Connecting Biodiversity with People's Wellbeing

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Contents

List of Acronyms

CBO	Community Based Organization
CSE	Conservation Strategy of Ethiopia
CWRs	Crop Wild Relatives
EIA	Environmental Impact Assessment
ENDA	Environmental Development for Action
EWCA	Ethiopian Wildlife Conservation Authority
FfE	Forum for Environment
FVs	Farmers Varieties
GMO	Genetically Modified Organism
IBC	Institute of Biodiversity Conservation
IK	Indigenous Knowledge
ISD	Institute of Sustainable Development
LEK	Local Ecological Knowledge
MoARD	Ministry of Agriculture and Rural Development
NBSAP	National Biodiversity Action Plan
NP	National Park
PA	Protected Area
PASDEP	Plan for Accelerated Development to End Poverty
SNNP	Southern Nations Nationalities People's Republic
TEK	Traditional Ecological Knowledge
UN CBD	United Nations Convention on Biological Diversity

Opening Keynote Address

Dr. Kassahun Embaye
Institute of Biodiversity Conservation (IBC)

Dr. Kassahun Embaye thanked the Green Forum and staff of IBC for choosing such an important theme- "Connecting Biodiversity and People Well-being"- and for organizing such a timely and judicious event where major actors can come together and discuss how to connect our vast resources for developing our communities and nation while not compromising the perpetuation of these resources and to come up with a common understanding and workable recommendations to facilitate the innovative linking of fragmented efforts to sustain the utilization of our rich biodiversity. He emphasized the peculiarity of the workshop by indicating its focus not only on connecting biodiversity, but also its feature of building on the positive relationship between biodiversity and people, rather than preaching the repeatedly spoken negative relationship between society and nature. Extending his speech, Dr. Kassahun mentioned that although socio-economic development demands the use of living and non-living natural resources, it must be done in a way that maintains its health and existence, and should not compromise the balance between harvest and reproduction. He also indicated that the current trends in global socio-economic development are unhealthy, in that most of the current global development comes at the expense of nature. Biodiversity is most vulnerable to various threats, as the cumulative effects of all our past and current interventions have ended up in massive environmental crises, undermining the lives of millions of people and has put the sustainability of the economic development of many nations in question.

According to Dr. Kassahun, fixing the current environmental crises which come mainly from the abuse of the normal processes of nature has resulted in a huge loss of investment. Many countries in the world, including Ethiopia, are now paying for what they have done to their environments, though the cost and effect varies from country to country. Developing countries in particular suffer under the precarious effect of such nature imbalances as they do not have the capacity to reverse the ill effects. He clearly stated that

the world cannot continue repeating the same mistakes as the consequences will become more complex and ultimately irreversible. He further mentioned the existence of a serious collusion between biodiversity and development in Ethiopia and that the current strong economic growth in the country cannot continue without forming synergy between biodiversity conservation and development. He then mentioned that development intervention has to be sustainable if healthy growth is sought. The impact of any development intervention has to be assessed in-depth starting from the planning phase and also needs monitoring during implementation, making all possible efforts to mitigate any adverse impact on the environment and on local communities. In line with this, Dr. Kassahun mentioned that Ethiopia's government has begun implementing a new five year development plan, called "Growth and Transformation Plan". Part of this plan will create synergy between sustainability and fast development through promoting a green economy.

Continuing his presentation, Dr. Kassahun said that during this Year of Biodiversity, Ethiopia is putting its best foot forward to integrate conservation and development. However, he explained that harmonizing conservation and development initiatives is not easy, and that the different stakeholders need to share vision and responsibility. Building on his premises, he mentioned that existing inherent biological and bio-cultural diversity in Ethiopia is a base for the country's development and can thus be a pillar for poverty alleviation. For a country like Ethiopia where agriculture is the main source of livelihood for most people, giving attention to sustainable development and moving beyond the status quo is necessary. He commented on the need for avoiding the pressure of development over conservation as this cannot last long when the ecosystem services and biodiversity is ill-managed.

Finally, he mentioned a few of the achievements of IBC in its 35 years, mainly the various in-situ and ex-situ conservation efforts, and the collection and storage of about 62,000 plant varieties. In conclusion he mentioned that Ethiopia's biodiversity is diminishing at an alarming rate, yet it is in a position to recover. He added that as each organism has unique features, we have to pay attention to all, understand that sustainable development is more about the future than the present, and hence, the current maximum exploitation of resources should be limited through more reasoning and concern for the future. There must also be an understanding that the contribution of biodiversity to our economy is currently far below its potential and needs to be studied and integrated in innovative ways.

View from the Green Forum

Million Belay
Melca Mahiber

Your Excellency, Invited Guests, Colleagues, Ladies and Gentlemen

It is with great honor and pleasure that I am presenting to you the view of the Green Forum on the topic of this year, which is 'connecting biodiversity with people's wellbeing.'

I will be talking about conservation of biodiversity, biocultural diversity, agro biodiversity and the role of women in biodiversity conservation. As you can see from the program, the Green Forum has chosen these four topics be the focus of this event.

This Green Forum is unique as it is held during the International Year of Biodiversity.

Discussion about biodiversity is so critical. Why is biodiversity, or thinking about bio-diversity, important to us?

One of the critical themes in the conservation of biodiversity is the issue of protected areas?

Biodiversity conservation efforts have shifted emphases and practices over time, based in part on our growing understanding of the biological, social, and cultural complexity of the task. Worldwide there are two opposing views on biodiversity conservation. The first emphasized the importance of protecting rare species and wilderness areas. It promoted the exclusion of humans from these areas. With this conception of nature, solutions to loss of nature focused on placing a "fence" around nature, excluding people (generally through reserves and protected areas), and letting nature take its course.

The second conceptual framework focused on utilitarian views of wildlife and wildlands. This is based on the assumption that poor people are agents of environmental degradation and the only way that we protect our nature is through benefit to the people arising from wildlife protection. If we open clinics

and schools, this view holds, then protection will be ensured. But experience does not support this view with very few exceptions like the CAMPFIRE program of Zimbabwe. Even the campfire program has a lot of critics.

I am not saying that either protection through excluding people or income generating through community based natural resources management projects do not totally work. There might be a need for them from time to time.

Now a Bold New Frontier for Conservation is being opened. It is based on the realization that Indigenous peoples and local communities, both sedentary and mobile, have for millennia played a critical role in conserving a variety of natural environments and species. They have done this for a variety of purposes, economic as well as cultural, spiritual and aesthetic. There are today many thousand Indigenous and Community Conserved Areas (ICCAs) across the world. These include forests, wetlands, landscapes, village lakes, water catchment, rivers and coastal stretches and marine areas. The history of conservation and sustainable use in many of these areas is much older than for government-managed protected areas, yet they are often neglected or not recognized in official conservation systems. Many of them face enormous threats.

Fortunately, there is also a growing recognition of ICCAs and acknowledgement of their role in the conservation of biodiversity. The Vth World Parks Congress and the Program of Work on Protected Areas of the CBD accepted them as legitimate conservation sites that deserve support and, as appropriate, inclusion in national and international systems. Some governments have followed suit. Others had already included them within their official Protected Area Systems. The Ethiopian government law on Protected Areas supports this initiative in its acceptance of Community-Conserved Areas as one of its protected area category. We applaud the government for this.

Your Excellencies and ladies and gentlemen, talking of biocultural diversity. After repeated failure to conserve biodiversity, those who are concerned in its conservation are realizing that they have missed one critical component, which is culture. They have come up now with a term called bio-cultural diversity.

Bio-cultural diversity talks about a dynamic set of socio-ecological relations in which “diverse natures” and “diverse cultures” have historically produced and continue to produce one another. Taking livestock diversity as an example, we can see that the majority of breeds in developing countries are products of communities and their indigenous knowledge about animal breeding and management.

Moreover, as many scientists have observed, biological and cultural diversity are declining together under the same global pressures. The loss of language leads to the loss of knowledge about species. At the same time, the loss of biodiversity corresponds to a diminishing human vitality.

We can say a lot about traditional ecological knowledge related to agro-biodiversity. What is very much worrying is, even though formal education and globalization have their merits, they are acting as agents of erosion of our culture. Bio-cultural diversity knowledge and practices should flow from generation to generation and intergenerational learning is critical for the survival of our identity and our wellbeing.

So we should focus on the conservation of culture as well as the conservation of biodiversity. Losing one will mean losing the other.

Your Excellencies and Ladies and Gentlemen, talking of agro-biodiversity

I was in Wollo last week. I went to Woreilu, one of the Weredas, as it is one of the centers of highland seed diversity in Ethiopia. I was walking with a farmer in the village and as we were passing fields of barley, wheat, lentils, pea and beans, planted on a beautiful landscape, I asked him what they were planting and what input they use to increase the productivity of their land. He told me how the diversity in crop varieties is decreasing and how farmers are increasingly relying on improved varieties and how year after year the amount of chemical fertilizer that they are using is increasing. My question was 'are farmers getting more money in to their pocket after all the purchase of all this inputs? His answer was a big NO. So, what are we sacrificing our biodiversity and the sustainability of our agriculture for, if it is not resulting in food increase and in ensuring the productivity of our land? Climate change poses an additional challenge as having a diverse seed and the knowledge related to it is critical for adaptation. Is there any other alternative?

Well, a recent workshop that was organized by MELCA, ISD and EOSA and which participated leading thinkers on the issue in Ethiopia and Africa, Dr. Tewolde Berhan Gebre Egziabher and Dr. Melaku Werede included, concluded that 'the kind of agriculture that we should follow should be based on farmer varieties and ecological agriculture. Ecological agriculture implies including the whole biodiversity/ ecosystem around the farm in to the equation rather than what is just produced on the farm. The conclusion is that using compost, increasing the plant biomass around the farm, healing degraded lands and enhancing the productivity of farmer varieties with research which participates farmers, will definitely increase productivity and improves food sovereignty. It also improves the health of both the ecosystem and the people. This is the direction that we should go if we going to adopt to the climate change.

We must then defend and protect the smallholder and peasant farmers, herders, fishers and other small-scale food providers who conserve and develop agricultural biodiversity that will secure future food. In so doing, we must prohibit any systems, methods, processes or technologies, which might damage agricultural biodiversity and related ecosystem functions.

This is also why we think we should resist the imposition and importation of Genetically Modified Organisms in to our food systems, as they are dangerous to our biodiversity and the rights of our farmers to conserve and share their seed. They also endanger the health of our ecosystems by increasing the use of chemicals despite their promise of use of little or no agrochemicals.

Ladies and gentle men, we should also recognize the role of women in the conservation of biodiversity. Women play a huge role in selecting, experimenting and conserving agro-biodiversity. In many communities, they also advise their husbands on what should be planted in the farm. In some communities in Wollo, it was reported that during the famine of 1984 some women preferred to starve their family than lose their seed. The home garden of women is abundant with medicinal plants and it the pharmacy of the household. They also have time and space tested knowledge on food preparation and storage, which is critical for the growth of any countries food system. This role, however, is little recognized and we need to acknowledge this immense critical knowledge through various mechanisms including policy, which focuses on supporting women knowledge system and participatory research.

As a final note to my speech, let me tell you a story from Bale.

Once up on a time, a handsome rat was born to a famous rat family in the Bale Mountains. When he was ready to marry and procreate, he looked around at all the girls around him and did not feel that they are his equals. He told this to the elders in the community and they all agreed and started to confer on where they could find a wife for their handsome prince. They decided to ask the Sun for a wife. They told to the sun 'you are so beautiful and powerful than any creature that we know. Can you give us your hand to be a wife to our handsome prince? The sun replied 'No I am not the most powerful as I have no power against the cloud. It effectively blocks me and I cannot reach you if it is there.' The elders agreed and asked the cloud to be the wife. Cloud said 'I am so flattered with your request but I am not the most powerful. I am powerless against a strong wind. So you have to ask the wind. 'The wind replied when asked for its hand 'thank you for asking me but I am so powerless against the mountains. They reduce my speed and I even loose the water that I hold when I am faced with them.' The elders thanked the wind for its honesty and went to the mountain with their request. The mountain laughed and said 'you see, yes I am so strong and can block the wind but I am

so powerless against you. You can enter in to one part of me and go out through the other. I am so porous because of you.' The elders could not believe their ears and told this to their astounded prince. He said 'after all, we are powerful and I should have married my own than looking for someone.' So he chose one of his own and married in a huge fan fare.

The Moral of the story is that the solution to our biodiversity loss is on our hand. Let us base our development on the knowledge, innovation and practices of our local communities and marry what they have with the external knowledge system in a selective way and when it is needed. We should stop calling our farmers, pastoralists, fishers, forest dwellers and other communities as backward and degrade their knowledge and practices. Let us not think about developing, mobilizing, organizing, inspiring, etc. of local communities. Let us learn from them. Let us give them a meaning full space and presence in our policymaking. Let us give them the space and they will help us conserve our biodiversity. After all wellbeing is not only economics. Local people tell you that wellbeing does include the health of their ecosystem and the revival of their history. We need to base development on the aspirations and realities of people. Then people will have a meaningful wellbeing.

In conclusion, I think we should push for community conserved areas, put culture in to our conversation as we talk about biodiversity, base our agriculture on farmer seed varieties and recognize and support the role of women in biodiversity conservation.

Thank you very much for listening to me and I hope you will participate in the Green Forum's sessions actively and have a much greater opportunity to learn with us about the challenges and good practices related to our Biodiversity.

Opening remarks

on behalf of H.E. State Minister Beshir Abdulahi
Mr. Tesema Legebo
Agricultural Sector Support Project Coordinator, MoARD

Distinguished Participants,

Ladies and Gentlemen,

This conference takes place at a timely juncture. Globally, we observe the International Year of Biodiversity in order to recall the importance of protecting the wealth contained in the multitude of animal and plant life.

