristics	3
4.0 Methodology	6
4.1 Improve planning, decision-making, advocacy and management capacity of resource users.....	7
4.2 Positively influence policy makers in favour of participatory INRM as a strategy for ecological and economic change in the highlands.....	7
4.3 Improve the performance of practitioners and commitment of organization managers involved in INRM research and development	8
4.4 Build the capacity of researchers and development workers from partner organizations to enhance knowledge management	8
5.0 Findings.....	9
5.1 Information needs of different categories of end users.....	9
5.1.1 Information needs of farmers.....	9
5.1.2 Information needs for policy makers, researchers and development agents	10
5.2 Capacity building of researchers and development workers	13
5.3 Development and dissemination of knowledge products	15
5.3.1 Site level products.....	16
5.3.2 Regional level products	16
5.4 Evaluation of knowledge products by farmers	19
5.5 Tracking AHI knowledge products	21
5.5.1 At the community and district levels	22
5.5.2 At regional and international levels	22
6.0 Discussion	29
7.0 Conclusion	31
8.0 References.....	32

LIST OF TABLES

Table 1: Some key characteristics of the AHI benchmark site discussed in this paper	5
Table 2: Farmer priority information needs in Kabale, Uganda (N=55 parish groups).....	9
Table 3: Examples of information needs for policy makers, researchers, development agents and donors	11
Table 4: Training events to share knowledge and knowledge products.....	14
Table 5: Number of knowledge products from the RRT and site teams	15
Table 6: Some of the method guides developed by AHI.....	17
Table 7: Knowledge products evaluated by farmers in the different sites	20
Table 8: Evaluation of knowledge products based on gender (sex and age)	21

LIST OF FIGURES

Figure 1: Map of East and Central Africa showing location of the AHI Benchmark Sites discussed in this paper.....	4
Figure 2: African Highlands Initiative impact pathway.....	6
Figure 3: Number of publications and citations by year.....	23
Figure 4: Number of citations for 10 peer reviewed articles.	23
Figure 5: Website statistics for the past year.....	24
Figure 6: Number of proceedings hits since posting.	25
Figure 7: Average number of hits per AHI working paper since posting	26
Figure 8: Downloads of select AHI briefs in the past year.....	26

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LIST OF ABBREVIATIONS & ACRONYMS

AHI	African Highlands Initiative
ACP	African, Caribbean and Pacific
ASARECA	Association for Strengthening Agricultural Research in East and Central Africa
AusAID	Australian Agency for International Development
BMS	Benchmark Site
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Centre
COP	Community of Practice
CTA	Technical Centre for Agricultural and Rural Co-operation
DRD	Directorate of Research and Development (Tanzania)
EARO	Ethiopia Agricultural Research Organization (Now EIAR)
ECA	East and Central Africa
EIAR	Ethiopian Institute of Agricultural Research
ERIA	External Review & Impact Assessment
EU	European Union
IAR4D	Integrated Agricultural Research for Development
ICRAF	World Agroforestry Centre
ICT	Information and Communication Technologies
IDRC	International development research Centre
IFAD	International Fund for Agricultural Development
IMAWESA	Improved Management of Agricultural Water in Eastern and Southern Africa
INA	Information Needs Assessment
INRM	Integrated Natural Resource Management

ITAU	Impact Targeting and Assessment Unit
KARI	Kenya Agricultural Research Institute
KISPs	Knowledge and Information Sharing Products
NARI	National Agricultural Research Institute
NARO	National Agricultural Research Organization, Uganda
NARS	National Agricultural Research System
NGO	Non-Governmental Organization
NRM	Natural Resource Management
R&D	Research & Development
RRT	Regional Research Team
PM&E	Participatory Monitoring and Evaluation
SACCOS	Savings and Credit Cooperative Societies
SARI	Selian Agricultural Research Institute
SED	Sustainable and Equitable Development
UNDP	United Nations Development Programme

1.0 INTRODUCTION

Increasing degradation of the natural resource base in the highlands of East and Central Africa (ECA) interlinked with high levels of rural poverty is a major concern to governments in the region. Despite numerous innovations to reverse this trend (Thomas and Mati, 2000; Mati, 2007; Liniger and Critchley, 2007) few of them have been put into practice. This illustrates a glaring gap between knowledge and action characterized by 'Islands of Success' specifically pointing at deficiencies in the dissemination process. The traditional dissemination strategy of research findings has continued to use the ineffective research-extension-farmer pathway (Norris, 2001) leading to failure by past and current research and development (R&D) efforts in natural resource management (NRM) to effectively communicate findings to end users (Ashby, 2003; Mowo et al, 2010).

Substantial amount of data, information and experience from NRM research in ECA has been accumulated over the years but most of it has not reached target users (policy, decision-makers and farmers). Due to this the impact of research on agricultural development has been a subject of much controversy. Different factors are responsible for this scenario among them being (i) poor information targeting, (ii) limited expertise in knowledge management, (iii) improper packaging of knowledge products, (iv) focus on the scientific community at the expense of other potential users of information and (v) limited participation of stakeholders in knowledge management. To promote adoption of NRM practices therefore, enhanced knowledge management is required in order to improve the collection, synthesis, production, delivery and reach of NRM results to the different stakeholders with greater attention to answering their specific needs and interests. Spallek (2007) observes that knowledge is the 4th factor of production besides labour, capital and land and is only successful if it is oriented at and linked to the stakeholders' shared goals. Schwaab (2007) argues that knowledge management initiatives aim at identifying experiences/lessons and disseminating them widely to all stakeholders in a form they each can access and utilize depending on their information needs and how best they would prefer it packaged.

Knowledge management (KM) is defined as the systematic strategy of creating, conserving, and sharing knowledge to increase performance (Plunkett, 2001). According to Schwaab, (2007) knowledge management is a promoter and an agent of change and therefore it is essential given the large amount of data, information and experience accumulated over years and the need to work more efficiently with limited resources. A crucial problem with knowledge management is that knowledge must be formalized or made explicit in order to be available (Beckman, 1997). Interviews, observations, after action reviews and knowledge elicitation can be used in order to convert tacit knowledge into explicit knowledge (Cross and Baird, 2000). This process is defined by Nonaka and Takeuchi (1995) as "Externalization" where the use of metaphor facilitates this conversion. Knowledge exists in either explicit or tacit states. Explicit knowledge is that which has been codified in some way, such as in scientific journal articles, operating procedures and best management practices. Tacit knowledge on the other hand is that which people carry in their minds, such as facts, opinions, intuition, feelings and judgments.

Until recently, many people did not think in terms of "managing knowledge". They felt that knowledge was a personal asset accumulated from experience, education and trusted colleagues (Plunkett, 2001). Lately, various development-related institutions have stressed

that natural resources research should be demand-led in order to improve its relevance and potential for uptake by the intended beneficiaries. Arising from this emphasis, the issues of knowledge management continue to receive increasing attention. The growing recognition in recent years that sustainable development strategies need to encompass a globally integrated understanding of environmental as well as economic and social dynamics has placed even greater demands on the production and utilization of relevant knowledge (Kristjanson et al, 2007). Post and Weggeman (1999) conceptualize knowledge management as a 'knowledge value chain' which clearly locates the key stages of knowledge management from knowledge generation to commercialization and research adoption. Importing the concept of the knowledge management value chain into NRM will go one step forward towards eliminating the gap between academics/researchers and practitioners of integrated natural resource management (INRM). Effectively, the value chain demands that researchers begin a dialogue with the users of the research from the outset.

In the context of AHI, knowledge management efforts are complementary and crucial towards developing its specific focus to the research and development goals i.e. by helping to scale up the application of good results and their incorporation in policies, institutional arrangements and technologies that effectively support sustainable and equitable development (SED) (German et al, 2006). The AHI knowledge management initiative was borne from the recognition that despite a number of useful lessons emerging from the AHI benchmark sites, the impact of these on wider INRM discourse and practice had been limited within the region. AHI recognized that impact will not be obtained in the absence of deliberate documentation, "packaging" and targeting of information, coupled with dissemination and capacity building strategies. AHI also realized that it was not enough to disseminate information, but to link this to other actions that would improve the capacity and uptake of the information, and to collect feedback on its usefulness.

The usual format of documentation used by researchers in the region did not include dimensions that were useful to various users or practitioners, e.g. inclusion of social dynamics, attention to documenting methods and processes used (beyond trial techniques) and capacity building techniques. Therefore, appropriate communication tools were needed to enhance the sharing of knowledge. Such tools include face-to-face communication, searchable databases, websites, on-line discussion forums and synthesis documents that draw together current knowledge, communities of practice (COPs), workshops, networking opportunities and knowledge brokering.

To improve the programme's capability in reaching out to key partners to influence their behaviour and work, and align them with its mandate, AHI embarked on a knowledge management initiative supported by the International Development Research Centre (IDRC). This was done through an initiative titled "*Enhancing Knowledge Management to Advance Integrated Natural Resource Management (INRM) Research, Development and Advocacy*" which was implemented between 2002 and February 2008. This paper discusses the achievements of the project and provides recommendations on knowledge management for improved livelihoods and landscapes in the humid highlands of East and Central Africa.