Here in Ethiopia, we are working hard to improve the livelihoods of our people by building up a strong economy. We have just concluded the performance evaluation of the First Five Years Development Plan. The economy has grown at an average rate of 11 % every year, the production of major crops has risen by more than 50% and social and infrastructure services are reaching more and more people. We can be proud of these achievements. Yet we know that much remains to be done.

As you know, we have made a strong commitment to move this country and its people further ahead. The government's Growth and Transformation Planning for the next five years sets out ambitious goals – such as doubling our food production as well as our industrial output.

But the plan also recognizes the need to conserve our natural resources, which includes Ethiopia's rich biodiversity. For many, these two goals – developing the economy and protecting the environment – are incompatible. They argue that building new roads and factories pollutes our water and air and destroys the habitats for plants and animals. They argue that efforts to protect our nature in reserves and parks deprives the people living in theses areas of the resources they need to improve their lives.

We can easily find examples for such cases. But this is not the way it has to be and there are other examples that show us that the protection of nature and human development can not only co-exist side by side, but they can actually

reinforce each other. In the long run, we have to admit that sustainable economic development and our survival as a species are even dependent on the protection of our environment and the preservation of its diversity.

Why is that? If the world's biodiversity is rapidly diminishing – why should we care?

In simple words: to keep our options open. To allow us to adapt - and to survive - in a constantly changing environment. We all know how climate change is affecting this country: rainfall is more erratic, hail is damaging crops and some plants will no longer grow in certain areas. We need to find crops better adapted to the new circumstances – and nature's diversity offers a wealth of option to choose from. Without diversity, we have no options. So we must keep these options alive, we must preserve biodiversity, to keep ourselves alive.

Protecting our biodiversity is not a task of its own that can be separated from our other goals. On the contrary: Nature and human culture have been co-evolving over thousands of years. A culture is marked by the environment in which it develops – and a landscape is marked by the people who inhabit it. Take for example the inuit people living in zones of permanent winter, whose language has 50 different words for snow. Here in Ethiopia, where many languages have no concept of snow, you can find areas with more than 50 varieties of wheat – each with a separate name. Language and culture conserve the knowledge about local biodiversity. If we lose this language, we will also lose the knowledge about these 50 varieties of wheat – and maybe also the one that is best adapted to the new climate conditions.

Protecting biodiversity thus also means protecting the diversity of culture. Our federal system provides a strong foundation for different cultures to strive. This is a good starting point for our efforts. We are here today to learn about best practices of how protecting cultural and natural diversity can strengthen each other and also contribute to the development of our national economy. Tourism is only one promising field – and I am happy to say that our Ministry of Tourism held a conference on Tourism and Biodiversity just days ago to address this issue. I would like to thank the organizers of the Green Forum for putting such positive examples at the center of this conference.

Instead of wasting our time arguing whether to protect nature or to develop our economy, let us join forces and do both! The presentations over the next two days will demonstrate that it is possible. I invite all of you to use your knowledge and resources to make this possibility a reality in Ethiopia.

And now, I wish you fruitful deliberations and declare the conference officially open.

Agro-biodiversity in Ethiopia: Mainstreaming for Development and Conservation Management

Dr. Fassil Kebebew
Institute for Biodiversity Conservation

1. Introduction

Ethiopia is recognized as a centre of agrobiodiversity and is designated as one of the eight Vavilovian Centers of crop origin and diversity and harbors crops of global importance including sorghum, millet, Arabica coffee, durum wheat and tef, among others (Witt, 1985). For example, Coffea Arabica is estimated to contribute 60-75% of the global coffee crop. The genetic variation found in Ethiopia's highland forests is important as all the Arabica coffee grown in the world today is offspring of a limited number of samples collected in the Ethiopian forests (Kushalappa and Eskes, 1989; Van der Vossen, 2001; Anthony et al. 2002). As a result, coffee has a very narrow genetic base world-wide and is relatively vulnerable to pests and diseases. The economic value of wild coffee genetic resources for the world coffee industry in breeding programs for disease resistant, low caffeine content and increased yields is estimated to be between a half and one and a half billion USD per annum (Hein and Gatzweiler, 2006).

Ethiopia also harbours important gene pools of crop wild relatives (CWRs) for at least over 120 species of crops, including grains, pulses, oil seeds, vegetables, tubers, fruits, spices, stimulants, fibers, dyes and medicinal plants. In addition, several crops that were domesticated outside of East Africa exhibit high secondary diversification in Ethiopia, as evidenced in farmer varieties (FVs) of wheat, barley, and several pulses.

Owing to these and other factors, the country's strategies such as the National Biodiversity Strategy and Action Plan (NBSAP (2005) sets the overall biodiversity goal of the country as "The establishment of effective systems that ensure the conservation and sustainable use of Ethiopia's biodiversity,

provide for the equitable sharing of the costs and benefits arising there from, and that contribute to the well-being and security of the nation". The NBSAP identifies four strategic objectives (highest priorities of biodiversity conservation for Ethiopia), and 23 specific objectives which are followed by one or two actions for the achievement of the overall goal. One of the four strategic objectives is on agrobiodiversity, which aims to conserve the rich agrobiodiversity of the country through a mix of in situ and ex situ programmes. Likewise, the country's development plan known as "Plan of Accelerated and Sustainable Development to End Poverty (PASDEP)" recognizes biodiversity as a source of security for improved livelihood and a foundation for the agricultural development strategy of the country. It states the government's desire to strengthen, reinforce and expand biodiversity activities so as to effectively support food security and livelihood programs in line with the development plans of other affiliated bodies.

Ethiopia's agrobiodiversity resources (both wild races and crop cultivars) have important "option values" for the agriculture sector. These are not readily monetized and are not captured in the economic cost-benefit calculus for development. As a consequence, they are threatened. Population growth, coupled with poverty, the commercialization of agriculture, changes in consumption patterns, conversion to modern, high-input agriculture, and the globalization of agricultural markets are threatening agrobiodiversity in Ethiopia causing a rapid loss of agricultural biodiversity and wild crop varieties from wild lands. Recent studies undertaken (Mesfin Bayou, 2010, Bezabih Emana, 2010; Feyera Senbeta & Kassahun Tesfaye, 2010; Eshetayehu Tefera, 2010; Kebebew Asefa, 2010; Kassahun Tesfaye & Feyera Senbeta, 2010; Moll, 2010) concluded that agrobiodiversity will only be maintained if the country mainstreams agrobiodiversity conservation into production systems and landscapes through strategies that simultaneously promote food production and biodiversity conservation. However, there is a huge absence of mainstreaming initiatives in the country.

2. Causes for absence of agrobiodiversity mainstreaming

Policy failure: The policy and legislative frameworks do not articulate strategies specific to the conservation and sustainable use of agrobiodiversity in general and the mainstreaming of agrobiodiversity into policies, strategies and plans in other sectors that impact the conservation and sustainable use of agrobiodiversity. This is compounded by insufficient awareness at policy, scientific and community levels on mainstreaming agrobiodiversity into production systems. For example, even though the NBSAP establishes the country's strategy for protecting biodiversity, it fails to identify options and recommended action for the conservation and sustainable use of agrobiodiversity and the integration of agrobiodiversity concerns into agricultural, wildlife, forestry and other policies. Similarly, PASDEP falls short

of integrating biodiversity and agrobiodiversity considerations into the planned development activities in other sectors. In response to the growing demand for food, the country's extension service places a high emphasis on high yield varieties even in areas where FVs are better suited.

Market failure: Despite the current and potential future importance of Ethiopia's agrobiodiversity to the international community, there has been little or no financial return from global benefits into the Ethiopian economy at the national or community levels. This is largely due to the inability of the market to price agrobiodiversity conservation values into production systems, compounded by the failure of the financial sector to recognize crop system diversification as an asset. This is occurring despite the full knowledge that innovative biodiversity-rich farming systems can be high-yielding and sustainable and that the adoption of farming practices that utilize and conserve biodiversity may ultimately limit agricultural expansion and improve environmental quality. Most Ethiopian farmer varieties are produced under organic conditions and almost 80% of its coffee is shade coffee. Despite the current global demand for organic products, there has been little to promote the demand for agrobiodiversity friendly products (such as shade coffee and teff). Information on values and incentives for small holder farmers to include FVs in farming systems is scattered and illusive. There is little marketing of FV, and the supply chains are ephemeral, lacking a certification and verification process needed to provide traceability.

Institutional arrangement: The greatest institutional barrier to agrobiodiversity conservation is the fact that there is no defined agrobiodiversity management working structure under both the governmental or community structures of the kebele, the lowest governance structure with influence on natural resource exploitation.

Although the dominant small-scale low-external-input agriculture depends to a large extent on agrobiodiversity elements, research institutions, universities and extension services are not yet sufficiently capable of practical support to the small-scale agriculture sector to maintain or improve productivity in order to complement modern external input-dependent agriculture.

On the other hand, despite astounding progress, major gaps in the knowledge of and approaches to crop in situ conservation persist in Ethiopia, considering the complexity of the farming systems and agro-ecological conditions under which the various crop species and their landraces are managed. There is also an outstanding need to support the farmer-based approach to in situ conservation by more extensive research on the genetic, ecological, and social dynamics of landraces. Research on agrobiodiversity is limited to documentation of the farmer varieties, and even that is not yet complete. The result of this is that there are huge knowledge gaps regarding improved

agrobiodiversity, especially regarding its role in improving food security. Although low yields is one of the most often cited threat to FVs, there is little research attention to their agronomic performance, hence no attempt to increase productivity levels. For example, enset has the potential for providing industrial starch but it is not exploited, despite the fact that the country cannot meet its domestic demand for starch and instead imports considerable quantities. This is compounded by the fact that farmers and local traders have very low skills in agronomy, and harvesting and processing of most crops.

Although there is full recognition of the importance of the wild gene pools for economic crops (e.g., coffee, teff, enset), there is no institutional or individual capacity to plan for and implement conservation strategies linked to utilisation that will contribute to economic development.

3. Climate change and agrobiodiversity

The agricultural sector in sub-Saharan Africa is expected to be especially vulnerable to climate change because the region already endures high heat and low precipitation, provides for the livelihoods of large segments of the population, and relies on relatively basic technologies, which limit its capacity to adapt. Ethiopia's First National Communications to the UNFCCC reported that the temperature across the country could rise by between 0.5 and 3.6o C by 2070; the annual average temperature is expected to reach a high of 26.92°C by 2070-2099 (Cline, 2007). During the same period, precipitation is expected to decrease in the northern regions, while southern areas could see an increase of as much as 20%. Decreases in rainfall will therefore be exacerbated by higher evaporation rates associated with the higher temperatures. These fluctuations of both temperature and precipitation will have implications for agrobiodiversity and agricultural productivity. For instance, recent studies conducted in 50 districts in Oromia Regional State reveal that increasing temperature marginally during the rainy and dry seasons reduced the net revenue per hectare by US$997.70 and US$177.60 respectively (CEEPA, 2006).

Climate change will bring other unknown uncertainties such as more intense and frequent droughts, compounding already difficult climatic conditions. In addition, the reduction of the length of growing seasons could lead to the loss of many long duration farmer varieties as well as force large regions with marginal agriculture out of production, adversely affecting food security in the country. Therefore, it is important to ensure that agriculture is able to adapt to climate change and can continue to produce the food needed by expanding human population. Agrobiodiversity will clearly play an important role in this. Farmers and land managers need adaptive capacity to match food production to needs while maintaining agrobiodiversity in the face of changes in the

timing and intensity of precipitation, seasonality, temperature regimes during the growing season, diseases, pests and weeds and interactions between all of these factors.

4.The way forward

Mainstreaming agrobiodiversity into agricultural production systems: The long-term solution to the genetic erosion of agrobiodiversity in Ethiopia is to mainstream its conservation into farming systems through strategies that simultaneously promote food production and biodiversity conservation. Despite an increasing population and consequent land-use pressure evident in the country, it is still possible to increase food productivity without compromising the maintenance of the FVs in the country. This will only happen if production and business practices are shaped to actively sustain agrobiodiversity, including CWR within the farming systems. This could be achieved through formulating enabling policies and laws and establishing marketing systems, in combination with conservation in 'set aside' in situ gene banks developing in parallel schemes of payment for ecosystem services (PES) and institutional capacity.

Enabling policy/law: The country should put in place a comprehensive agrobiodiversity friendly policy and legislative framework to promote agrobiodiversity friendly production practices. Agrobiodiversity in food security and socio-economic development has to be taken seriously by policy makers at the national and regional levels. That means agrobiodiversity principles have to be mainstreamed into local and national agricultural, trade and industry policies and programmes. The National Extension Service has to be empowered to provide farmers with knowledge based extension technology to promote FVs and conservation of agrobiodiversity within the current production systems. The extension service should recognize the role of FVs in national food security and economic growth, and appropriate extension packages to support conservation and sustainable utilization of these landraces alongside the high yielding varieties. Equally, the service has to regard the importance of conserving the wild relatives of crops which have Ethiopia as the centre of origin and/or diversity, and there has to be an appreciation of the critical importance of these gene pools in the global agriculture sector.

Marketing: Market incentives make agrobiodiversity more profitable. Commercialization of agriculture combined with the need to increase food production to meet increasing food demands is one of the key threats to many FVs in Ethiopia today. FVs need to contribute adequately to solving the current food security and development problems in Ethiopia by providing for the growing demand for traditional, organic or simply different foods that could also provide a niche market for many of the farmer varieties (FVs) at

competitive prices. For example, the unique selling point for tef in an international market is the fact that it is a gluten-free cereal which may be consumed by people suffering from celiac disease (chronic digestion insufficiency). It is estimated that 45 million people suffer from this condition worldwide (Celiac Sprue Association 2008: www.csaceliacs.org/celiac_defined.php). Tef is already being used to bake gluten-free bread in Netherlands. The global market for low caffeine coffee fetches billions of USD every year. Farmers need to be linked with these and other markets and provided with the capacity to participate in the marketing of agrobiodiversity friendly products equitably and profitably. Care should be taken, however, to avoid incentive measures that may promote unsustainable practices such as increased demand due to availability of markets leading to over harvesting.