2.0 OBJECTIVES

The overall objective of the AHI knowledge management initiative was to enhance the access and sharing of information among INRM practitioners for improved livelihoods in the highlands of East and Central Africa. Specifically, the initiative aimed at:

1. Improving planning, decision-making, advocacy and management capacity of resource users
2. Positively influencing policy makers in favor of participatory INRM as a strategy for ecological and economic change in the highlands
3. Improving the performance of practitioners and commitment of organization managers involved in INRM research and development
4. Building the capacities of researchers and development workers from partner organizations to enhance knowledge management.

These objectives were guided by the overall goal of maximizing the reach and effectiveness of INRM. The general objective targeted improving the capacity of grassroots communities to better manage their resources, and institutions to support these efforts by enhancing documentation, production and sharing of information. The objectives were achieved through use of interlinked strategies that (i) utilized lessons from well-grounded and practical models of effective INRM derived through systematic reflection and learning; (ii) used differential means of communication and content to reach a range of users; (iii) proactively seized opportunities for influencing policy and practices and (iv) promoted links with existing ICT and initiatives.

3.0 STUDY SITES AND THEIR CHARACTERISTICS

AHI Benchmark Sites (BMS) meet the following criteria: high altitude ($> 1,500$ m.a.s.l.), high population pressure (> 100 people per km²) and having clear signs of stress to natural resources (e.g. severe land degradation, land fragmentation to small parcels, decreasing agro-ecosystem productivity and crop and animal pest and diseases) (AHI, 2001). The project was designed and implemented at the BMS level and the main implementers were the Regional Research Team (RRT) and the AHI BMS teams in Tanzania (Lushoto), Ethiopia (Areka and Ginchi) and Uganda (Kapchorwa and Kabale) (Figure 1). Specific characteristics of the sites are summarized in Table 1.

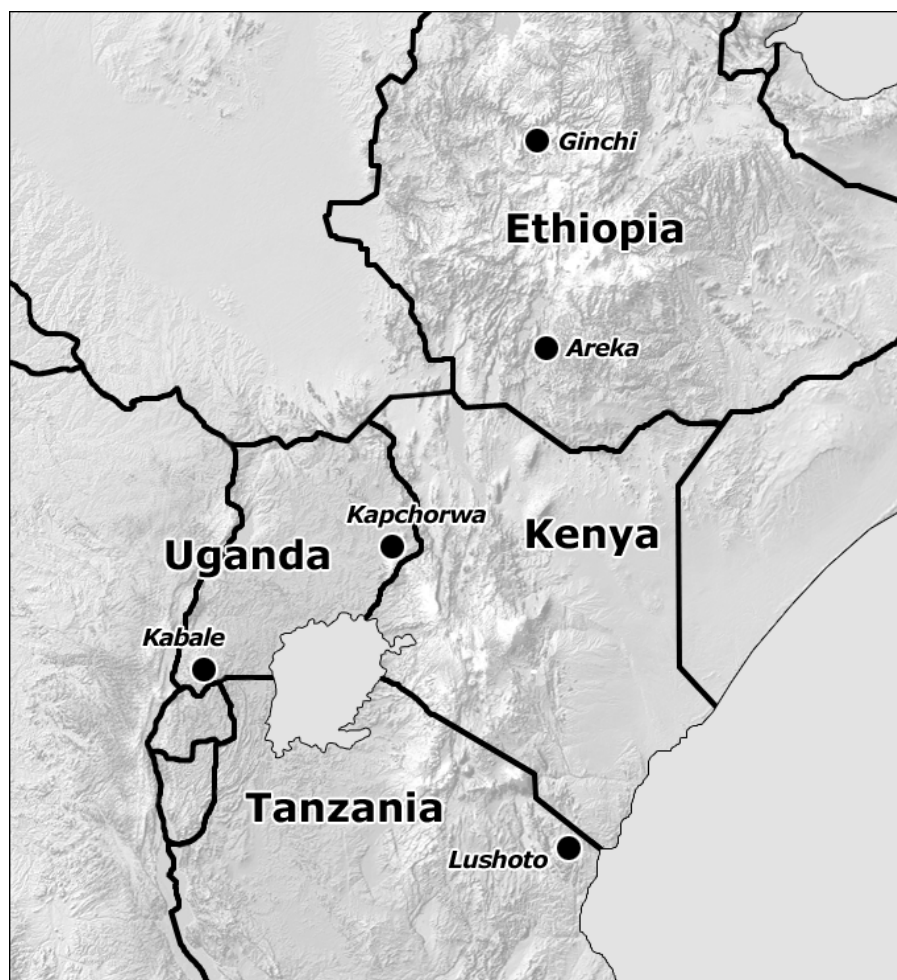


Figure 1: Map of East and Central Africa showing location of the AHI benchmark sites discussed in this paper

Table 1: Some key characteristics of the AHI benchmark site discussed in this paper

SITE ATTRIBUTES	BENCHMARK SITE				
	Areka, Ethiopia	Ginchi, Ethiopia	Lushoto, Tanzania	Kabale, Uganda	Kapchorwa, Uganda
Altitude (metres above sea level)	1800-2600	>2200	1100-1450	1500 - 2700	1000 – 2000
Population density (/km ²)	400-600	100-200	200-300	100 - 300	111
Enterprises	Enset, wheat, pea, maize, barley, sorghum, sweet potato, faba bean horticulture, communal grazing	Barley, pulses, Irish potato, wheat, oilseeds, seasonal rotation from individual cropland to communal grazing	Maize, banana, tea, coffee, horticulture in valley bottoms, high-value trees, zero grazed livestock	Sorghum, pulses, banana, zero grazing, vegetables, potatoes	Maize, beans, banana, wheat, coffee, barley Irish potatoes, some cassava
Irrigation	None	None	Seasonal	Seasonal	None
Livestock trends	Low numbers and decreasing; intensive management	High numbers yet decreasing; access to grazing land good	Low numbers and decreasing; zero grazing mostly	Low numbers and decreasing; mostly zero grazed	Low numbers and decreasing
Forest/woodlot access	Medium (tree planting common)	Limited (planting limited; remnant forest is distant)	Medium to high (mostly cultivated; natural forests are protected)	Few trees and decreasing	Limited forests; extensive woodlots
Market Integration	Limited; some off-farm employment	Medium	Medium to good (tea, vegetables)	Poor	Medium

Source: AHI, 1997

4.0 METHODOLOGY

The project was implemented in the context of AHI's impact pathway (Figure 2) which proceeds from the development and testing of innovations designed to increase local capacity in INRM in AHI benchmark sites (PROJECT 1); and institutionalization of methods and approaches in the ECA region to enable better assistance and support to grassroots' efforts at regional scale (PROJECT 2). The knowledge management grant provided AHI the opportunity to develop knowledge products in PROJECTS 1 and 2.

PROJECT 1

Developing innovations in pilot sites, districts and institutions

Mechanisms

PROJECT 2

Institutionalization of innovations in national institutions/partnerships

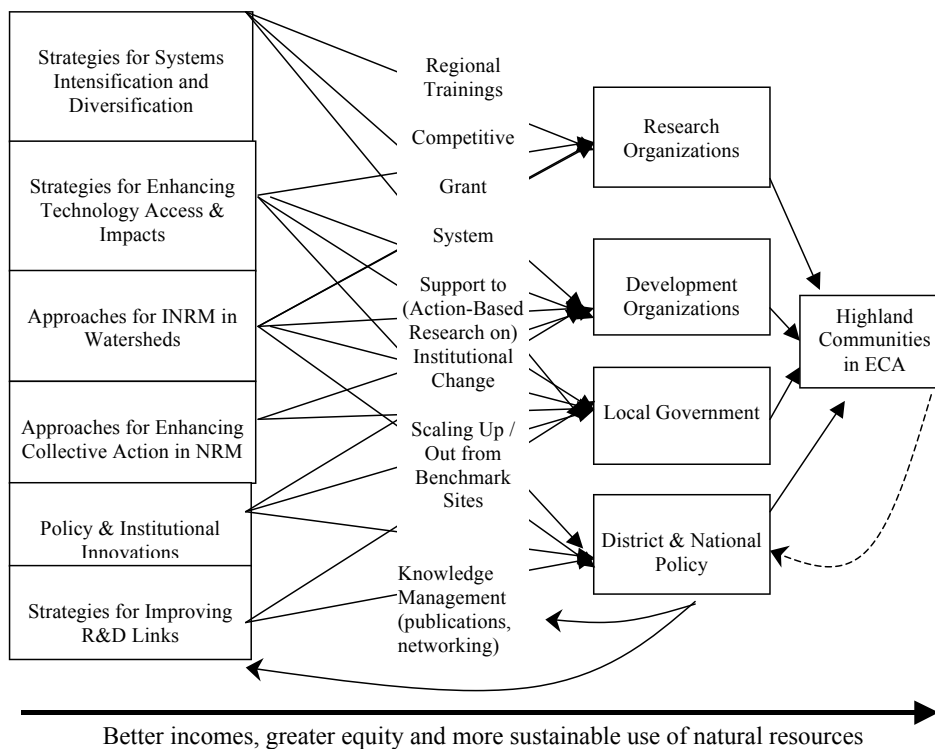


Figure 2: African Highlands Initiative impact pathway

AHI used action research to document and deliver on diverse knowledge products, while building farmer and researcher capacities in INRM activities as an overall methodology for field implementation. A step-wise methodology development process was used whereby researchers tested, monitored and documented what is being done, including the changes in the landscape, and changes in the attitudes and behaviours of researchers and farmers. Diverse tools were developed and used to collect and disseminate information in different forms. Examples of such tools are shown in Table 6 (Information needs assessment protocols for targeted end users) and Annex 1 (Outline of protocols for information needs assessment). A number of activities were implemented during the life span of the project to achieve the objectives. These are narrated below under each of the specific objectives.

4.1 Specific Objective 1: Improve planning, decision-making, advocacy and management capacity of resource users.

This objective was achieved through different activities including (i) the designing and execution of information needs assessments for farmers at the benchmark sites, (ii) capacity building to strengthen farmers' planning, negotiation, implementation and advocacy capacity, (ii) advocacy to policy makers using knowledge products in national and regional meetings, (iii) production and distribution of different knowledge products and (iv) tracking utilization and impacts of AHI knowledge products at the community level. Through this mechanism, new information and capacity needs with regards to participatory monitoring and evaluation was conducted in partnership between local communities and NARS partners.

4.2 Specific Objective 2: Positively influence policy makers in favour of participatory INRM as a strategy for ecological and economic change in the highlands.

To achieve this objective, this initiative linked up with another IDRC-funded ACACIA project in Uganda and the AUSAID and Italian Government-funded Landcare project in Tanzania, Uganda and Ethiopia. The main activities undertaken were (i) development and presentation of AHI knowledge products at regional and international fora and (ii) assessment of the information needs for policy makers, researchers and development partners at community and national levels. Further, in another IDRC-funded project, AHI commissioned an external review and impact assessment in 2007 to draw insights on results of the programme for the last 12 years. The assessment yielded insights on the extent to which policy makers were being reached by AHI knowledge products. The knowledge products are used for scaling up INRM approaches in East and Central Africa.

4.3 Specific Objective 3: Improve the performance of practitioners and commitment of organization managers involved in INRM research and development.

The knowledge products were categorized to target specific audiences and stakeholders. The key activities under this objective was to publicize AHI work to research and development organizations in the region by giving out AHI materials in scientific and development-oriented forum with R&D actors. The knowledge products are posted on the AHI website (<http://www.worldagroforestry.org/projects/african-highlands/archives.html>) to reach out to the global audience. Further, the regional research team conducted write-shops to develop and share methods guides for INRM and impact assessment. The impact assessment report is a public document and was shared in district, national and regional fora.

4.4 Specific Objective 4: Build the capacity of researchers and development workers from partner organizations to enhance knowledge management.

Capacity building was a key activity aimed at strengthening the ability of the site teams and local communities in the development and dissemination of knowledge products. The specific activities that supported this objective were; (i) on-site mentoring on knowledge management through follow-up visits by the RRT members across the sites in Tanzania, Ethiopia and Uganda (at the end of each visit key knowledge products such as AHI briefs and methods guides were tested and developed respectively), (ii) workshops that included site write-shops, developing quality proposals between sites and regional teams, and book writing at site and regional levels.

5.0 FINDINGS

5.1 Information needs of different categories of end users

Different stakeholders require different information implying that correct targeting is important and hence the need for information needs assessment. To ensure correct targeting of knowledge and information sharing products (KISPs), information needs assessment was conducted for the different user groups. This is important given that targeted knowledge management facilitates better and faster decision-making (Schwaab, 2007). This includes the contents of KISPs, how it is presented and the media through which it is distributed. Farmers might require more illustrations packaged in a way they can refer to it with ease. This is more important for the less literate in the community. In some sites it was found necessary to use vernacular languages and even drama to effectively communicate the messages.

On the other hand, policy makers require very brief and focused information as they are deemed to have limited time to read lengthy documents. Development agents would require manuals or guides packaged in a way that they can easily take with them to the field. The way information is packaged and transmitted to end users plays a critical role in communication and hence in ensuring understanding and uptake of intended innovations. The information needs of the different stakeholders were determined in the study sites using the information needs assessment (INA) protocols for different stakeholders as shown in Annex 1.

5.1.1 Information needs of farmers

An example of farmer priority information needs is shown in Table 2 for farmers in Kabale, Uganda. The table shows that information needs for the majority of the farmers in this site are on improved seeds/clean seed management, post harvest handling and market information. This reflects the most pressing needs of the farmers given the high losses in yields from lack of quality seeds and high post harvest losses. Markets are an important force in the uptake of technological information and farmers in Kabale like in the other AHI sites have shown that access to information on markets is important. Similar observations were made in the other study sites and also in Rwanda (Mowo et al, 2006; AHI, 2001).

The table shows that NRM, use of organic manure, work plan development and bee-keeping scored very low (below 30%) in terms of the number of farmers who requested for the information. For organic manure a possible reason might be that most farmers are familiar with it since it is their major source of nutrients. However, the low score on NRM is surprising given the extent of natural resources degradation in Kabale.

Table 2: Farmer priority information needs in Kabale, Uganda (N=55 parish groups)

Topic	Parish group						Total	%
	Mugandu	Karujanga	Buramba	Rwanyena	Kitooma	Kibuga		
Market information	6	10	9	10	10	10	55	100
Post harvest handling	6	10	9	10	10	9	54	98
Improved seeds/clean seed management	6	10	9	10	10	6	51	93
Soil characterization using local indicators	2	0	3	1	0	4	10	71
Crop and animal pests and disease controls management	6	1	6	6	8	7	34	62
Fertilizer management and application (source, quality, where, when?)	3	2	3	8	9	5	30	55
Local farm yard manure	2	4	5	6	1	8	26	47
Credit institutions/schemes	1	1	2	6	6	5	21	38
Bee-keeping	0	4	2	1	2	4	13	24
Organic manure	1	2	1	1	4	3	12	22
Workplan development	0	1	0	4	0	6	11	20
Natural resource management (bylaws, trenches, grasses)	3	3	8	10	6	9	39	18

5.1.2 Information needs for policy makers, researchers and development agents

Protocols for information needs assessment for policy makers, managers and development partners were developed and tested in Areka and Lushoto Benchmark sites in Ethiopia and Tanzania respectively. Part of the exercise on the information needs of policy makers was done during the 2006 AHI Regional Stakeholder and Steering Committee Meetings held from July 3-5, 2006 in Entebbe, Uganda which helped to identify the information needs of a select group of policy makers. These included NARI managers (and representatives of the ASARECA Committee of Directors), national extension managers and NGO representatives. Results of this exercise are summarized in Table 3.

Table 3: Examples of information needs for policy makers, researchers, development agents and donors

Common information needs for all the stakeholders	
Methods on systems intensification	<ul style="list-style-type: none"> • Participatory methods in NRM • Soil fertility management strategies for annual and perennial crops • Understanding social and biophysical niches for crop production to aid in out-scaling • Utilization of models (crop optimization, scenario studies, crop-livestock systems) • Monitoring and evaluation tools and baselines
Methods on institutionalization and scaling up	<ul style="list-style-type: none"> • Farmer field schools and field days, • Win-win technologies for replication that address livelihoods and NRM • By-law reforms for NRM at community level governed by community through collective decision-making • Capacity building and training at all levels, especially community/farmer training in NRM • Mechanisms to enable farmers access relevant information
Specific needs per country/organization	
Methods on policy and institutions	
Ethiopia (EIAR)	<ul style="list-style-type: none"> • Methodology for by-law reforms in support of NRM, facilitating farmer institutional development in NRM; PM&E • Hot Spot Analysis • Method for linking farmers to policy-maker • Methodology for self-led institutional change • Methodology for identifying barriers to institutionalization of new research methods
Uganda (NARO)	<ul style="list-style-type: none"> • Method for linking farmers to policy-makers • Methodology for self-led institutional change • Identifying barriers to institutionalization of new research methods
Tanzania (Lushoto District)	<ul style="list-style-type: none"> • Methodology for By-laws reforms in support of NRM governance at local and District level • Methodology for linking farmers to policy makers

	<ul style="list-style-type: none"> • Methodology for strengthening interaction among crosses cutting institutions
Methods on scaling up and institutionalization	
Ethiopia (EIAR)	<ul style="list-style-type: none"> • Framework for linking different learning approaches to improve R&D • Action Research Guide • Methods guidelines for research to integrate perspective of diverse stakeholders into research planning • Approach for iterative learning processes at community and project levels
Uganda (NARO)	<ul style="list-style-type: none"> • Framework for linking different learning approaches to improve R&D • Action Research Guide • Approach and principles for forging synergies among institutions in research-NGO partnerships • Approach for iterative learning processes at community and project levels
Tanzania (DRD)	<ul style="list-style-type: none"> • Methodology for strengthening interaction among cross cutting institutions • Methodology for identifying barriers to institutionalization of new research methods • Framework for linking different learning approaches to improve research-development linkages • Methodology for sustaining farmer-to-farmer spillover of technologies

Table 3 shows that with the exception of few cases, the information needs of the different stakeholders represented did not differ much but pointed to a high demand for the AHI products. Information needs assessments similarly carried out in Areka, Ginchi (Ethiopia) and Lushoto (Tanzania) identified different information requirements for NGOs, agricultural training colleges, research institutions, local government and the departments of agriculture and natural resources at zonal level. The information needs of the different groups differ from one site to another and between countries depending on the innovations being introduced and the specific requirement of the target groups.