Markets provide incentives for farmer uptake of agrobiodiversity friendly practices. Markets support achieving economic growth with all its merits of poverty reduction and securing livelihoods to greater numbers of people and conservation of the FVs of Ethiopia. The key components of the strategy will be the expansion of demand, improved efficiency of production, supply control mechanisms and certification. The driving force is to increase the value of the crop to primary producers and associated market chain actors so as to sustain a sufficient level of income for the producers and other poor actors that participate in the marketing chain.

Expansion of Demand: An increasing demand has to be created for natural products and a growing range of related niche markets. Simultaneously, consumption trends have to increase towards traditional food products in many, particularly developed countries. There has to be increased knowledge and interest about the nutritional composition of food products and an increased interest in 'well-being' and 'health products' such as natural medicinal, cosmetic or endurance sports food (such as food for triathletes and long-distance runners).

Improved efficiency: A successful marketing chain must be able to bring a product of satisfactory quality onto the market at a reasonable price, and at the same time ensure that farmers are fairly compensated. To achieve the two targets (reasonable market price and fair compensation to farmers) requires a production and marketing atmosphere with a great deal of horizontal and vertical integration, communication and cooperation. The horizontal organisation of farmer groups can be achieved through cooperatives to share the burdens of capital investments, to gain bargaining power in dealing with middlemen and to secure profitable contracts. The vertical organisation of farmers is needed to encourage farmers to transcend operating at the level of mere harvesting/collecting and to move into product processing. In the case of coffee production, for example, more farmers should be able to invest into

their own coffee pulping and coffee drying or washing equipments to be able to sell processed high quality green coffee beans. This could strongly support their position in the overall marketing chain.

Supply control mechanisms: To successfully promote conservation and increased incomes, a strong consumer demand and a relatively efficient marketing chain need to be tempered by mechanisms to control supplies. This is necessary to avoid strong commoditization which might lead to declining prices. Supply control is necessary to preserve minimum incomes for the producers once initial market failures have been taken care of. Supply control can be achieved through mechanisms such as specification of product characteristics or quality attributes, specification of production processes or methods and linking the product to its area of production (labelling for region of origin).

Certification: Branding requires certification; but the current certification standards do not guarantee achievement of the double goal of increasing incomes while encouraging conservation. Although certification is a relatively new phenomenon in Ethiopia, wild forest Arabica coffee from South-western Ethiopia is certified according to the generic certification standards Utz Certified, Fair Trade and Organic (EU-Regulation No. 2092/91). By highlighting the positive image of being from the cradle of worldwide Arabica coffee in the 'untouched' Ethiopian highland rainforests, the product found its way into small niche markets particularly in Europe. However, research conducted in the certified local Arabica coffee cooperatives provides evidence that the current certification activities do not positively correlate with the sustainable use of the ecosystem coffee forest. In contrast, certified cooperatives witness a trend towards intensification of forest management at the expense of the forest ecosystem and biodiversity. This is because the generic certification standards currently applied for the forest coffee were developed for intensive agricultural production systems (e.g. coffee plantations in the Americas). They do not acknowledge the uniqueness of Ethiopian forest coffee as a NTFP growing in its natural environment, as any plantation coffee from Bolivia, India or Vietnam can be rewarded with the same certification labels. There's a structural dilemma concerning the fact that the applied standards certify the product 'forest coffee', and not the production system 'coffee forest'.

Under these circumstances, producers respond to the premium price provided by certification with a typical microeconomic behaviour and increase their forest coffee production by means of intensified forest management activities. A new, updated system is needed.

Conservation of agrobiodiversity and wild relatives together in "set aside" in situ gene banks: It is only in nature that plant diversity at genetic, species and eco-system levels can be maintained in the long term. Indeed, agrobiodiversity

exists as a result of human interaction with plant species and the landscape via agricultural systems over very long periods of time. Interaction of FV with CWR is particularly important in allowing a greater proximity-mix of crops, increasing the probability of the mixing of genes, and hence the potential for new varieties to emerge. These wild varieties contain a great deal of genetic diversity necessary for survival, and although they are low producers, their proximity to cultivated cousins allows for genetic traits to pass back and forth from weedy to crop varieties, further facilitating a rich diversity of genetic possibility in the adaptation of new varieties and the maintenance of existing genetically diverse varieties. Gene banks on the other hand only capture 'snapshots' of genetic material that, once 'banked' are unable to express new forms which result from adaptation to changing environments and conditions, and the emerging pests and diseases which these produce. Unless plants are conserved in viable breeding populations in natural habitats, the risk of genetic erosion will remain high.

Payment for Ecosystem Services (PES): Mechanisms for compensating farmers for the services delivered by improved agrobiodiversity conservation have to be investigated and a PES scheme established for the agrobiodiversity conservation. Improving management of the agrobiodiversity conservation will directly promote the ability of the ecosystem to deliver two services with potential markets; water catchment and carbon sequestration. These require identification of feasible PES schemes and project proposals for their implementation.

Development of institutional capacity: Institutional framework that links national, regional, zonal, district/woreda, kebele, NGOs and CBOs plans and enhances operational capacity for in-situ conservation of agrobiodiversity and crop wild relatives has to be created. Capacity and accountability of local government to enforce policies, sectoral guidelines and spatial plans in support of agrobiodiversity have to be increased. Capacity development schemes to develop skills at all levels and actively engage communities to support the integration of FV into farming systems, and to link such production to private sector markets has to be in place. Local level producer societies for specific crops such as shade and low caffeine coffee have to be promoted as a mechanism of incentives for adoption (linking farmers to markets and credit).

Conclusion

Ethiopia's agrobiodiversity has immense current and future potential to meet the national and international communities' agricultural needs. However, despite this recognition, there has been little or no financial benefit to Ethiopians at the national or local levels. This is largely due to the inability of the market to put a price tag on agrobiodiversity conservation values,

compounded by the failure of the financial sector to recognize crop systems diversification as an asset. These are driven by the fact that there is little knowledge of how to use markets to promote agrobiodiversity. It is widely recognized that FVs need to be part of instead of being replaced in the commercialization of agriculture and the economic development of the country.

A case in point is coffee. The great genetic diversity and variety of Ethiopian coffees is mirrored by the great varieties and attractiveness of its flavours and taste. This indeed makes Ethiopian coffee a crop that in principal is well suited for a 'mainstreaming biodiversity' approach. Ethiopia is now exporting Arabica coffee to 54 countries, making it the fifth largest exporter in the world. During the last seven years, 91% of the coffee export earnings were received from 10 countries: Germany (23%), Japan (16%), Saudi Arabia (16%), USA (13%), Belgium (9%), Italy (5%), France (3%), Sudan (2%), England (2%), and Korea (1%) (Bezabih Emana, 2010).

The problem however, is that despite its relatively strong performance in the coffee trade, Ethiopia has little experience with trading coffee other than a raw commodity. Almost all of its coffee is currently being exported as green Arabica coffee, and fetching very low prices compared to the price of a cup of coffee. Because of its long history with coffee, it would be relatively easy to expand demand and establish special marketing channels for the wild coffee by identifying the region of origin and branding special characteristics of flavour and taste.

Marketing of specialty coffee from Ethiopia has started, but the amounts being traded and the prices being obtained are dismal compared to the potential. In recent years, coffee has developed an ever stronger speciality market segment. In the USA alone, the specialty coffee industry has grown from $1 billion in 1990 to $11 billion in 2006 and is expected to continue to grow well into the foreseeable future. However, very little of that has been noticed by local farmers in Ethiopia. Much better prices could be fetched on the international markets if such branding would be realized to a greater extent than today and the quality of the coffee traded substantially improved.

Recent biophysical and market studies on coffee (Feyera Senbeta and Kassahun Tesfaye, 2010; Bezabih Emana, 2010) reported that a price increase of between 50-70% could be achieved simply by improving the growing and processing of the green bean alone. The reports added that only about 15% of Ethiopia's coffees are in the category of speciality coffee today. With quality improvements in growing and processing, it would be quite possible to achieve 50-60% in this category and some further 10-15% in the very top artisan definition for highest qualities. Right now however, most coffee trading is organized through the Ethiopian Commodity Exchange (ECX),

which has quite static grade classifications. Washed coffees are generally rated higher than sun dried coffees and state suppliers often still have an edge over local farmers when it comes to rating. If specialty Arabica coffee is to be taken seriously as a commodity, this system needs more flexibility and openness. Here the high expertise and great experience of Ethiopian Arabica coffee testers could be put to better use. The ECX in the case of coffee should serve not just as a 'basic commodity' exchange but could expand its services for trading a high quality product. Considerable effort has been placed in developing marketing systems for Arabica coffee, including the formation of a central commodity exchange mechanism that provides up to date information on Arabica coffee prices. Several non-governmental bodies have started marketing wild Arabica coffee as certified specialized coffee. However, most of the Arabica coffee traded is not certified as specialized coffee and the standard certification applied has inadvertently encouraged biodiversity loss in the coffee forest. This is because the certification fails to recognize the importance of the forests as reservoirs of agrobiodiversity beyond the importance of the wild Arabica coffee as a product, and have therefore elicited a typical micro-economics response from farmers.

In summary, by removing the barriers to mainstreaming indicated above, it is possible to ensure that agrobiodiversity is better protected. More importantly, the country will be able to maintain the "Option Values" for future agrobiodiversity use that would otherwise be forfeited as agrobiodiversity is lost with increasing rapidity. This will be a critical contribution to assuring food security.

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Discussion

Sue Edwards
Institute for Sustainable Development

Mrs. Edwards highlighted the enormous potential of Ethiopian agro-biodiversity. She indicated that as the IBC gene bank is the only institution conserving agricultural crops, it must also do research, and criticized the 2004 decision to remove the research component from the institute's mandate. She also mentioned the need for benefit sharing; those who are investing and sacrificing to conserve must be compensated if we want to encourage continuing conservation. She also strongly stressed integration and continued work on farmer's varieties as they do have great potential. For instance, she said teff, which is grown in Ethiopia has more nutritional value compared to other introduced food crops such as rice. Strengthening her argument, her research shows that many Ethiopians become hungry more quickly when they eat rice or wheat than when they eat teff; this has to be considered in development and research. She also commented that the male dominated economy must end. She noted that in Ethiopia a husband is always interested in economic security first, but a woman's priority is food security, as she has to feed her children and send them to school. Thus, if the wife must get and prepare food, it comes from what her husband produces, not from somewhere else. It is also important to note that food security and cultural obligations go together, yet because men do not prepare food they are relieved of these obligations. Rather, women's role in conserving agro-biodiversity is immense in order to preserve traditions. Mrs. Edwards mentioned home gardens as a sort of gene bank where women grow as many possible varieties that will provide not only food but also fulfill cultural obligations.

Commenting on the listed varieties in the presentation, it is important to note that these are not the only ones to mention and the list needs to be comprehensive. Mrs. Edwards added that there should be a presentation of the various uses of these listed varieties as some are used as staple foods, others as cash crops, and still others are used mainly for medicinal purposes. One thing she noticed that Dr. Fassil did not include in his presentation is the details in which crops are threatened more and which are not, why, what intervention has been undertaken so far and what will be needed to save them before it is too late. Talking about sustainability, she emphasized the need for ecologically sensitive agriculture, agriculture with low inputs and the need for further research to make locally grown foods more competitive. Also there is a need for development agents to recognize and take into consideration the knowledge, needs and interests of farmers. We have to also confess, she added, that improved varieties are not always the solution, as

one can see now wheat becoming vulnerable to a disease called yellow rust as already observed at Arsi, one of the major wheat growing areas of the country. Thus, this is the time to also encourage the use of farmer varieties.

Comments and questions from participants

Dr. Gemedo Dalle from IBC commented that the first presentation should also include the slogan of UN/CBD as we are celebrating the Year of Biodiversity. He also emphasized the need for domesticating wild varieties when we are talking of mainstreaming. This is because there are some important wild relatives which are considered as weeds, even by farmers, while they are important for the continuity of evolution. He also commented that the overall efforts of promoting agro-biodiversity and conservation and integration of farmer varieties should not undermine the role of improved varieties, rather there is a need to maintain a balance and sustainability.

Mr. Negusu Aklilu from FfE, commented about agro-biodiversity, indicating that there is a general understanding that local varieties and farmer varieties have low productivity. But there are some study results indicating that they are highly nutritious when compared to improved ones, and taking into consideration the efforts of ISD, the possibility exists for improving local varieties for higher productivity. As mentioned, ISD has conducted research, and the results revealed are challenging the common understanding that "local varieties are less productive". One cannot forget the opportunity of tapping into the global organic markets which look more for farmer varieties produced under low agricultural inputs. He continued his comment by adding that using improved varieties may not pose a problem, but what is done as genetic modifications or improving a given commodity is threatening, as Ethiopia is known for its landraces, and how we can successfully protect these landraces from contamination and use and pass them to the next generation is the underlying challenge we are facing now. We thus need to rethink and act quickly.

One participant added not to forget indigenous knowledge (IK) whenever we talk of diversity conservation. Giving his reasons, IK is not promoted and integrated in Ethiopia, mostly in government intervention, as it appears on paper and in workshops. It must be emphasized and not only talked about until all interested parties implement it. IK is important because there is various associated knowledge that is responsible to conserve a given plant or animal species without which we cannot keep them.

Another delegate described the presence of a good opportunity to integrate the conservation of biodiversity in the main development agenda as the government is now in the process of developing and implementing a five year growth and transformation plan. Mr. Negash then directed the following

question to Dr. Kassahun: considering the government is in the process of developing and implementing a five year plan, how can conservation of biodiversity be effectively integrated in this growth and transformation plan? Has the plan given due attention to biodiversity? What has IBC done so far and has IBC advised decision makers to give the proper value for biodiversity in the plan? Finally, what type of partnership is needed for this to be successfully integrated?

Yet another participant asked Dr. Fassil what the role will be of research institutions to improve the productivity or yield per unit area of farmer's varieties, as so far the focus is on imported varieties?

Somebody from IBC mentioned that Dr. Fassil had organized an agro-biodiversity project in IBC some years back and that project was concerned with plants, animals and microbes. Yet, what was presented now is only about plant species. Why did he not speak of the animals, the soil and its microbials, and the forests; are these not part of agro-biodiversity? Can we think of food security without talking about soil microbials? Shouldn't this be included in the presentation?

He also had further questions: Ethiopia is a center of agro-biodiversity, true, but still millions of people are starving. Thus, do you think the government will accept simple biodiversity recommendations, as the plan of the government is to promote fast growth and to double crop yields within five years? Should we continue begging for food; and where is the role of our diversity in terms of relieving us from such hunger? Considering the widespread poverty and food insecurity in the country, will biodiversity ever be able to feed our ever increasing population?

Another colleague from IBC commented that Ethiopia is not only the origin of coffee, but also the only place for organic coffee production. Thus, we need to create demand for such organic products, so that farmers will further be encouraged to conserve and continue using their landraces after they get financial returns.

Response and reflection from Dr. Fassil

It is through such a forum that we are able to reach a common goal, agree upon what to do and what not to do as we need to balance development and biodiversity if we want to continue as a nation. Conservation and development will be harmonized because the biodiversity we are talking about is the basic input of development. For instance, the improved seed varieties we are using today have been developed from their wild relatives, and a rich biodiversity of wild varieties is the basis for future farmer's varieties. When we talk about high yield, it is all about having good soil and the organic matter, the

microbes, etc. This means that biodiversity is the base for development, mainly for countries like Ethiopia, which are vulnerable to the adverse effects of climate change. On the status of research, Dr. Fassil said that research is neither interested nor close to addressing the issue of farmer's variety, and has to give emphasis to these valuable landraces in the future. The researchers have to rethink their approach and try to balance exotic and local varieties as local varieties have some qualities that one cannot find in the exotic or improved varieties. He also indicated that there is no problem with promoting high yielding or improved verities, the issue is if we do not care for and conserve local varieties, we do not know from where are we going to get them later on when these high yielding varieties need to re-improved. You see, improvement is a process and cannot be stopped and that is also why we need these local varieties as they are inputs for future improvements, beside their current economic role.

There needs to be new food crops domesticated and also we need to set aside protection areas for wild crops, as we cannot domesticate all at once. Regarding women, yes, they are a key when talking about agro-biodiversity and the comment about them has been noted and should be included in the Green Forum declaration. Dr. Fassil also agreed with the comment on the inclusion of animals and microbes as they are part of agro-biodiversity.

It is true that we do have many resources. The issue is that we did not mainstream and make use of them. The central message of my presentation was that organic, locally grown product should penetrate the global market. These products should be certified to win this marketing, some areas should be set aside for continued evolution to conserve both wild and domesticated varieties, and once farmer varieties are linked with markets, conservation will certainly be encouraged.

Response and reflection from Mrs. Sue Edwards

If managed well, local varieties will give the same yield as improved varieties; the issue is that the researchers did not conduct further testing. But this idea that "local varieties are not productive" is not true and has no base from research. To this effect, the existing ISD research indicates that local varieties can compete with modern ones even without chemical fertilizer, using compost and single seedling planting methods. She emphasized that there is no empirical evidence to say that local crops are low producing. In this context, she also repeated her demand for the restoration of IBC's research mandate. She added that organic or ecological agriculture will serve both urban and rural people, mainly applicable for youth based cooperatives, and this could be seen as an entry point to integrate conservation with development.

In relation to improved seed varieties, Mrs. Edwards stated that many species have already been introduced in Ethiopia and farmers are using them now. The question is who will pay for the patent rights, if the patent owners ask for them, and is there a legal framework on benefit sharing to make them legitimate. Thus, for various reasons, we should not undermine the role of farmer varieties.

Response and reflection from Mr. Million Belay

Commenting on the issue of how to eliminate starvation and promote conservation in Ethiopia, Million said that there are many starving in Ethiopia, but this doesn't mean that it is due to poor conservation practices. Conservation hasn't lead to famine as we are not conserving for the sake of conservation. The truth is rather that people are starving due to low productivity from an ecosystem that is a victim of severe degradation, desertification, climate change, undermining the role of culture, institutional capacity, etc. Rather, these people who protect their environment well and manage biodiversity, and respect and integrate their culture are in more or less a good position. The case of the Sheka forest could provide one good example of this.

It is also very difficult to accept when one participant said "we have to go for GMO". He rather suggested focusing on our own varieties, improving them and using the existing global markets. If we use GMOs, do we know what will come later on? China had started growing cotton, and at the time of the startup, it was low input; however, it started declining in productivity and did not continue as it was hoped. Coming to Ethiopia there are various cotton varieties, and how can anyone be sure what will happen to this landraces after the introduction of GMO cotton? Finally, one should not forget that, if managed well our local varieties can give good yield, and there is evidence to prove this. Research has to focus on improving local ones instead of seeking modified ones.

Response and reflection from Dr. Kassahun

Biodiversity has been an issue for Ethiopian people for the last 35 years. Since then, many scientists have put forth effort and Ethiopia has gained international recognitions for its agro-biodiversity. The IBC is far better than other African biodiversity institutions in terms of capacity, work done and also in advising the government about conservation yet we need to work hard as things are changing fast, and our diversity is also degrading. IBC had the chance to get involved in the five year transformation plan, and so we looked at and discussed it. Yet, as the plan is too crude, and it may not specifically include biodiversity in it. However, as many ministries do, MoARD is now trying

to develop its own strategy and IBC will prepare an action plan after then. At that time, we will have the chance to develop a comprehensive plan which will be based on the previous conservation documents. As far as research is concerned, we should focus on our own varieties, but as the current issue (poverty) is too overwhelming, we need to also incorporate improved varieties, yet such introduction of improved varieties is not a long-term solution, and we have to maintain what we have now. If well managed and assisted by research, landraces can yield five to six times what is produced now. Thus, research, biodiversity and development should go hand in hand. About making such synergy between different actors, we need to organize another forum to discuss issues and the way forward and enhance our partnerships.

As for GMOs, as a person working in IBC, I have a problem supporting GMOs as there is no need of it. Productivity is increasing and food security is improving in Ethiopia without having such things which we are unsure of its impact. GMO is about fast return and there are various bodies supporting the introduction of GMOs to Ethiopia, but we should first check out its current adverse effects, understand the trade-offs, its long-term impacts, see if it really gives much more than what we have now, and then we need to reach a clear decision on GMOs. The international environment is not helping to discourage GMOs, yet we should try to protect ourselves from it nonetheless. Research has to also focus on farmer's varieties and ways to make them competitive.

Biocultural Diversity: Concept and Relevance to Development

Million Belay
Melca Mahiber

Introduction

This paper uses livestock and agricultural biodiversity to explain biocultural diversity. It will start with the explanation of what biocultural diversity is by taking livestock as an example. Biodiversity is a problematic concept by itself and adding culture to it might be a bit complicated to explain. But this paper will give you a short literature review of the concept of biocultural diversity and how it is critical to understand it and to consider it in development. The paper ends with an ecological calendar to demonstrate the detailed, seasonal knowledge about the cycle of nature and how the local people in Horo Soba Kebele, Bale are and have been using this knowledge and practices to live with the rhythm of nature.

Biocultural Diversity?

The knowledge of local communities related to environment has been termed indigenous knowledge (IK), local environmental knowledge and practices (LEKP), and traditional ecological knowledge (TEK). Recently another concept, 'biocultural diversity', is gaining acceptance(Sterling et al., 2008). Biocultural diversity denotes the link between biodiversity and human diversity. It recognizes the role played by human diversity in biodiversity conservation (Cocks, 2006). Comparing and Supporting Endogeneous Development (Compas, 2007) define biocultural diversity as:

> *the variety and distribution of biological and cultural phenomena. In addition to the biological elements, it includes phenomena such as worldviews, knowledge, values, religion, social and economic organization, languages, food production, health systems, art and artefacts. It suggests a process of mutual reinforcement between cultural and biological diversity and the importance of resilient and sustainable human-environment relationships.*

In her recent publication, Maffi (2010: 5-6) defines biocultural diversity as

> *Biocultural diversity comprises the diversity of life in all of its manifestations – biological, cultural, and linguistic – which are interrelated (and likely co-evolved) within a complex socio-ecological adaptive system.*

The definition, she went on, comprises not only the diversity of plants and animal species, habitats and ecosystems but also human cultures and languages. These diversities do not exist in separate parallel realms, but rather are different manifestations of a single, complex whole. The links among these diversities have developed over time through the cumulative global effects of mutual adaptations, probably of a co-evolutionary nature, between humans and the environment at the local level.

Pretty et al. (2008) say that 'A variety of conceptualizations and fields have arisen that seek to integrate across biodiversity and culture'. As one example, the concept of "biocultural diversity" has emerged as a way of seeing socio-ecological landscapes in more holistic terms, foregrounding the interdependence of community and place, while suggesting some of the richness with which diverse communities see, value, use and protect threatened environments (Posey, 1999; Maffi, 2001; Escobar 1999).

Köhler-Rollefson and the LIFE Network (2007:2) write that:

> *Pastoralists have developed large proportions of India's ruminant livestock breeds. Mobile and flexible, pastoralists have created numerous breeds of cattle and camels, buffaloes, sheep and goats. These breeds are closely associated with the pastoralist communities that developed them. The animal breeds have evolved over centuries within specific ecological and social systems. Representing the collective heritage of the communities they are associated with, these breeds cannot be conserved separately from their production systems: they will survive only as long as the knowledge systems in which they are embedded also survive.*

According to Pretty et al. (2008), nature and culture converge on many levels that span values, beliefs and norms to practices, livelihoods, knowledge and languages. As a result, there exists a mutual feedback between cultural systems and the environment, with a shift in one often leading to a change in the other (Maffi & Woodley, 2007). For example, knowledge bases evolve with the ecosystems upon which they are based and languages comprise words describing ecosystem components. If plants or animals become extinct then the names given to them are often lost from a language shortly after, and this will change the way the natural environment is shaped by the practices and livelihoods of those human communities. Nature provides the setting in which cultural processes, activities and belief systems develop, all of which in turn shape the local environment and its diversity. Pretty et al. (2008) claim that there are four key bridges interlinking nature with culture: beliefs and

worldviews; livelihoods and practices; knowledge bases and languages; and norms and institutions.

Beliefs and worldviews: Culture can be understood and described as a system of meanings, the way in which people interpret the world around them (Geertz, 1973). In some traditional communities, natural elements are thought to be akin to humans and are respected as such. Therefore many ancient or rural cultures base their views of nature on spiritual beliefs and worldviews, whereas industrialized cultures tend to base their beliefs on science and the teachings of formal education (humans as a biological species), although many modern people in industrialized countries still acknowledge a spiritual or affective relationship with nature and the outdoors (Milton, 1999), and all traditional cultures incorporate substantial bodies of empirically derived "ethno-science."

Livelihood and practices- As a set of practices or ways of doing things, cultures shape biodiversity through the direct selection of plants and animals and the reworking of whole landscapes (Sauer, 1965). Adams (1996) described nature as a "cultural archive, a record of human endeavour and husbandry".

(LPP, 2003:1) states that:

> *The majority of breeds in developing countries are products of communities and their indigenous knowledge about animal breeding and management. Livestock breeders influence the genetic composition of their herds through: cultural concepts about how to use an animal ("breeding objective"), local preferences for certain characteristics, such as colour, size, or behavioural patterns ("breeding goal"), selection practices for certain qualities (castration, culling, offspring testing), pedigree-keeping, social restrictions on selling animals and leading to reproductive isolation.*

The widespread role of cultural activities in shaping nature has led to non-human or near-pristine nature being viewed as sacred. However, growing archaeological and ethnographic knowledge of diverse cultures has demonstrated that many habitats previously thought to be pristine are in fact an emergent property of resource dependent livelihood practices. For instance, North American landscapes sustained through periodic burning (Cronon, 1983) and grazing regimes in mountain areas have encouraged shrub-to-forest conversion (Brower & Dennis, 1998). Niamir (1995, 247) claims that:

Although no record was found of permanent range enclosure, many pastoral groups in Africa have temporary range reserves aimed at preserving forage for the dry season or drought years, preventing crop expansion, protecting timber, and regenerating degraded areas.

Knowledge bases and languages: If diverse cultural practices and worldviews are central to the management of biological diversity, then the key linkage between nature and culture is the knowledge upon which these practices and worldviews are based (Posey, 1999; Maffi, 2001, 2005; Harmon, 2002). People know that the world governs behaviours, understandings and values that shape human interactions with nature. Berkes (2001) describes this as a "knowledge-belief-practice" complex that is key to linking nature with culture.

Knowledge of nature, traditional knowledge, indigenous knowledge, local ecological knowledge or eco-literacy is accumulated within a society and transferred through cultural modes of transmission, such as stories and narratives, and observation as people travel around the land and observe the landscape (Pilgrim et al., 2007, 2008a). It comprises a compilation of observations and understandings contained within social memory that try to make sense of the way the world behaves, and societies use this collective knowledge to guide their actions towards the natural world. As a body of knowledge, it is rarely written down, enabling this cultural resource to remain dynamic and current, adapting with the ecosystem upon which it is based (Berkes, 2001; Turner & Berkes, 2006).