5.2 Capacity building of researchers and development workers

Several trainings and guided learning workshops were implemented under this project with additional funding from the EU Capacity Building Project through ASARECA. Regional and in-country trainings were carried out across the sites (Table 4). The training covered a wide range of topics as shown in the table. The number of women participants was reasonable (about 26%) with more participation (percentage wise) observed in the ‘Training of Trainers course on District Integration for Natural Resource Management’ conducted in Machakos, Kenya (71%) and Korogwe Tanzania (50%) and the Training of Trainers course on Participatory Integrated Watershed Management conducted in Moshi, Tanzania (58%). The trainings that attracted the least number of women are the training on ‘Self-led Institutional Change for Integrated Natural Resource Management’ conducted in Kibaha, Tanzania (0.05%), ‘Training of Trainers on Participatory Integrated Watershed Management’ in Arusha, Tanzania (0.1%) and Training on Systems Intensification and Optimization in the Highlands of eastern Africa conducted in Awassa, Ethiopia (0.1%). The limited participation of women in the Self-led Institutional Change for Integrated Natural Resource Management training can be explained by the limited number of women research managers as this course was mainly meant for managers.

Table 4: Training events to share knowledge and knowledge products

Training event	Venue	Disaggregated data	
		Male	Females
Regional training			
Regional training workshop on self-led institutional change for integrated natural resource management	Entebbe, Uganda	21	3
Regional training workshop on participatory by-law reform for natural resource management	Lushoto, Tanzania	21	4
Sub total 1 (Regional training)		42	7
Follow-up training (in country)			
Self-led Institutional Change for Integrated Natural Resource Management	Kibaha, Tanzania	20	1
Self-led Institutional Change for Integrated Natural Resource Management	Nairobi, Kenya	24	4
Training of Trainers on Participatory Integrated Watershed Management	Arusha, Tanzania	20	2
Training of Trainers on Participatory Integrated Watershed Management	Moshi, Tanzania	12	7
Training of Trainers on District Integration for Natural Resource Management (KARI, Kenya)	Nairobi, Kenya	13	4
Training of Trainers on District Integration for Natural Resource Management	Machakos, Kenya	14	10
Training of Trainers on District Integration for Natural Resource Management	Korogwe, Tanzania	12	6
Building the Capacity for Documentation of Integrated Agricultural Research for Development (IAR4D) in NARO, Uganda	Mukono, Uganda	28	9
Training on Tracking Natural Resources Management Technologies Spillover	Butare, Rwanda	19	7
Training on Systems Intensification and Optimization in the Highlands of eastern Africa	Awassa, Ethiopia	20	2
Sub total 2 (Site-level training)		182	52
Grand total		224	59

5.3 Development and dissemination of knowledge products

Apart from the interim and annual reports submitted to IDRC every year, other major outputs of the project are the different types of knowledge products that have been developed at regional and site levels and distributed to different users. These can be grouped under the four AHI programme-level research thrusts, namely:

1. Farm level innovations
2. Collective action and watershed management
3. Improving research and development linkages
4. District institutional and policy innovations.

Table 5 outlines a summary of the total number of different knowledge products developed by site and regional teams. The number of publications is not substantial and quite a lot of unpublished data/information (grey literature) is still in the benchmark sites.

Table 5: Number of knowledge products from the RRT and site teams

Knowledge product \ Site	Areka	Ginchi	Kapchorwa	Kabale	Lushoto	RRT	Total
Journal papers	1	-	-	-	-	23	24
Papers in conference / proceedings	5	13	1	-	14	18	51
Manuals, tools and method guides	-	-	-	-	4	11	15
Working papers	-	-	-	-	1	25	26
Briefs	10	2	-	-	-	33	45
Leaflets	5	6	5	3	1	-	20
Booklets/brochures	-	-	4	1	1	-	6
Posters	4	3	2	3	7	14	33
Case studies	3	-	-	-	5	5	13
Total	28	24	12	7	19	129	233

5.3.1 Site level products (leaflets, brochures, pamphlets)

At the site level knowledge products targeted the resource users based on their information needs. More than 38 knowledge products were developed by site teams. These are in the form of leaflets, policy briefs, posters, case studies, method guides, brochures and booklets. To allow for wider reach some sites translated some of the knowledge products into the popular languages in the area e.g. Amharic in Ethiopia, Kiswahili in Tanzania and Rukiga in Kabale, Uganda.

5.3.2 Regional level products

At the regional level, knowledge products emphasized the production of policy and training briefs and the design and production of AHI publication series (AHI Method Guides, AHI Working Papers and AHI Briefs); publication of the AHI Proceedings and establishment of the AHI website. The target users include policy makers, NARS managers and researchers, extension and NGO managers, and the global community.

(a) AHI method guides

A total of eight method guides have been developed from the four thrust areas as shown in Table 6. Development of all the regional level method guides was led by a RRT member. Site team members were co-opted as junior authors except for method guide number 7 which did not include anyone from the site. From the table, most of the participants were from the Ethiopian site team in the development of the regional level method guides followed by Tanzania and then Uganda. The reason for this can partly be explained by the fact that the number of scientists active in the benchmark sites is higher in Ethiopia than in the other two countries and there were different reward systems for publication in the three countries. The methods guides can be accessed through the AHI web page or <http://worldagroforestry.org>

(b) AHI working papers

A total of 25 working papers have been published in the AHI publication series so far. Development of working papers is encouraged as a step towards promoting them to journal papers which requires a more rigorous review. AHI working papers can be accessed at <http://www.worldagroforestry.org/projects/african-highlands/archives.html#wps>

(c) AHI briefs

Thirty three (33) AHI briefs were prepared in collaboration with site teams. AHI briefs focus on relaying important messages to readers with limited time like policy makers, research managers, donors and other decision-makers. They are short (not more than 700 words, with photo and graphical illustrations enabling the reader to get the message in as short a time as possible. The briefs are organized around five themes; (i) systems intensification (Series A), (ii) institutional innovations (Series B), (iii) watershed management (Series C), (iv) advancing impact (Series D), (v) institutions and equity

short a time as possible. The briefs are organized around five themes; (i) systems intensification (Series A), (ii) institutional innovations (Series B), (iii) watershed management (Series C), (iv) advancing impact (Series D), (v) institutions and equity (Series E) and Training (Series T) as shown in the list below. AHI briefs can also be accessed at <http://www.worldagroforestry.org/projects/african-highlands/archives.html#briefs>.

Table 6: Some of the method guides developed by AHI

Title	Authors
Theme: Farm level innovations (1)	
Technology Spillover: A Methodology for Understanding Patterns and Limits to Adoption of Farm – Level Innovations. AHI Methods Guide A1 http://www.worldagroforestry.org/projects/african-highlands/pdfs/mgs/a1_spillover.pdf	German, L., J. Mowo, M. Kingamkono and J. Nuñez
Theme: Collective action and watershed management (4)	
Niche-Compatible Agroforestry: A Methodology for Understanding and Managing Trade-Offs in Tree Species Selection at Landscape Level. <i>AHI Methods Guide C1</i>	German, L., B. Kidane and S. Charamila, W. Mazengia, S. Ayele and T. Tolera
Participatory Watershed Action Planning. AHI Methods Guides No. B4. Version 1.0	Mowo, J.G., L. German, B. Kidane and Opondo, C. J
A Socially-Optimal Approach to Participatory Watershed Diagnosis. <i>AHI Methods Guide B2</i>	German, L. and K. Mekonnen
Creating an Integrated Research Agenda from Prioritized Watershed Issues. <i>AHI Methods Guide B4</i>	German, L., A. Stroud, G. Alemu, Y. Gojjam, B. Kidane, B. Bekele, D. Bekele, G. Woldegiorgis, T. Tolera and M. Haile
Theme: Improving research and development linkages (1)	
Action Research: An Approach for Generating Methodological Innovations for Improved Impact from Agricultural Development and Natural Resource Management. AHI Methods Guide E1	German, L., W. Mazengia, S. Charamila, H. Taye, S. Nyangas, J. Tanui, S. Ayele and A. Stroud
Theme: District institutional and policy innovations (2)	
Institutional Change: A Guide for Facilitating Self-Led Institutional Learning and Innovation from Within. <i>AHI Methods Guide D1</i>	Opondo, C., A. Stroud, L. German, S. Rao, J.G. Mowo and J. Tanui
Facilitators' Guide on District Institutional Collaboration for Integrated Livelihoods and Conservation. <i>AHI Methods Guide B2</i>	Tanui, J., R. Lutalo, C. Lyamchai and M. Hewison (2007)

(d) AHI proceedings

The AHI Regional Conference held in Nairobi Kenya on 12-15 October 2004 was organized to take stock of findings, challenges and lessons learned up to that time and to share experiences on “best practice”, approaches and methods on INRM. The conference also represented a step towards building awareness and institutionalizing promising new approaches to agricultural research and development in eastern Africa. The proceedings compiled the experiences of AHI and its partners in addressing integrated livelihood-NRM challenges across eight diverse themes. The eight themes make the eight chapters of the proceedings. These are (with number of papers in brackets):

- Chapter 1: Historical perspectives and future scenarios (4 papers)
- Chapter 2: Addressing bottlenecks to enhance impact (7 papers)
- Chapter 3: Fostering systems intensification and diversification (15 papers)
- Chapter 4: Enhancing gender inclusion, equity and awareness (9 papers)
- Chapter 5: Technology uptake mechanisms (10 papers)
- Chapter 6: Participatory integrated watershed management (6 papers)
- Chapter 7: Managing new working relationships (8 papers)
- Chapter 8: Emerging issues (4 papers)

The proceedings can be accessed at <http://www.worldagroforestry.org/projects/african-highlands/pdfs/proceedings.pdf>

(e) Book on approach matters in INRM

In a move to have the lessons and experiences of AHI in one consolidated document, a book titled ‘*Integrated Natural Resource Management in the Highlands of Eastern Africa: From Concept to Practice*’ was submitted to Earthscan, publishers based in the UK, and should be ready by January 2012. The publication is an ambitious effort to document more than 10 years of research, methodological innovation and lessons learnt in AHI through reflections of the protagonists themselves – AHI site teams and partners involved in innovating to enhance the impact orientation of research. It is an attempt to summarize the experiences of farmers, research and development workers, policy and decision-makers who have interacted around the theme of INRM in the humid highlands of ECA. It aims both to raise awareness of the crucial importance of “approach” in the outcomes derived from research and development work, and to distill lessons learnt on “what works, where and why.” The book therefore is enriched with examples and case studies from five benchmark sites whose variability provides the reader with an in-depth knowledge of the complexities of NRM in agro-ecosystems that play an important role in the rural economy of the region. The book is divided into six chapters:

- Chapter 1 gives an overview of the programme, how it evolved, the different phases it has passed through, and its organization and governance
- Chapter 2 summarizes methodological innovations oriented towards intensifying and diversifying smallholder agricultural systems for optimal system productivity (economic, social and ecological)
- Chapters 3 and 4 provide a detailed description of AHI efforts to foster participatory landscape-level innovation. While Chapter 3 takes an in-depth look into methods for

operationalizing participatory integrated watershed management, Chapter 4 focuses on efforts to address landscape level NRM problems through participatory governance

- Chapter 5 explores district institutional and policy innovations in support of local level NRM efforts
- Chapter 6 summarizes the programme's early experiences with scaling out pilot innovations and institutionalizing participatory, integrated approaches within national research and extension organizations.

(f) Other regional publications

Other publications targeting regional audiences have been developed in the form of leaflets (20), brochures/booklets (6), posters (33) and case studies (13).

The external review and impact assessment (ERIA) of AHI was conducted and published by the Impact Targeting and Assessment Unit (ITAU) of the International Maize and Wheat Improvement Centre (CIMMYT) in 2008 (Mekuria et al, 2008). The ERIA aimed at reviewing the programme's progress and assessing AHI's performance in the region. On knowledge management the ERIA observed that AHI should improve and expand its dissemination and publicity efforts at the national and local levels by reaping the opportunities offered by modern dissemination technologies; build on its own positive experiences (e.g., the telecentres); and enhance the exchange of its players also at the lower levels (through more farmer visits and exchanges, also trans-nationally). Further, Mekuria et al, (2008) noted that AHI has a well-organized website (as one of the main tools for dissemination of knowledge products), but it only targeted specific stakeholders (donors, research partners, governments, extensions...etc.). It shows the overall strategy and objectives of AHI, monitoring and outputs of the projects, but fails in facilitating other 'targeted' users. There is no search engine that could assist one find specific information amongst the AHI online publications. In addition, the website targets only English speaking audience.

(g) Peer reviewed journal publications

For wider reach of the AHI knowledge products, 23 peer reviewed journal papers were developed and published in different journals by 2008. Several other papers have been and are being developed since then.

5.4 Evaluation of knowledge products by farmers

Some of the knowledge and information sharing products developed for farmers were subjected to an evaluation to assess their demand by farmers using their own criteria. Therefore, the criteria were different in the different sites and for the different knowledge products. A total of 42 knowledge products in English and some of the popular local languages were presented for farmer evaluation (Table 7) in the different benchmark sites indicating also the winning products.

Table 7: Knowledge products evaluated by farmers in the different sites

Site	Topics submitted and language used	Total	Winning knowledge product
Areka	Poster – Evolution of watershed (English) Leaflet – Bolloso (Eng/Amharic) Leaflet – Sweet potato leaves (Amharic) Leaflet – Porcupine control (Amharic) Leaflet – Napier grass for rehabilitation (English) Leaflet – Taro	6	Taro leaflet
Ginchi	Leaflet – Evolution of watershed management (English/Amharic) Leaflet – Spring development (English/Amharic) Leaflet – Potato (English/Amharic) Leaflet – Forage and potato (English) Leaflet – Barley (English/Amharic) Leaflet – Livestock and INRM (English/Amharic) Poster – Linseed production (English/Amharic) Poster – Farmers motivated to participate in soil and water conservation (English/Amharic) Poster – Need for collective action and gully stabilization (English/Amharic)	17	Spring development poster & barley leaflet
Lushoto	Case study – When old farmers enter into tomato production ventures with the young: the case of selected villages in the Baga Watershed Poster – Making the difference in technology dissemination Case study – Spillover of AHI-disseminated INRM technologies from the pilot village of Kwalei to Watershed villages – unanticipated spillover of integrated innovations Case study – Two million shillings plus five years: how farmers in Lushoto graduated from begging and established their own SACCOS (English) Guide – Soil management technologies (Swahili) Guide – Tree selection for appropriate niches (Swahili) Booklet – Kijitabu Cha Mkulima (Swahili) Leaflet – Banana management (Swahili) Leaflet – Overview of Lushoto work (English)	9	Kijitabu Cha Mkulima pamphlet
Kabale	Leaflet – Conflict and natural resource management (CAPRI) (English/Rukiga) Poster – Conflict and NRM (CIAT) (English) Poster – Niche incompatibilities (English) Leaflet – Organic fertilizer (English/Rukiga) Poster – Compost manure (English/Rukiga) Leaflet – Clean seed management (English/Rukiga) Booklet – Post-harvest crop handling (English)	11	Clean Seed leaflet & Post Harvest Handling booklet

gender (sex and age) groups. There was no marked difference in the evaluation of the knowledge products by either women or men in the two age groups. Older women gave highest scores (see stars) to three knowledge products and younger women to five knowledge products. However, the three highest scores by the older women went to the same knowledge products similarly scored highest by the young women. The same trend is observed with men.

Table 8: Evaluation of knowledge products based on gender (sex and age)

Knowledge product (translated into Kiswahili)	Scores			
	Elders		Youth	
	Women (n=5)	Men (n=16)	Women (n=4)	Men (n=16)
Soil conservation and fertility management in highland areas (farmers' booklet)	5*	16*	4*	16*
Improved cabbage production	1	8	1	10
Improved tomato production	2	5	4*	16*
Improved banana production	5*	16*	4*	16*
Diamond die back moth: pests in cabbage	1	5	2	10
Plant fodder shrubs for more milk and cash	0	0	0	0
Control of thrips in tomato	2	5	2	10
Use of mulch for sustainable production of banana	5*	16*	4*	16*
Use of bunds for improved water management in tomato production	2	6	4*	13

5.5 Tracking AHI knowledge products

AHI knowledge products have been distributed to various organizations and communities within and outside the benchmark sites. More than 700 copies of different method guides were printed and more than 1000 CDs containing the different AHI knowledge products burnt and distributed to different users. Distribution of the knowledge products was done by site and regional team members attending various national, regional and international conferences. However, there was no systematic follow up on who took our materials and what impact they have had on them or their organizations.