Norms and institutions: In addition to ethics, values and environmental practices, ecological knowledge bases, if culturally ingrained, give rise to socially embedded norms and institutions. These normative rule systems govern human interactions and behaviours towards the natural environment, and have often co-evolved to mutually sustain both people and nature (Ostrom, 1990).

Human cultures are built around and attribute meaning to natural systems and processes in various ways, including cosmologies, worldviews, and religious and spiritual beliefs (Berkes, 2008). These understandings fundamentally govern both individual and collective actions towards nature, connecting knowledge and understandings with behaviour. How we know the world, therefore, governs our behaviour and practices that, in turn, shape landscapes, forming a cultural archive of human endeavours. Amidst a diversity of cultures comes a diversity of meanings, leading to a diversity of actions, providing an array of biodiversity outcomes. This nature-culture continuum or interaction has existed through the past and into the present, and is therefore likely to be sustained in the future. Kalland (2003) warns that 'it is naïve to assume that everybody within a culture acts according to a fixed set of norms and values. Moreover, such conception ignores contradictions that exist in culture'.

The above four frameworks acting as bridges, interlinking cultural diversity and biodiversity, namely beliefs and worldviews; livelihoods and practices; knowledge bases and languages; and norms and institutions will be used to

study how the diversity in livestock is related to the diversity in the culture of the people.

Common Threats to Cultural and Biological Diversity

According to Haverkort (2007), the forces that threaten biological and cultural diversity have the same origin: commercialization and commoditization of nature, deforestation, urbanization, migration, modern agriculture, food and clothing habits, globalization and domination by powerful organizations.

Köhler-Rollefson and the Life Network (2007:3-4) write that:

> *the most frequently cited reason for the declining of livestock diversity are: the intensification and industrialization of agriculture and animal production, large-scale promotion of uniform high-yielding breeds and cross-breeding, policies and developments that disadvantage ethnic minorities, conflicts and wars, natural disasters and the decline of the pastures and common property resources that form the foundation of the production systems in which the breeds developed.*

The processes leading to the loss of biological diversity and the loss of distinct ways of life are many and varied and act across a variety of scales and regions. Our large-scale global agricultural systems depend on remarkably few staple crops and in consequence we are witnessing a plummeting diversity of agricultural varieties and livestock breeds (Shava et al. 1999, 2004). Languages and traditional ecological knowledge are similarly in danger of extinction (Maffi, 2001). Sterling et al. (2008) identified four main threats to biocultural diversity: unsustainable resource utilization, globalization, urbanisation and climate change.

Unsustainable resource use

Unsustainable resource use results from the world economic system, which has led to an unprecedented rate of human consumption of natural resources. This global rise in consumption relates to the total number of people using resources, per capita consumption, and the way in which we use resources (Sterling, 2008).

Globalization

In the last century the pace of new market linkages has increased dramatically, aided by improvements in technologies of transportation and information. In terms of biocultural diversity, globalization has an effect on ecology as it produces greenhouse gases from transportation means and other sources of industrial pollution. Globalization has lead to a loss of agro-biodiversity because of the widespread use of commercial and large-scale farming to provide for the global market. There has been a loss of traditional language associated with agriculture to make way for learning the commercial

language, which leads to trafficking of wildlife and encourages access to biodiversity and the subsequent degradation from distant users (ibid). One of the consequences of globalization and the attendant systems of education has been the loss or marginalization of traditional ecological knowledge, the associated knowledge systems, their practitioners and traditions and vernacular languages which are sensitive to local biodiversity loss (Berkes, 1999).

Urbanization

Today, more than half of the world's human population lives in urban centres; it is estimated that by 2030, 60% of the world's population will be urban dwellers. For ecological systems, the conversion of wild lands to unplanned or uncontrolled urban expansion constitutes a loss of habitat for plants and animals. Living in cities exposes urbanites to more consumer goods, advertising, and marketing, which increase per capita consumption. In addition, the large numbers of people who live in cities affect the regions surrounding cities. As rural areas experience loss of population, the social fabric of life becomes frayed. The spread of information and urban-centric worldviews and aesthetics has led to the de-valuation of local, rural ways of knowing and thinking that have shaped the world for millennia (Sterling et al. 2008).

Maintenance of languages, cultural forms, and practices are deeply linked to traditional forms of livelihood, many of which are difficult to perpetuate in the urban context. Traditional environmental language may thus be lost first in situations of language shift as a response to radical cultural and ecological change such as urbanization (Maffi 2001). Children of urban migrants do not possess the traditional ecological knowledge nor do they engage in the same cultural practices as their parents (Belay et al., 2005).

Climate change

The Earth's climate is changing. Global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial levels. Climate change affects human health (see Patz et al., 2005) as well as cultural practices and livelihoods, changing how people traditionally get food or build houses and threatening integral characteristics of sacred spaces. Forest environments and the people and other parts of nature that depend on them face droughts, crop failures and more intense forest fires as the climate changes.

Value of Biocultural Diversity

A key value of biocultural diversity to local communities is livelihood sustenance. Most rural people derive a living directly from the environment (biophysical resources) on the basis of their local knowledge and practices (culture). The importance of traditional ecological knowledge to resource management has been well described in recent years, re-emphasizing the inter-dependence of biological and cultural diversity. Cultural understandings of the environment not only give rise to sustainable management practices, but also to knowledge of species requirements, ecosystem dynamics, sustainable harvesting levels and ecological interactions (Pilgrim et al., 2007, 2008a). If sustained through stories, ceremonies and discourse, this culturally ingrained knowledge can enable people to live within the constraints of their environment for the long term, without the need for catastrophic learning in the event of major resource depletion (Turner & Berkes, 2006).

Kalland (2003, 325) states that:

> *Local knowledge is relevant to development on three levels. First there is empirical knowledge. To this level belong knowledge pertaining to the behaviours of plants and animals, how these can be collected and captured, and for what purpose they can be utilized. The second level is paradigmatic knowledge. Alternative paradigms, that of local peoples, can provide us with important new insights which can stimulate us not only to reflect on our own relationship with nature, but actively to construct new understandings through a process of syncretism. Finally, the third level can be termed institutional knowledge, which refers to knowledge embedded in their local institution or how people organize themselves in relation to their eco-system.*

LPP (2003) adds that indigenous knowledge can be a source of information about scientifically yet undocumented breeds and of their specific adaptive traits. Scientists often face difficulties deciding whether animal populations represent single or separate breeds. Furthermore, many unique behavioural and other adaptive traits (disease and drought resistance) are only manifested in the original environment and not under controlled conditions. Thus it is that the communities that have developed breeds are an important source of information on their relative advantages.

Endogenous development

A new and emerging form of developmental theory that is closely related to biocultural diversity is endogenous development. According to Rist and Haverkort, (2007), Endogenous development is understood as the sum of views, values and practices which marginalized, silenced, and oppressed societal actors create from within, in response to the initiatives of development coming from outside or being implemented from the top down.

Endogenous development is understood as time space and thus context specific expression of biocultural diversity. Endogenous development thus recognizes and appreciates the diversity of ecological, social, cultural and economic systems around the world. It considers the diversity of ontologies and epistemologies underlying the manifold cultures in which development is debated as an important resource that enables mutual learning and the co-evolution of different forms of knowledge and the corresponding notion of development (ibid, 2007).

Are Current Development Practices Taking Community Knowledge Into Account?

There are four main views here: 1) the appropriative nature of modern institutions which benefit from mining indigenous knowledge (knowledge piracy by and for modern institutions, such as pharmaceutical companies), 2) the current recognition of indigenous knowledge applications and innovation by local communities for their own benefits (this is still highly underdeveloped and largely untapped), 3) joint projects between modern institutions and local communities (that consider benefit sharing under the Convention on Biological Diversity), 4) recognition of the fallibility of science and looking into IK as a source of alternative solutions to the world's problems (Shava, pers comm.).

In many situations the national policies for land use, land ownership, marketing, health care, food systems, education and knowledge development are based on a conventional standalone notion of development and thus discriminate against development which considers biocultural diversity (Rist and Haverkort, 2007).

Alcorn (1999:1-2), referring to the importance of ethnobotanical knowledge to development, which also includes those related to livestock, laments that

> *for ethno biological knowledge to be mobilized as a resource to meet development goals, greater interaction is needed between the users of ethno botanical knowledge – rural residents – and specialists contracted to design, carry out, and evaluate development projects. Two barriers have limited this interaction: the status difference between ethnobotanical knowledge bearers and development specialists, and botanical literacy of development specialists. Ethnobotanical knowledge systems are currently associated with the lowest socioeconomic classes – tribal peoples and peasant farmers. That status association has led the elites who design development intervention to think of the knowledge base of these lower classes as the cause of their low socioeconomic status. Secondly, rural sociologies or agronomists who access and transfer knowledge are not educated to pay attention to natural vegetation as a resource. Instead, outsiders tend to see non-crop vegetation as weeds, brush, useless forest, or wasteland. On the other hand local people often*

> *manage that same vegetation as a multiple-use resource to ensure future productivity of their farmlands, and to meet their needs for food, fuel, construction materials, micro-enterprise inputs and medicine.*

Niamir (1999), writing on pastoralist communities and development traces the general erosion of indigenous social controls and land tenure systems in recent years. Some contributing factors are crop expansion, social disintegration, increasing income gaps, decreasing resource capacity, and in many cases well-meaning development projects that have ignored traditional systems (my emphasis). Project planning, design and implementation are often too inflexible in time and scope to properly take into account indigenous systems and popular participation. The experts, donor agencies, government officials and extension agents are often unwilling to consider the advantage of indigenous systems.

Case study from the Bale Community: Ecological calendar as an expression of biocultural diversity

Million Belay
Melca Mahiber

In April 2010, a team went to Bale Mountains for a mapping workshop with local communities. A sketch map of the Horo Soba area, which includes the Geysesy wetland, was done with about 30 local community members. Six teachers came from six local schools to participate in the process. While the elders and the youth were doing the sketch mapping, a group, mainly composed of the teachers, was preparing an ecological calendar. This is basically what is commonly called a seasonal calendar but with a focus on the relationship between cultural activities and changes in seasons. It is drawn in circles to designate the cyclicality of nature. The circles start from the centre. There are four circles and each have their own particular expressions. The inner circle contains the name of the seasons. Moving outward, the next circle shows the cultural activities of the community. The names of rituals and the materials used to celebrate these rituals are indicated here. The third circle contains activities of the community in each of the seasons. They include farming, livestock management, buying and selling in the market,and so on. The next level shows the plants and animals that appear at each particular season. The outer circle contains drawings showing the climatic conditions during each season.

The teachers were taught how culture is both spatial and temporal, and so it is not enough to do spatial maps only. The landscape changes according to seasons and so does the activity of people. The teachers learned how to think about the seasons in terms of their specific culture and how to identify and express in art what is happening in each of the seasons.

Prior to this session, the teachers thought that there are only four seasons in a year. Those seasons corresponded to the seasons of the entire country,

each season also being named according to the names used nationally. Those seasons also corresponded somewhat by times and conditions with European seasons. So they were a bit shocked when they learned that there are five seasons in the Bale region and the people have various activities according to each seasons. Ato Aman Mame, one of the elders who participated in the participatory mapping exercise and who works for MELCA – Ethiopia, talked to the participants about the seasons and the teachers depicted that on a paper as shown in the picture. Here is how the local elders divided the seasons and the cultural activities related to each:

Bedessa (March and April)

This is a time where there is little grass for animals. The animals will be thinner. There will be no rain and little running water, including rivers. The grass will dry and will be taken by strong winds. When there were few people, then they could take cattle to other places for food and water in the traditional practice called Godantu. This is a system where people take cattle to an area where there is relatively better grazing because the cattle will be hungry and they become vulnerable. Pointing at the wetland called Geysey, they said that people would come to the wetland for grazing. Horosoba and Gofingira village people will come to the forest during the summer. The forest is shady and the grass under the canopy will be green. But during bedessa, there will be little rain at the end of the season but they cannot go to the mountain because it will still be slippery. This is from the area under the trees still holding water.

During the reign of Emperor Hailesilasie, there was a program in place to manage the mountain, ensuring the well being of the cattle.. The landscape was covered with grass, and there were times when the cattle left the mountain to recover in other areas. During the summer (Bega), the cattle used to stay in the mountain because there was plenty of grass there. They did not come to the wetland. Now the population has greatly increased, and this management cycle is not followed. Previously cattle grazed in the mountain only during summer. Now they graze on it every season.

Goats and sheep prefer to graze on the mountain during rainy season and are able to because they have adapted to the slippery conditions. People may take horses and donkeys up the mountain but they prefer the wetlands.

Men will be farming during this time. They divide the animals according to their strength, and give those which are really thin and weak special treatment. Men also maintain and do repairs to the cattle barns. At this time, women take care of the weak animals by providing stored food and restricting their movement.

Melca is a crossing point of rivers where women go to pray to their gods for rain; Ujuba can be a patch of trees, a single tree or a rock where men make

their supplications. There are Ujubas called Guber and Soba. There is an Ujuba called Hora forest where many people used to go and spend a week praying. They also go to Soba forest for preying, which is closer to where they live, and it has a spring.

Children spend their time with their parents, managing cattle with them and talking together. So when elders talk, the children listen to them and are instructed by them. They tell them about their cattle, and their life's story. The children learn by singing what the women sing and acting as they do. Some of the teachings of the mothers and elders include 'don't prevent the cattle to rest until it is midday, and don't prevent the cattle from drinking water when it is cloudy.' Now people tend their own cattle only and the teaching happens mainly from the family.

When there has been a lot of rain, at the end of Bedessa, people go the mountain not to Melca and children throw roasted grain while they pray for the sun to come. The spreading of the dry grain symbolizes the wish for the dry season to come.