5.5.1 At the community and district levels

Tracking the utilization and impact of AHI knowledge products at the community level was a continuous exercise conducted by site teams. At the site levels, the knowledge products have been used in creating awareness, training on specific facilitation needs, and grassroots farmer learning processes. As a result, site teams observed positive changes in farmer practices in natural resource management with substantial improvement in agricultural productivity. Awareness of better varieties and better agronomical practices, for example, improved yields of maize threefold in Lushoto.

At the district level some good examples have emerged on the use of AHI knowledge products and their impact as evidenced in Kapchorwa District, Eastern Uganda which was one of the AHI sites. In this site, the knowledge products complemented other projects active in the district which are run by the local government and some NGOs. Examples of the latter are the Eco-Agriculture Partners and a UNDP funded project (Equator Initiative) who used AHI knowledge products (among others) in developing a proposal on community knowledge management for Africa. The proposal was accepted for funding by the Bill and Melinda Gates Foundation.

5.5.2 At regional and international levels

The external review and impact assessment (ERIA) (Mekuria et al, 2008) noted that AHI knowledge products have attracted the interest of different individuals and institutions as seen by (i) the number of people visiting the AHI website (<http://www.worldagroforestry.org/projects/african-highlands/index.html>) (ii) organizations seeking permission to use AHI knowledge products and (iii) universities and other organizations directing their students to AHI sites for practical exposure to INRM.

(a) Access to and use of AHI materials from the AHI website

Global knowledge sharing was advanced by the AHI website (<http://www.worldagroforestry.org/projects/african-highlands/index.html>) through posting of knowledge products. The number of website visits, number of downloads and citation indices give a picture of demand for AHI knowledge products.

The most used standard means to evaluate access to scientific findings is to track publication citation indices. Searches were run on the Webhero programme for AHI working papers and 10 peer reviewed journal articles. Figure 3 shows the number of publications and the total number of citations per year. There is a clear peak in 2006, which corresponds to an intensive publication effort in preparation for the AHI Steering Committee meeting. In other years, the publication record has been poor and there is a clear need to sustain written outputs on a more regular basis. On average, each peer reviewed article has been cited 0.9 times. Yet Figure 4 illustrates that citations are concentrated in a few peer reviewed publications, with several of them having no citations at all. A more in-depth analysis is needed on the reason for this trend, as the number of citations does not appear to be explained by the time since the article was published. While

Figure 4 illustrates how citations correlate with total number of publications, factors affecting the use of publications by others should be identified (e.g. topic, type of journal).

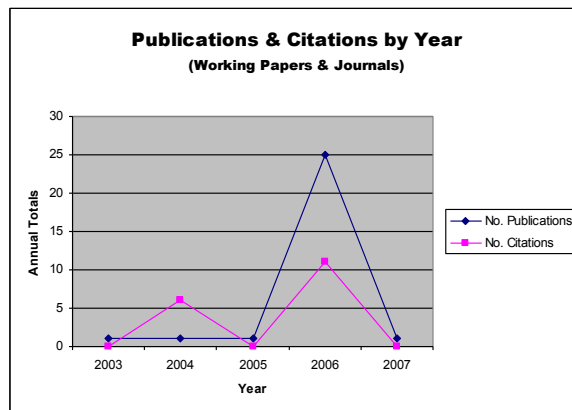


Figure 3: Number of publications and citations by year

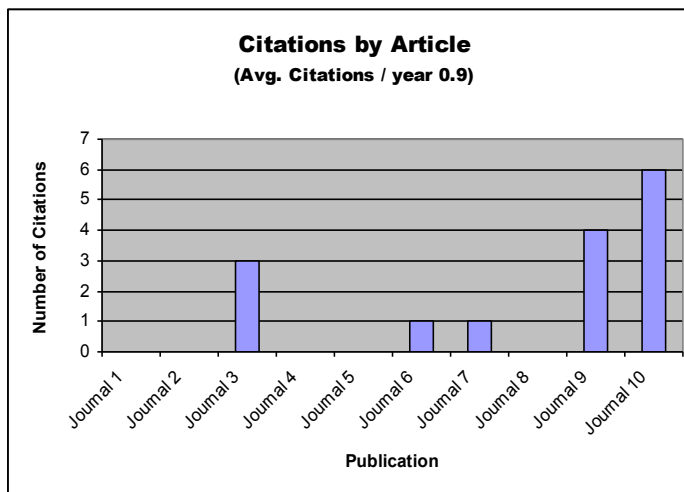


Figure 4: Number of citations for 10 peer reviewed articles

Statistics compiled by the AHI website host indicate much better performance as compared to citations indices. While there was a clear peak in website visits in June 2007 (one year following the launch of the new website), interest has been relatively steady above 1,500 visits per month (Figure 5). While the rate of downloads of AHI proceedings dropped in

the second half of 2007, the total number of downloads (using numbers of ‘hits’ as a liberal proxy) is extremely high (Figure 6). Even if only half of the hits result in actual downloads, the proceedings would have been downloaded more than 18,000 times. As the website host offers statistics for only the top 30 hits (in frequency), information for working papers and AHI briefs is limited to those which make the “top 30” list.

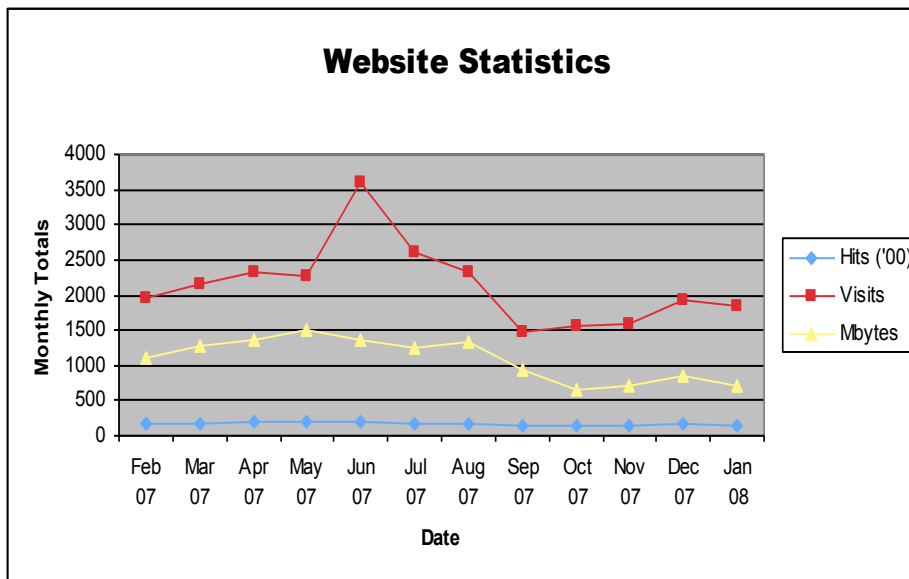


Figure 5: Website statistics for year February 2007 – January 2008

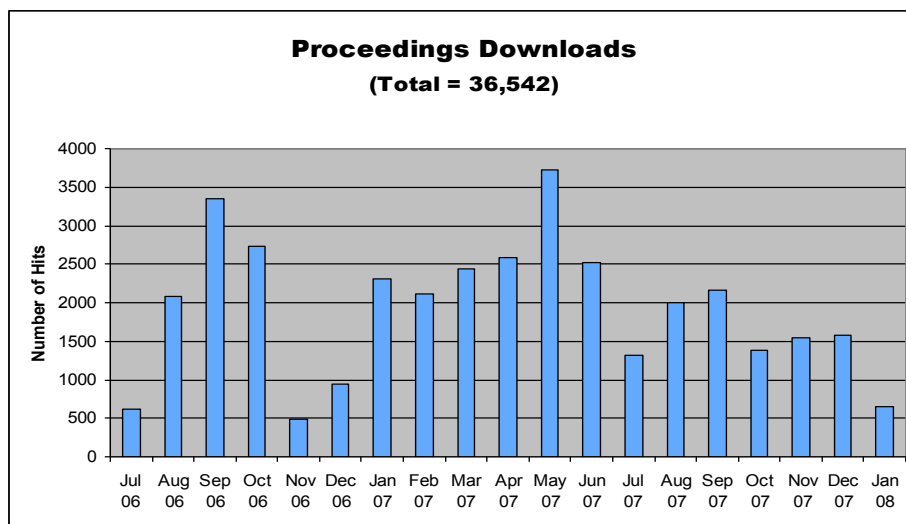


Figure 6: Number of proceedings hits since posting

Data is available for an average of 50% and 4% of AHI working papers and proceedings, respectively, suggesting the greater popularity of the former. With the average number of hits rising steadily since posting in July 2006 (Figure 7), the average number of monthly downloads for the listed working papers ranging from 95 to 175 over the past year and the high number of total working paper hits since posting (24,612), there is clearly a very high demand for these documents. Data on briefs could, however, be misleading as the number of hits required for statistics on each brief to be listed (the monthly “cut-off”) ranged from 41 to 64. For the approximately 4% of briefs listed, the total number of monthly hits went as high as 245 and the average number of hits per brief was around 64 (Figure 8). Briefs therefore were quite popular, and given the limited time invested in them relative to working papers it is probably worthwhile to continue producing these. With 62 countries shown to have accessed the AHI website, it is clear that the influence of AHI extends far beyond the target ecoregion.

The implication of these findings is that peer reviewed journal articles do not have as much impact as the AHI publication series in terms of reaching end users. While the CGIAR requires peer reviewed publications for the programme to remain viable as an ecoregional programme, the “impact” evidence of AHI publications suggests the programme should put its energies into producing in-house publications.

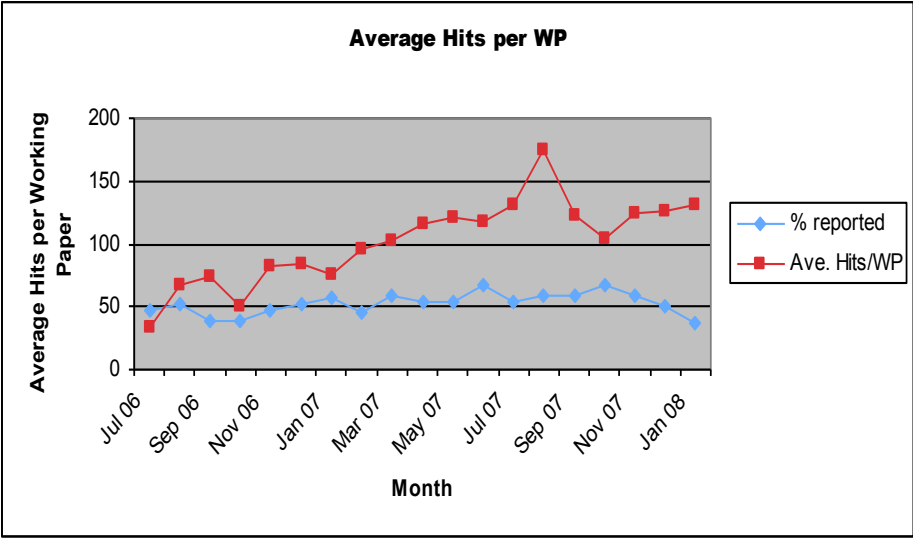


Figure 7: Average number of hits per AHI working paper since posting

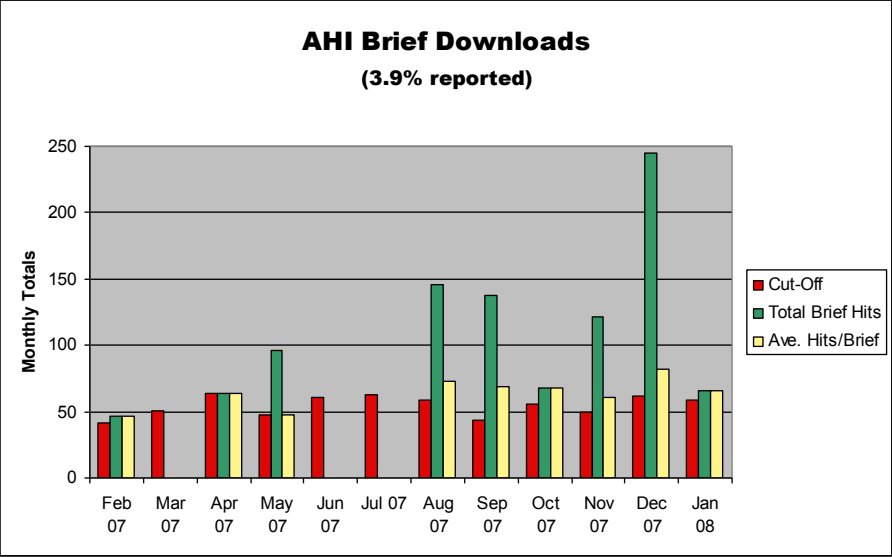


Figure 8: Downloads of select AHI briefs in 2007

Yet beyond the numbers, participant testimonies are perhaps the best illustration of how these dissemination methodologies were received:

After acknowledging the limited legitimacy of action research, and the difficulty of getting people to acknowledge action research in the CGIAR and national research systems, one professor from Ethiopia stated:

“... if you come up with this approach you will really have an initiative for Africa. So I am extremely impressed by the way things are happening in AHI, but I am also aware of and appreciate the very big struggle you are facing... Then you look at how much data you can get while doing development research as a primary activity...Our research system has to change.

“The innovative part of this methodology is to me the watershed diagnosis with different groups of farmers based on their social class, gender, etc. We are used to carrying out the diagnosis with a whole group where all types of farmers are grouped together.”

(b) Organizations asking for permission to use AHI knowledge products

Several organizations have asked for permission to reprint some of the knowledge products after they successfully accessed them through the different outlets AHI has been using. This is the outcome of investing in the production and dissemination of KISPs. Examples are shown in Box 1 below.

(c) Request for collaboration and information from different organizations

Boxes 2 and 3 present examples of requests for collaboration and information from Sweden and Netherlands respectively, further evidence of the outcome of the dissemination of knowledge products by AHI. Other requests were received from the Technical Centre for Agricultural and Rural Co-operation – ACP-EU (CTA) to produce a 5-minute documentary on sustainable land management and agroforestry by AHI in Uganda or Ethiopia in preparation for the seminar, *“The implications of climate change for sustainable agricultural production systems in ACP countries”*, in Ouagadougou, Burkina Faso, that took place on 26-31 October 2008. The Wondo Genet College of Forestry and Natural Resources in Ethiopia requested to bring a team of participatory and action research staff to one of the AHI sites after coming across information about the programme.

Box 1: Request for reprint permission

Dear Sir/madam

I take this opportunity to introduce myself as Tarun Pokiya, working as a CRC Coordinator for the Institute of Chartered Financial Analysts of India (ICFAI) University Press. I am part of the "Copyrights Cell" team handling issues related to copyright/reprint permissions from ICFAI. I am writing to you to seek your permission to reprint the below mentioned article.

The details are as follows:

Article: The Many Meanings of Collective Action Lessons on Enhancing Gender Inclusion and Equity in Watershed Management

Authors of the article: Laura German, Hailemichael Taye, Sarah Charamila, Tesema Tolera and Joseph Tanui

Issue Details: 2006 AFRICAN HIGHLANDS INITIATIVE (AHI) • WORKING PAPERS # 17

Page extent of the article: Entire Article

Source/URL: http://www.africanhighlands.org/pdfs/wps/ahiwps_17.pdf

Title of ICFAI's Professional Reference Book: "Watershed Management: Case Studies" (Book title is subject to change after the final review). Expected Date of Publication: November 2008

Looking forward to an early response from you and thanking you in anticipation

With Best Regards,

Tarun Pokiya, CRC Coordinator, ICFAI Business School,

E Mail Id: tarunp@ibsindia.org

Box 2: Request for collaboration from Sweden

My name is Elina Andersson and I am a Swedish student who is planning to carry out a study on soil fertility management in Uganda which will be performed within the master course in Human Ecology. The aim of the study is to examine soil fertility management strategies among smallholders and fieldwork will be carried out during two months in Hoima district.

I found the work of your organization very interesting and I am writing to ask if you are represented in Uganda, and in that case, who I may contact to ask for an interview on your work in this field of research.

Best regards,

Elina Andersson

E-mail: skogssus@hotmail.com

Phone: +4640121895

Box 3: Request for information by University student; Wageningen University, Netherlands

As part of my bachelor thesis research at Wageningen University (the Netherlands) about Scaling issues in participatory approaches to Soil and Water Conservation, I am planning to do a case study. I found the African Highlands Initiative a very interesting project with a truly people-centred approach, and therefore I decided to do the Case Study on the AHI. The question I am trying to answer about the AHI, is this:

How did the AHI project deal with scaling issues and what were the reasons for success and failure in this particular case? Therefore, I have some questions to you:

- Could you provide me with data or reports on scaling issues which have not been published on the website?
- Who is responsible for/ specialized in/ dealing with scaling issues within the project?
- On the AHI website, under 'Scaling Out', it says: The literature on scaling out generally emphasizes how to get technologies beyond pilot communities or farmer groups to larger numbers of farmers. Could you name some of this literature or important authors on this subject?

I hope you can find the time to answer these questions for me.

If you want to know more about my thesis, you can find my thesis proposal in the attachment.