Chamsa (May and June)

Chamsa is a season of fertility for cattle; if they do not get pregnant at this time, they may not get pregnant until the next year. They start to eat more and get big at this time. During chamsa they drink Hora, mineral water that nourishes them and increases their immunity. It is very difficult for the cattle to go to Hora during Bedessa but now they are stronger. Because the cows are well fed, they produce a surplus of milk for the people so people can go to Hora.

The land bears a lot of different varieties of grass. There are also plenty of herbs on the mountain, creating smells like a variety of perfumes. The cattle are strong from eating well and because of this they can go to the top of mountains, into the valleys and other places that they could not go before. Some cattle come to Geyssey from far areas.

During chamsa, men take the cattle to Hora and put beehives on top of trees. In addition to apiculture, they also do some agricultural activities, as this is a sowing time. Barley is the main crop, but garlic, onion, potato and cabbage are also common. Women stay at home. They clean the barn, collect fuel wood, plaster the house with cow dung and also help in the tending of vegetables. The women used to manually grind grain during this time but now they mainly take it to the mill for grinding.

There is a common ritual called feli weli that is practiced at this time. The family comes together and the women hold a black sheep and they sing and dance in a circle seven times, then kill the sheep and cut the skin into many strips. Early in the morning they put a strip of skin on the horn of each cattle.

The women then take the cattle to a particular water point called Irecha and they splash them with water while praying. This is believed to protect the cattle and ensure that they produce many offspring. They also mix milk and cow dung and they spread the mix in the barn while praying. The men do the same with the horses. If a man crosses them and does not say an apologetic word, he will be punished. This shows that women have power over men in certain occasions.

Gena (July, August and September)

This is the rainy season when people avoid the wetlands and go to the mountain. They also change the position of their barn because they get muddy. Calves and young horses are kept from the wetland because they might die. In a process called shemsu, the soil and farm are prepared for the coming season's planting of barley.

Women tend the vegetable gardens as they will be ready for harvesting soon. They also maintain and repair the barns as they get muddy; this is very exhausting work. The cattle get thinner as the grass will be covered with water and becomes inaccessible. It is very cold, the mountains are slippery and the wetland is covered with water. So people take the cattle to a high and flat area somewhere on the mountain.

This is a time for telling children stories and the history of their community as the family mostly stays home and young children cannot go far because of the cold. Now children must be educated, so the children tell their families about what they learned in schools related to their environment. One elder in the community said that they did not know about Tulu Dimtu, the biggest mountain in Bale, and he was told by his children that it is the second highest in Ethiopia. Besides this, there are no rituals at this time.

Bira (October and November)

The rains stop during bira. Grass is plentiful, and honey, barley, garlic and onion are harvested at this time of the year. Many cattle will come to Geysey as the grass there is really good. The community may go to visit the Hora salt water springs at this time. The people do not go to Hora forest at this time, as it is still muddy. Hygenia trees hold water and under them it will be muddy so it is not convenient to go to a forested area.

This is a special time for families, when they can spend more time with one another and women and men express their love to each other. There is plenty of food and milk around the house. Most weddings take place during bira.

In the past, there were plenty of traditional rituals but now there are none due to the Sharia law. Previously when there was harvest, people used to return some of the harvest to nature. Now they do not have enough even for

themselves. 'There is not enough butter for the house, let alone for the stone.' Ato Aman Mame, one of the community members interviewed during the case study, said. They attribute this to increase in population and degradation of the environment.

Bona (December, January and February)

During bona, the wetlands will dry and all the animals will go to the mountain. The sunshine is very strong and to avoid it they go to the grass under the trees on top of the mountain.

Bees are very active at this time. They go to the mountain to avoid the sun and to look for the newly grown flowers which they can pollinate.

As the coming season is bedessa, the whole family will help collect straw and store it safely to feed their cattle during rainy days. They also take their produce to the market to sell, and thresh the harvested crops at this time.

People know the coming of the season by watching the direction of the wind. If the wind blows from west to east, it is going to rain, and beans will be planted. If it blows from north to south, it means it will not rain. This is knowledge passed down through the generations. Rain comes first to the mountains. People living in the lowlands will find out it is raining in the highlands, and then will prepare for the rain.

Conclusion

The information above tells us that people have an intricate and detailed knowledge of their environment. People do not degrade the forest wantonly as if the forest is their enemy. People know that when the wetland is waterlogged during the rainy season, their only place to go is the mountains and under the trees. Cutting down trees will expose them to the elements and leave them little protection, so they want to preserve the forests.

It was also learned that there has been a loss of culture and practices. People have stopped doing some of the rituals their ancestors practiced; they cited new ways of thinking and beliefs as their reason. Belief systems were associated with nature and they are both temporal and spatial. They have a certain season to celebrate and a certain place to go to. Loss of rituals, they said, has contributed to the disintegration of society as a whole and has encouraged individual living. Communal life is replaced by personal advancement and this erodes their ability to act together in times of severe change including climate change.

The area in discussion borders the Bale Mountain National Park. Studies abound in Bale on the flora and fauna of the area, as well as hydrological

studies. However, to my knowledge there has been little done to understand the culture of the local community. The local communities are often portrayed as the enemy of the park and nature. What this calendar demonstrates is that, if those driving the conservation agenda in Bale take into consideration the knowledge of the people, their nature management and lifestyle could contribute to the management of the park.

What is striking in this study is the knowledge interplay between the school and the community. The teachers thought that there are only four seasons and taught their students this. Schools, as I often say, are islands of knowledge in local communities. In the subject community, there is almost no relationship between what is taught at school and in what knowledge is available in the local community. So misunderstandings and mistaken interpretations abound. In this case, the teachers were shocked to learn that there are five seasons rather than four seasons and the length of each of the seasons is not three months. So how do we take advantage of the knowledge base in local communities in forming educational curriculum and activities?

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Panel Discussion with Community Elders: Beliefs and Worldviews

Ato Weltata
Clan leader in Sheka Zone, Masha Wereda of the SNNP

Mr. Weltata spoke on the relationship between culture and biodiversity. He started by introducing Sheka and said that it is known for its natural resources with high forests and because of this the people feel they are the lung of the world. They say, "The world breathes because of us". He then moves on to explain the interrelation between their forest and culture and how culture has contributed to forest protection. He mentioned two major reasons why forests are protected among the Sheka people- economic relationships and social relationships. According to him the first is the respectful economic relationship of the Sheka people with the forest and second is the existing traditional methods and mechanisms that re-enforce accountability over resource use and management. For Sheka, the forest is life and no forest means no life. Local people see trees as their children and as no one needs his child to suffer and die, no one needs the forest or trees to suffer or die. According to other beliefs, people see the forest as the place where Abraham was to sacrifice his son to God. Marshy forests are left untouched as Sheka beliefs dictate that these sites are the sources of forests and where the souls of the dead are found. Sheka never cut lumber from the bottom as they believe if it is cut from the bottom the tree will die so they only cut lumber from branches. Further, forests surrounding Hora (wetland) is where livestock drink water so should not be deforested. This all implies how age-old and established beliefs help conservation. Furthermore, he said this is what they got from their ancestors and what they will transfer to their children.

Mr. Weltata then started discussing how economic utilization contributed to forest conservation. For Sheka, the main livelihood is forest honey. In Sheka, hanging beehives on selected trees is a source of livelihood. The forest in Kobois protected, and that some of the forests are set aside for beehives, and no tree cutting is allowed there. Honey in the forest is like money in the bank for Sheka people. They protect these forests as a group; no one can enter

these forests and if someone does, there are sanctions to penalize the one at fault. Thus, no one goes to these forests for the purpose of tree cutting and so much biodiversity is protected along with the forest. People believe that if the forest is destroyed, the rivers will dry, and as they need rivers to flow for their livestock and themselves, they protect the forest. Mr. Weltata also emphasized that in Sheka they do not produce much food, and prefer protecting their forest over eating too much. They enjoy the clean air and their good health and are proud of protecting their forests.

Finally, he commented on that as they are protecting huge forests which will be the heritage of nations and even the world, they need support from the government and others who wish to see biodiversity protected. All their assistance and even government initiatives should be based on local rules and regulation, as culture has played a significant role. In Sheka people will continue protecting the forest and hope the forest will be registered in UNESCO and transferred to future generations. Mr. Weltata also revealed that they need to solve their poverty issue. Mainly this time as the population is increasing dramatically and farming is encroaching and competing with their interests, they need support to keep the role of traditional rules, regulations and beliefs and view these as the key to sustainable forest management.

Haji Kemal
Elder from Bale Goba

Haji Kemal spoke on the relationship between culture and diversity and how the realization of a healthy connection between the two has contributed to and will continue contributing to safeguard species and thereby the well-being of the people. He started explaining the relationship by saying that all organisms should live together and cannot live separately. He believes organisms such as plants and animals may live without human beings, but human beings cannot live without other organisms. Ethiopians have many wonderful traditions and cultures. For example, Awlia (according to the Oromo) is one of these cultural beliefs that bring people together, make them discuss their environment, resource management and also reinforce laws. For the Oromo, at Hora places, people sit together, teach each other, transfer knowledge, eat together, and work together; all this fosters love and respect. The belief he mentioned was celebrated at a place named Dre Shekhusen in Bale, which also helps people to worship together, sit and discuss together, and pass on their traditional norms and knowledge, including resource management.

Continuing his speech on how beliefs protect biodiversity, he said they care for trees and biodiversity because there are both economic and cultural and

traditional obligations. They make use of trees without killing them. According to him, such economic gain enhances the continuous social cohesion between people and their biodiversity. Adding to what he said, in areas of Bale there are about 13 species of bees known as basic sources of honey, and the honey from these species has different tastes and color. One can be for food, while another is medicinal, and all have different markets and prices. Without these species there will be no honey and that will cause a great loss of economy and even culture. All this equates to making the protection of diversity more than income, but also their integrity. The Bale forest allows people to enjoy 7-9 months rain, over 240 rivers and springs, of which there are 42 big rivers where four of them are suitable for hydro power generation. The Bale mountain people believe that all this is due to the forest in Bale Mountains.

In terms of uniqueness, Bale forest supports several species of endemic wildlife – including Yedega Agazen, Semen Kebero, Walia and different types of monkeys. The local communities recognize such peculiarity and also the role of the forests in hosting such differences. During the last few years many tourists have come to these areas to see these unique creatures. Thus, he said, how can we destroy these while the world is coming to see what has been protected for so long?

Regarding health care, there are no advanced health centers in the mountains. Rather, people rely on traditional medicines. Thus, their biodiversity is their pharmacies.

Coming to the role of beliefs, people learn a lot from their elders. Among other things, they were told by their ancestors that it is not good to cut small trees and they respect that. Thus, they only cut branches rather than killing the whole tree. Trees under which elders gather are not cut. Bigger trees where livestock rest and get shade are never cut. Big trees are considered as an old man and given great respect. These and many more beliefs help protect the forests.

However, there are some issues. Although the Bale mountain people believe conservation is important, and though they know without conservation they will be the losers, there are serious upcoming issues pressuring their beliefs and affecting their long term positive relationship with nature. Thus, there is a need for all stakeholders to come together, discuss and be proactive. Haji Kemal mentioned that comparing the past few years with farmer, he witnessed that their traditions and cultures are now threatened. He is urging that advanced education strike the balance, and school children should not be told to forget and undermine their fathers' beliefs and values. He said they are supposed to send their children to school, but not to be the enemy of their own traditions and culture. Schools have to tell the youth to plant trees to

replace the ones they are using. This education is lacking now when compared to the previous generation that respected nature. The current generation is neglecting nature management. The current education system has to also make room for learning traditions. When students are asked to name one medicinal plant, more often than not students are unable to answer. If students have this knowledge they will want to preserve trees because they know their value, but now they view all trees as the same. As an elder, Haji Kemal can indentify almost all the trees and every tree and plant has its own role, purpose, and peculiarity and has to be protected. In his concluding remark, he stated that the youth should be most competent of forest conservation as these can be forces for protection, and if not, there will be rapid deforestation.

Wzo. Fatuma
Taxonomist from Harbu

Mr. Million told the audience that he was born and raised in Merkato (the major market area of Addis Ababa) and he knew about diversity as Merkato is a market place where many different food types are brought to be sold. Thus, though he was a city boy, he got the chance to learn about many plant products. But who else in Addis Ababa can identify two types of sorghum? Generally, the large majority of urban people cannot identify most plant species as they do not have the tradition of using these plants as the rural people do. He said that culture is the key to knowing and understanding diversity.

Mr. Million introduced Fatuma, a famous taxonomist who came from Harbu, an area known for its great diversity of sorghum. Fatuma not only introduced herself, but also the various sorghum varieties used and managed in her area. She listed some of the major varieties including Cherekit, Zengada, Wef Aybelash and the like. She mentioned how these species are different, what criteria they use to identify them and for what they use them. Though they could be named only as sorghum by most people, they are not one; each type has a different use and value. One of them is a major staple food, while another is used for a drink, and yet others are medicinal or for social obligations. Like the previous speakers have stated, she also confirmed that the source of her knowledge is her ancestors and had reached her as traditional knowledge.

Talking about the role of women in maintaining these varieties, women are mostly responsible for storage, and they use various traditional storage methods that are able to keep the seeds for three to four years and even more, if they want. Fatuma is not only an expert on sorghum, but also on teff

and she can identify various teff varieties such as Bursa, Nech bungn, Key bungn, Atembera, and others which would be named by many people only as teff. She added that their use is also different. In her conclusion, she mentioned that many women know most varieties and are key in seed conservation and also transfer of knowledge.

Million Belay
Melca Mahiber

Mr. Million said it is not only the seeds that we are losing, but also the knowledge and language associated with it. If knowledge is disappearing, then the value we give to biodiversity will also get weak as we know less about it. Naturally humans have a tendency to value what he knows about. Thus, knowledge and language have a great role in biodiversity conservation as we conserve what we know and talk about. Strengthening this idea, there is evidence on the overlap of diversity of language and species, saying that in areas where there are diverse languages there is also a great diversity of plant or animal species. In our case, then we have to take care of our language as it has something to do with even our diversity conservation.

Mr. Million indicated that there are various norms and institutions collectively called customary laws used and implemented by local communities to manage, use and develop diversity. If customary laws are ignored or eliminated, there will be automatic pressure on biodiversity. Thus, there are dichotomized powers among the communities to exercise customary laws. For example, a clan leader has the power and responsibility to monitor implementation of such customary laws. A clan leader is traditionally a person appointed to lead the society, govern resource use, and manage. For instance, Gudo in Sheka is a traditional belief in which the local communities pray to God to get what they want, for example rain, and the clan leader is responsible to lead such an event. He follows up by reciting traditional rules and regulations. These rules are binding, and never written. Some of these traditional rules include never allowing begging on the street, killing, theft and so on. Tree cutting is never allowed in sacred sites and through this, we can see how traditional institutions allow biodiversity conservation.

The problem is that the current generation does not respect clan leaders and traditional norms and institutions. These norms and institutions are in line with government laws and have to be respected. Mr. Million stated that traditional norms have significant implications on economy, societal integrity and also sustainable resource management and thus need protection and reinforcement.

There were several questions posed to Mr. Million and the other speakers at the conclusion of the presentations: How do we overcome famine while conserving biodiversity, and shouldn't we promote industrialization to eradicate hunger from our country? Is not poverty the main enemy of our biodiversity? How can Ethiopia conserve with a rapidly increasing population? Culture plays a great role in conservation, but how it will deal with tree cutting for fuel wood as over 90% of our energy comes from green biomass, and yet it is the greatest threat to Ethiopian biodiversity? Another participant suggested that it is simply better to follow the examples of developed countries and to promote growth first and then focus on conservation later.

The idea that if one forest is destroyed we have other similar forests to be used, Mr. Million said that Ethiopia has different agro-ecology and there is no evidence that if some forest is destroyed that another can substitute. This idea will confuse decision makers. What we know is that there is no forest similar to Sheka or Bale forest and if it is destroyed we will lose all the peculiarities in it.

Ethiopia cannot be compared with other country and it is not a good recommendation to say "let's grow first and conserve later". Developed countries underwent growth many years back when the impact of climate change was not as serious and they grew by abusing the environment which we are now suffering the effects of. In no way should Ethiopia follow this route in our development. This time we have to talk about how we can adapt to the ill effects of climate change through using our own resources in a wise manner, which includes sustainably utilizing our resources.

We know that population increase is an issue, yet is it the only reason for deforestation? No, what about the tea plantation introduction in the Sheka area? What did it do for the local communities? Right after the introduction of this technology over there, the local communities started to grab land, they realized they could begin deforestation, weakening the customary laws and expediting deforestation. Thus, when we talk of population growth or industrialization we have to also look at its consequences and ways to curb its effects.

Yes poverty is our main issue; but is it the only reason for deforestation? Let me give an example from Arsi Negele. The town is becoming a center for local production and marketing, and demands huge amounts of firewood, thus dramatically increasing deforestation. So can we say poverty is the main reason for biodiversity loss? This example creates doubt.

How is the structure of the norms at Sheka area, i.e. how effective are the mentioned norms in protecting the forest resources?

How do you harmonize the advanced laws with your traditional laws?

Dr. Gemedo from IBC commented that the message from this presentation and the ideas of the elders is how cultural diversity contributes to conservation of our resources and now how will it be possible to integrate it to the existing situations. Thus, allowing participation of the local community is one step ahead and that Melca's work to promote the participation of local communities is an example for us.

CBD has given serious attention to customary laws. However it is still under debate as some signatory countries don't accept it while some do. Yet in Ethiopia it is crucial as some are even recognized as more than advanced laws in some parts of the country. Dr. Gemedo emphasized that research has proven that customary laws have a significant role in protecting biodiversity.

Community knowledge (e.g. LEK) is very important for conservation and sustainable utilization of biodiversity. Therefore, this knowledge should be documented and used. However, we have to integrate traditional and scientific knowledge to ensure sustainable development and poverty alleviation. We should also note that at this time residents in areas of interest are given the chance to play a key role in conservation and to protect their cultural diversity. As a word of caution when talking about community knowledge and conservation we should not forget about Bio-piracy. This is theft of genetic resources and IK and is a threat to the sovereign right over the biological resources through different ways. We may lose our own resources through research, botanical gardens, etc. Thus we need to join efforts in fighting against Bio-piracy.

Ethiopia is signatory to CBD and has put in place every provision to access benefit sharing arising from genetic resources and associated traditional knowledge. Thus, there is a mechanism for local communities to benefit. We have to also take care when publishing information on IK (e.g. to what extent should we document and communicate IK to the global society is a question that we have to consider). This is because once it is published then the global community may use this information to further hunt the IK and even the genetic material without benefiting the local communities who generate the knowledge.

Mr. Aleshum continued by saying he also appreciated the method of presentation which included the participation of elders and local representatives. Responding to the point raised by one participant that "poverty is the cause of biodiversity loss in Ethiopia", Aleshum commented that, rather it is a lack of an integrated approach and the dominance of

agriculture in the economy. According to him, had it been carefully integrated, biodiversity would have served to enhance productivity and thus reduce poverty.

There is a need to integrate conservation with advanced growth, and this is possible. He also commented on whether the country should seek industrialization to reduce poverty or not , and he suggested that there is rather a need to integrate advanced growth, conservation, population growth control, and Ethiopia will benefit even more than by promoting a single dominant approach which is also not supported by global community this time.

Response and Reflection from Mr. Weltata of Sheka

Mr. Weltata confirmed that the exploding population is becoming a threat to biodiversity conservation, even in Sheka.

The other important issue he commented on is commercial farming. It can be allowed, but an impact assessment should take place first. Part of this assessment should ask whether or not we have other potential farm areas other than these old, historical, and biodiversity rich hotspots. We have to consider these all before simply giving preference to investment.

About climate change in Sheka, yes it has an impact. Some years before, because of the forest, there was no need of refrigerators. But now we have started using them as we cannot get things as cold as we need. This is happening due to deforestation and rising temperatures increasing. If these trends will continue, will commercial farms make us continuously respond to and adapt to it? We have to analyze these circumstances. Then we must ask what will happen to our rivers if the forests are eliminated, and what will then happen to our hydro power, the honey production, and the main livelihood of Sheka people. Any investment intervention has to take into account all these when talking about development.

Sacred forests which are found both in villages and natural forests are shrinking as other religions are pressuring the traditional beliefs of Sheka. Is this fair to these people? The rights and interests of the people must be valued before the introduction of commercial investment and it has to get our consent.

Another important issue we face is that budget allocation from the government is based on numbers of people, and inherently we will get a small portion as we are few in number compared to other areas. Despite a small population, we are protecting huge forests that serve Ethiopia and the world and we need to be compensated for that.

Response and Reflection from Haji Kemal of Bale

Regarding the firewood and construction material in Bale area, people often use bamboo which is found in abundance in the forest and also regenerates fast. They also use dry wood, but it is not allowed to cut and use living trees for fuel wood. Currently they started using improved stoves in response to reducing the impact of firewood on the forest.

Explaining the role of women in conservation in their area, Haji Kemal indicated that there is an attachment between women and some tree species in particular. Women use the bark of selected certain tree when pregnant and it will protect her from bad things. Women also use some tree species to make smoke for fumigation, and her husband is responsible to protect these trees as his wife needs it badly. After giving birth, women use selected trees as medicine and hence all people are responsible to protect these trees. Some tree species are used by women after birth to stimulate milk from her breast. Branches and leaves of some trees are used at home as insect and pest repellent and hence, they will not be cut. These benefits from trees help conservation of biodiversity.

Comments and reflection by Sue Edward

Mrs. Edward added some points to her previous talk. The discussions during the workshop have to be practical, and there should be talk about sustainable development through integration of IK as nature preservation is becoming difficult to apply, mainly in this era of climate change. But, this does not mean that we completely ignore preservation; we have to reserve some places to be preserved and this has to be based on impact assessments and thorough studies. There are some places which are too fragile and may have suffered irreversible damage, such as wetlands. We have to protect these places.

Talking about ecological agriculture, she commented that it is not about protecting a given resource, rather the wise use of it. Many people fear this concept thinking that it compromises development. But ecological agriculture is about development and innovation, where the environment is central to development initiatives. We use the species, but have to in a way that the species will continue perpetuating. To do that we have to reinforce the EIA before we give land to investors. Mrs. Edward also observed that serious land grabbing is going on in Africa in general. Nor is Ethiopia different from other nations following the world food crises, and care should be taken to prevent food shortages from reoccurring. IBC should be empowered to be able to give critical recommendations and advisory services to the government, the private sector and other stakeholders concerning biodiversity and the environment.

Panel Discussions: Protected Areas and Biodiversity

Indigenous and Community Conservation Areas

Million Belay
Melca Mahiber

Mr. Million gave his view on various issues, the first being indigenous and community conservation areas. He started by defining and discussing the concept of community managed conservation sites, its constraints and challenges, and also its potential and opportunities for promoting integration of community based protected areas in Ethiopia in an effort to enhance conservation efforts and add success stories.

Explaining what is protected in these areas by local communities, Mr. Million mentioned these are either natural areas or managed landscape areas, but all have ecological and cultural value, species diversity and are basically under the protection of local communities and without any external forces. These communities are farmers or pastoralists. They protect these sites for the continuation of culture and the diversity they host.

These sites have three features. The first is that the local communities have an unavoidable attachment to these sites. An example is the Kobbo system, where individuals in Sheka select some trees and use them to hang beehives. The whole forest will be owned by a group of people and protected from damage. The second is when a community agrees to protect a given site and sets it aside for "no touch". Third is the decision about these sites being under the responsibility of the local communities. That means it is traditional law that governs these sites and its processes.

Responding to why we need such sites, Million stated that they are complementary to the sites that are protected by the government. As the government cannot oversee all places at one time such complementation is crucial. Further, these sites protect critical ecosystems, endemic species, water points and areas of significance. In addition, they will serve as a

corridor for wildlife as community based conservation sites are distributed over a wide geographic area. They are sources of life not only for the communities protecting them, but also for communities surrounding them. For instance, Bale forest is a source of various water points and these rivers will serve over 12 million people downstream. They are also a refuge for agro-biodiversity. Thus having many such places means we have a wider gene pool and must enhance conservation efforts. More important is that studies show that there have been few success stories from government conservation efforts. Because we are now in an era of promoting participation of local communities, these sites will serve as a learning base for integrated conservation through participation.

Community conservation sites are under unwritten regulations, but the communities are under the framework of government rules and regulations and these places will serve to teach how traditional conservation fits into the government's conservation and development plan. Generally, as many sites in the country are severely threatened (e.g. mining, commercial farming, urbanization, road construction, etc.), the presence of these sites will promote conservation and help to reach out to as many species and ecosystems as possible, and the cost of conservation is cheap yet effective. As traditional conservation sites have evolved through the generations, they have been able to adapt to various emerging challenges including climate change, contrary to the forced and new conservation efforts, like area closure.

Mr. Million pointed out various factors that challenge the continuity of community based protected areas. These include the currently seen tendency to transfer these sites to government protected areas, making decisions without comprehensive EIA, alienation of these sites to other land uses, external forces such as illegal settlement and breaking traditional rules and regulations, lack of support and recognition by laws of the government, among others. Being controlled by communities also sometimes brings its own problem as all members of the community cannot always agree on everything.

There are some recommendations given as solutions to some of these issues. Establishing and strengthening a legal framework at the local level will give these efforts legal protection. Raising awareness on the value and importance of community protected areas through workshops, teaching and training will provide ideological support. Developing an enabling environment for the local communities to participate in any decisions on these sites and their surroundings is essential for community participation. In line with this, there are a few start-up initiatives such as local communities in Mago National Park area, and some in Kenya where community based protection sites have now started to protect their areas on their own.

Questions and Remarks

We have some success stories about participatory forest management; now are there any initiatives for participatory wildlife management and can it work in Ethiopia? Is there any progress and are we aware of it?

Responding to why only biologists are panelists, yes I agree that it would have been better had we included other professionals. Green Forum will present this to decision makers for consideration.

Participatory wildlife management already exists in Ethiopia. The problem is that most of us are not familiar with it and need further training and awareness. Otherwise, yes it will work if recognized and integrated.

The Challenges of Protected Areas, its Implication to Biodiversity Conservation

Challenges of Protected Areas and the Implication to Biodiversity

Yonas Gebru
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Introduction

The International Union for Conservation of Nature and Natural Resources (IUCN) defines a 'protected area' as "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means". The Convention on Biological Diversity (CBD) defines it as "a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives". Although all protected areas meet the general purposes contained in the above two definitions, in practice the precise purposes for which protected areas are managed differ greatly.

Globally protected areas are considered as a major tool in conserving species and ecosystems. It is also believed that they provide a range of goods and services essential to the sustainable use of natural resources. As a result, most countries often have wide-ranging systems of protected areas that have developed over many years. These systems vary considerably from one country to another, depending on national needs and priorities, and on differences in legislative, institutional and financial support. In all cases, however, adequate and proper information on protected areas is essential to enable a wide range of conservation and development activities.

IUCN has defined six protected area management categories:

Category 1a
Strict Nature Reserve: protected area managed mainly for science. These are strictly protected areas set aside to protect biodiversity and also possibly geological and geomorphological features, where human visitation, use and impact are strictly controlled and limited to ensure the protection of specific conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.

Category 1b
Wilderness areas: protected area managed mainly for wilderness protection. Wilderness areas are usually large, unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

Category 2
National Parks: protected area managed mainly for ecosystem conservation and recreation. National parks are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems indigenous to the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreation and tourism opportunities.