Thank you in advance,

Kind regards,
Leendert van Wolfswinkel
Wageningen University & Research Centre
leendert.vanwolfswinkel@wur.nl

6.0 DISCUSSION

Effective management of natural resources in the highlands of ECA is vital for enhanced household food, nutritional and income security as well as sustaining the natural resource base. Excessive land degradation characterized by deforestation, massive loss of top soils, landslides, siltation of water bodies and agricultural lands in valley bottoms has negatively affected ecosystems health and livelihoods of highland as well lowland dwellers. It is also one of the major factors contributing to weakening the agro-ecosystem resilience to the adverse effects of climate change. Mitigating land degradation requires, among other factors, application of proven innovations by resource users. However, much as there are numerous technologies which could ensure effective NRM and hence reverse the trends in land degradation, access to information remains one of the major bottlenecks in adoption of these technologies. An important aspect observed by site teams when implementing the different AHI projects is the limited knowledge on natural resource management by different stakeholders participating in the agricultural production value chain. This is caused by the limited access to the right information, in the right format and at the right time for the different stakeholder groups (Masuki, 2008). Access to information by farming communities has the potential to contribute to improvement in rural livelihoods because communities will be empowered with the necessary knowledge to manage natural resources.

Results from this study shows that different stakeholder groups require different sets of information, packaged in a way that suits each particular group. In addition to this, the reach of this information and hence the media of dissemination is crucial. Of importance also is systematic tracking of the reach and impact of the disseminated knowledge products as this gave us the measure of how stakeholders have been influenced by the information.

The different stakeholder groups were influenced differently by the information reaching them leading to different reactions and impact. Increased awareness by farmers led to improved natural resource management and better linkages to markets; factors that contributed to improved yield (Meliyo et al, 2006; German et al, 2006). Various NGOs which accessed AHI knowledge products benefitted from them, including accessing donor funding as happened in Kapchorwa in Eastern Uganda.

At the regional level institutional changes were observed. For example, NARS partners started reforming their research set up and institutional arrangements. While changes at the local level may be attributed to work taking place at benchmark sites and only partially attributable to this project, there was a clear relationship between this grant and the project's influence on strategies of the NARS in Ethiopia (EIAR) and Uganda (NARO) as well as the Sub-Saharan African Challenge Programme and ASARECA in general. The NARS management and researchers at large have recognized the value of documenting and sharing their lessons as this has enabled them make informed decisions. Meanwhile, IMAWESA (Improved Management of Agricultural Water in Eastern and Southern Africa) an IFAD funded project under ASARECA, recognizing the importance of documentation and AHI's experience on this, asked AHI to build capacity in this area culminating in the development of the Methodological Guide for Process Documentation (Mowo et al, 2007).

Four outputs could be considered innovative as far as ensuring relevance and wider reach of the AHI knowledge products. These are: (i) targeted sharing of the knowledge products, (ii) evaluation of farmers' knowledge products by farmers, (iii) use of different formats for dissemination of the knowledge products and (iv) use of different regional and international conferences and workshops as avenues for dissemination of knowledge products. Targeted sharing started with reaching out to managers and policy makers to create a common vision and direction of the project. Evaluation of knowledge products by farmers increased their interest in and ownership of the knowledge products and challenged researchers in ensuring quality and relevance of the information contained in the various knowledge products. The different formats used in dissemination of AHI knowledge products led to increased access to information by different groups of users. For example, the use of CDs, which can store a huge amount of information, was a convenient medium when distributed in conferences because most people prefer to carry less bulky materials. For stakeholders with access to the internet it was convenient for them to access all AHI knowledge products from one point. The use of forums such as conferences and workshops ensured wider reach even to actors outside the NRM box and hence catalyzed demand for the knowledge products and opportunities to forge strategic partnership with non-traditional but important actors such as the water and health sectors.

Requests for AHI knowledge products from different organizations show that there was extensive reach of our knowledge products. The most effective was through the website which is by far the most efficient way of dissemination of information where facilities exist. Unfortunately, in the study countries and elsewhere in Eastern Africa such facilities are confined to institutions and few individual households, especially the learned. However, in another study Masuki et al (2008) showed that with improvement in such services like rural electrification including the use of solar power, such facilities are moving closer to rural communities especially at district/county and parish (sub-county) levels. With limited investment by the relevant departments at these levels, farmers close to these facilities can access information from the websites. This implies that developers of

information need to consider uploading easy-to-understand information in their websites considering the diversity of people who wish to access the information. Otherwise, the website has been an important source of information for scientists and development agents in organizations that have access to the relevant facilities.

Perhaps an important aspect that was not covered in this initiative, but studied under other AHI projects is the role of indigenous means of communication in information sharing among rural communities. The use of indigenous mechanisms for communication like traditional dances where songs are modified to focus on given technologies proved to be an effective tool in communicating information to farmers (Owenya, 2006). Apart from being a means of communication traditional dances also provides entertainment and social gathering creating harmony in the community which is vital for successful natural resource management. In the course of implementation of the project several lessons emerged. These include the acknowledgement that; (i) knowledge products are an important ingredients or catalyst for change as knowledge and experience are shared and put into use by different stakeholders, (ii) continuous documentation and regular reporting are essential building blocks for quality knowledge products as they ensure effective capture of the processes and (iii) adopting different knowledge packaging and dissemination approaches is an effective strategy for ensuring wider reach.

7.0 CONCLUSION

The IDRC support to knowledge management in AHI has been one long investment in a field that is crucial for sustainable management of the natural resources and the survival of highland communities and beyond. After generation of large amounts of data and information it was imperative that resources be directed to packaging and sharing of the knowledge generated for which this project provided timely intervention. The support from this project provided the means to the site and regional teams to document experiences and analyze, synthesize and evaluate lessons while providing avenues for informing others using pertinent communication mechanisms. This has contributed significantly to the visibility of AHI and our R&D partners. Built upon past IDRC support, the project has effectively assisted AHI to “close the loop”– that is to document and disseminate information derived from its experiences to have the envisioned institutional and technical impacts.

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ANNEXES

Annex 1: Outline of protocols for information needs assessment

A. Target groups

- a. Farmers
- b. Researchers
- c. Development/NGO
- d. Policy-makers

B. Objective

Identify the information that is most urgent (for farmers to address priority problems, and for others regarding what they want to learn from the AHI experience).

C. Methodology

Conduct stakeholder meetings with each of the four stakeholder groups, asking:

- a) Current information gaps related to AHI watershed management activities (content); and
- b) Most useful current information channels that inform practice/behaviour (format).

Farmers

Hold community meeting to brainstorm on the following:

- a) Information needs according to watershed problems;
- b) How farmers get information (modern and traditional channels), and the most effective information dissemination channel (consider leaflets, radio, video, drama, mentor systems, peer groups, farmer to farmer).

Researchers

- a) Site team meeting to identify key aspects of AHI work that could be of interest to other researchers;
- b) Formulate a questionnaire that would be distributed through mail and/or given as an interview (to be discussed);
- c) Identify researchers and stations to be targeted for the evaluation;
- d) Questionnaire should cover the most important information sources that enable them to adopt new research practices and Topics they are most interested in from AHI work.

If the work is new to them, a summary of diverse activities being carried out in watershed work should be given – including integrated research, participatory research, watershed diagnosis, by-law reforms, multi-stakeholder work, systems intensification, etc.

Researchers within AHI host station, and in other stations, centre managers

Development/NGOs

- a) Identify key aspects of AHI work that could be of interest to development organizations in the above meeting;

- b) Formulate a questionnaire for this particular group incorporating the dimensions identified for NGO consumption, that would be distributed through mail and/or given as an interview (to be discussed);
- c) Identify NGOs, service providers and extension to be targeted for the evaluation;
- d) Questionnaire should cover the most important information sources that enable them to adopt new development practices and topics they are most interested in from AHI work

If the work is new to them, a summary of diverse activities being carried out in watershed work should be given – including integrated research, participatory research, watershed diagnosis, by-law reforms, multi-stakeholder work, systems intensification, etc.

NGOs, Ministry of Agriculture, Ministry of Natural Resources, Water ministries, others engaged in extension

Policy-makers

- a) Identify key aspects of AHI work that could be of interest to policy-makers during the above meeting;
- b) Formulate a questionnaire for this particular group incorporating the dimensions identified for consumption by policy-makers, that would be distributed through mail and / or given as an interview (to be discussed);
- c) Identify policy-makers to be targeted for the evaluation;
- d) Questionnaire should cover the most important information sources that enable them to modify existing policies and topics they are most interested in from AHI work.

If the work is new to them, a summary of diverse activities being carried out in watershed work should be given – including integrated research, participatory research, watershed diagnosis, by-law reforms, multi-stakeholder work, systems intensification, etc.

Interview/consult higher-level research managers (e.g. EARO Headquarters, SARI Headquarters, DRD Headquarters, NARO Headquarters); Ministry of Agriculture and Ministry of Natural Resource and Water Ministries (national and regional heads); members of the ruling party.

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United Nations Avenue, Gigiri - PO Box 30677 - 00100 Nairobi, Kenya
Tel: +254 20 7224000 or via USA +1 650 833 6645
Fax: +254 20 7224001 or via USA +1 650 833 6646
www.worldagroforestry.org