Category 3
Natural monument or feature: protected area managed for conservation of specific natural features. They are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological features such as a cave or even a living feature such as an ancient grove. They are generally quite small areas and often have a high visitor value.

Category 4
Habitat/species management area: protected area managed mainly for conservation through management intervention. These are protected areas aimed at protecting particular species or habitats and the management reflects this priority. Many protected areas under this category will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not necessarily always the case.

Category 5
Protected landscape/seascape: protected area managed mainly for landscape or seascape conservation and recreation. It is a protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic

value, and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

Category 6
Protected area with sustainable use of natural resources: protected area managed mainly for the sustainable use of natural ecosystems. These areas are generally large, with much of the area more-or-less in a natural condition and where protection is under sustainable natural resource management and the low-level use of natural resources being compatible with nature conservation is seen as one of the main aims of the area

Generally, protected areas represent the heart of the world's political and economic commitment to conserve biodiversity and other natural and related cultural resources. They are, therefore, a major component of official conservation policy and practice. The United Nations Environment Programme's World Conservation Monitoring Centre (UNEP-WCMC) has calculated that there are more than 102,000 protected areas throughout the world. Taken together, they cover more than 11.5% of the terrestrial surface of the earth. These sites have been established by virtually all countries of the world and are managed through special rules and for conservation purposes.

Nowadays, the aim of protected areas include the sustainable utilization of natural resources, the preservation of ecosystem services and integration with broader social development processes, along with the central role of biodiversity conservation. In addition, more attention is being given to respecting cultural values as vital associates of biodiversity and to the need to engage local communities in measures and decisions affecting them. In contrast to the previously accepted approach that basically excluded people, most protected area professionals today acknowledge natural resources, people and cultures as fundamentally interrelated and essential one to another.

The following are the three main lines of thinking that have converged to create the aforementioned new understanding of protected areas:

i. The first line of thinking lays emphasis on:

- Networks of protected areas, and connectivity within the networks.
- The integration of protected areas in the broader landscape or seascape, and within the regional and national economy and policies.
- Protected areas as one of several components necessary for an effective regional or national conservation strategy.

ii. The second line of thinking stresses that:

- Ecosystems are open, always subject to a variety of influences from their surroundings and in a state of flux.
- "Disturbances", such as grazing from herbivores or periodic fires, are extremely important in conservation efforts, and human disturbances that occur within ecological limits can be part of the dynamic pattern of conservation.
- Ecosystem management is best understood as an adaptive process, strongly dependent on local biological context and history.

iii. The third line of thinking recommends to:

- Work with, rather than against, indigenous and local communities, NGOs, and the private sector, provided that all such actors are committed to basic conservation goals.
- Develop management partnerships among social actors, benefiting from their complementary capacities and advantages.
- Perceive the conservation of biodiversity as inseparable from its sustainable use and the fair sharing of the benefits arising from the utilization of genetic resources, as reflected in the three main objectives of the CBD.

History of Protected Areas in Ethiopia

Ethiopia, located in the horn of Africa, has long been recognized for its wealth of natural resources and high biodiversity. Up to the mid 1960s, however, these resources remained largely unprotected until the government instituted a conservation- and protected-area program. The primary objective of this program was to establish areas and associated bylaws for the conservation and protection of a range of species and habitats while the promotion of tourism and income generation were secondary priorities.

Since then Ethiopia has been involved in a number of conservation activities. In this regard, the most remarkable effort has been its attempt to conserve the afro-alpine habitat of the Bale Mountains National Park and ensure the survival of several endangered endemic species such as Ethiopian wolf (Canis simensis) and Mountain nyala (Tragelaphus buxtoni)..

Other notable activities include the establishment of numerous protected areas and the conservation of diverse native species within these areas. These initiatives were undertaken for the sake of education, research, and recreation; because these areas provide such essential items as fuel wood, building materials, forage, traditional medicines, and wild foods, sustainable use programs have been instituted.

Ethiopia's conservation- and protected-area program has also generated income both at the local and national levels through tourism, controlled hunting, and the direct sale of wildlife and wildlife products.

Despite these achievements, there have been many setbacks. Several of Ethiopia's protected areas exist on paper only, while others have declined in size or quality. The majority of these conservation problems can be attributed to Ethiopia's adoption and implementation of an exclusionary protected-area policy which lasted for a long period of time and to the causes and consequences of the various institutional arrangements put in place.

The Ethiopian Wildlife Conservation Organization (EWCO) was established in 1965 and was formally recognized as an autonomous body in 1970. The EWCO's responsibilities by then included establishing nine national parks, four wildlife sanctuaries, seven wildlife reserves, and 18 controlled-hunting areas between 1965 and 1980. It also was responsible for adopting and implementing a range of hunting and conservation policies, including the adoption of the IUCN protected-area descriptions and guidelines.

According to Proclamation No. 541/2007 (A proclamation to provide for Development, Conservation and Utilization of Wildlife) protected areas have the following definitions:

- National parks: areas designated to conserve wildlife and associated natural resources to preserve the scenic and scientific value of the area which may include lakes and other aquatic areas;
- Wildlife sanctuaries: areas designated to conserve one or more species of wildlife that require high conservation priority;
- Wildlife reserves: areas designated to conserve wildlife where indigenous local communities are allowed to live together with and help conserve the wildlife;
- Wildlife controlled hunting areas: areas designated to conserve wildlife and to carry out legal and controlled hunting;

Currently in Ethiopia there are:

- Four Wildlife Sanctuaries,
- Eight Wildlife Reserves,
- 20 National Parks,
- 18 Controlled Hunting areas,
- Seven Open Hunting areas,
- Two Community Conservation areas.

Out of these, 11 national parks and two sanctuaries are directly administered by the federal government (the Ethiopian Wildlife Conservation Authority)

while the remaining protected areas are managed by the respective regional governments.

Biodiversity of Ethiopia

Ethiopia possesses considerable biodiversity and natural resources, as well as many endemic species. Like many other countries, it depends upon its rich biodiversity for socioeconomic development. For generations, the nation has relied on biological resources for food, clothing, shelter, energy, health and recreational requirements. Ethiopia was one of the first countries to have started domesticating wild plants and animals. The country is also rich in animal diversity, boasting the largest livestock population in Africa.

Animal (Faunal) Diversity: Ethiopia is rich in its fauna diversity. According to IBC Ethiopia hosts 277 species of mammals, 861 species of birds, 201 species of reptiles, 63 species of amphibians, and 101 species of fish.

Plant (Floral) Diversity: The flora of Ethiopia is very diverse and has many endemic elements. It is estimated that between 6,500 and 7,000 species of higher plants occur, of which about 15 percent are endemic. The Simien and Bale Mountains have been identified as areas of plant endemism of global importance.

Microbial Diversity: Ethiopia is also known for its high diversity of micro organisms but very little has been explored, collected, identified, characterized, conserved and utilized. According to IBC, a total of 56 genera and 127 species of bacteria, 35 genera and 45 species of fungi, 96 genera and 247 species of algae, 8 genera and 20 species of protozoa, and 27 species of viruses have been identified.

Cultural Diversity: In Ethiopia there are about 80 different ethnic groups with different languages, cultures, and invaluable indigenous knowledge, innovations and practices which play a vital role in biodiversity conservation and the sustainable utilization of natural resources.

Threats to Biodiversity

It is universally accepted that human activities have greatly reduced biodiversity around the world. The greatest threat to biodiversity is loss of habitat as humans clear vegetation for agriculture, construction, etc. Pollution of the air, water, and soil through chemical compounds such as herbicides, insecticides, and others also contribute a lot to biodiversity loss. In Ethiopia the most drastic damage has occurred in the natural high forests that once covered more than 35% of the total land area of the country and to their rich biological resources. Together with this, animals, microbes and the associated indigenous knowledge are being lost before we can even realize their benefits.

Major Challenges in the Management of Protected Areas

- Deforestation and soil erosion: deforestation on lands adjacent to, and within, certain protected areas has resulted in the loss of critical habitat, species isolations, and local species extinctions. As farm lands become scarce, farming on steep slopes will increase which will increase the rate of soil erosion and gullying. The decline in water quality can also be attributed to unregulated deforestation and soil erosion.
- Lack of capacity: absence of adequate budget, trained manpower, appropriate technology etc. The absence of adequate budget means lack of infrastructure and equipment. This can also lead to understaffing and lack of any in-depth research as well.
- Poaching: easy access to automatic machine guns would increase the frequency and intensity of conflict between ethnic groups. This might, in turn, result in the displacement of one or more ethnic groups from the disputed areas. The displaced might try to occupy nearby protected areas. Illegal hunting would become a common practice for the displaced.
- Transition-Period Insecurity: e.g. the 1991 transition period
- Industrial investment projects: e.g. the case of Babille Elephant Sanctuary
- Growing Human Population
- Climate Change Impacts
- Human settlements: permanent and seasonal settlements in and around protected areas
- Unsustainable Harvesting of Natural Resources
- Low level or absence of community participation in decision making planning
- Lack of Benefit Sharing
- Unstable Institutional set up
- Illegal trade of live wild animals and their products such as ivory, ostrich eggs, live animals, skins, etc

Questions to Mr. Yonas

- You mentioned that 16% of Ethiopia's land is protected areas; is this information really up-to-date and do we really know the size of our PAs, and our forests?
- This past month we heard that Ethiopian forest area had tripled in recent years. Is this true? Which method of forest inventory was done? Who did it, and when? There are many professionals who dispute this information and give different figures.
- You told us that our PAs are rich in diversity and when we are talking

about diversity it includes species, gene and ecosystem diversity, but have they been categorized? Are we in a position to identify lost, endangered, extinct ones and the like and to pass this information on to decision makers?

- There are many workshops, discussions and forums, yet there is no work being done on the ground. Everything is degrading as we talk, what shall we do to move on from talking to acting? Have we played a role in influencing decision makers, investors, and other stakeholders to value nature and do their best to conserve?
- You did not include the following on your list of challenges; lack of clear ownership, short-term benefits maximization, undemarcated and unclear boundaries for our PAs, and a lack of awareness among the general public.
- The challenges you mentioned have been around many years and remain unsolved. So how can we say there is progress in EWCA? Also benefit sharing and participation of the local communities was recommended and until now has not been implemented. Do you think this will be implemented sometime soon?
- It was repeatedly mentioned that the communities in and around PAs have problems; what can be done for these communities? What type of livelihood can we design for them as we need to fulfill their need for fuel wood, construction materials and other things?

Responeses by Mr. Yonas

It is true that the presentation concerning challenges does not include all factors that affect PA management. However, Mr. Yonas said, the presentation was only to raise discussion points for the participants and in that case, it met its goal as additional points were raised and discussed as well.

The obstacle in sustainable PAs management in the country is not only the investment sector, but also the whole process including lack of strong EIA implementation. The emerging investment sector is the most important factor to focus on as it is competing with PAs above anything else, particularly in the last five to ten years.

The issue of population growth is controversial, Yonas acknowledged, however, we have to see it in the Ethiopian context and in that case he expressed doubt if our population is an asset. In India the population is an asset, but in our case we are resettling people from one place to another as the carrying capacity of land is declining from over time. There are millions of people that need food aid every year, including in normal growing and harvest seasons, and this alone implies that we have a problem feeding everyone. We should not compare the population size with the size of the country, rather we

have to ask if the land can hold and feed the population aside from all other needs; in that case, the current economic growth is not supporting the population. People are always going to PAs and forests to acquire farmland and now even very sloppy areas are under cultivation, yet the returns are not satisfactory or sustainable, and there is damage done to the PAs.

As mentioned by the participants many factors such as lack of awareness, shortage of strong institutions, lack of livelihood diversification, endemic poverty, lack of clear ownership, short-term benefit maximization and the like should be included as major challenges.

There are efforts to resettle communities within the boundaries of PAs, but the majority of people are not ready at this time. Participatory community based PAs, following the basic principles of cooperatives, have been tried such as in Guwasa and Bale, but they need capacity building.

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Policy, legislation and institutions on Protected Areas

Mr. Yeneneh Teka
Ethiopian Wildlife Conservation Authority (EWCA)

Before Yeneneh was given the chance to speak, the moderator addressed some pertinent discussion issues to the panelist who should focus more on them. These include how the current arrangement is helping to implement the policy of EWCA, building capacity, how the relationship is between the federal government and the regions, and defining the current major challenges and what type of solution they need.

Mr. Yeneneh then began by introducing EWCA and its new structural arrangement under the Ministry of Culture and Tourism. This new arrangement has helped EWCA to implement its policies and also build capacity. Responding to panelists' concerns about the challenge of institutional restructuring, Mr. Yeneneh said that institutional rearranging has been around for a long time and has affected the achievements of wildlife development and management. However, as the issues went on and reached a climax, the government responded by endorsing a policy in 2007, followed by upgrading and improving a previous regulation (5411/1999), and then set criteria on how to manage PA, and in this new regulation rules were included soliciting ownership arrangements; which belonged to the federal and which were the regional governments'. According to the new regulation, the majority of NPs are under the management of the federal government, and few are under regional governments. The major achievements during the last two year are policy ratification, proclamations and regulation endorsements and a new institutional arrangement for EWCA. These are breakthroughs for the sector. The current arrangement is good for now, as it has helped to protect wildlife. The previous arrangement under MoARD was difficult to coordinate conservation and development; this is the main reason for restructuring EWCA under Ministry of Culture and Tourism.

Coming to the challenges, as cumulative problems piled one on top of the other during previous years, many problems still exist as we cannot overcome all obstacles overnight. But EWCA is now on the right path to solve these issues and face emerging ones and hence make the country the beneficiary of the sector. According to Mr. Yeneneh, this should not take a long time. He talked about the power and relationships EWCA has, pointing out various partners and donors, and it is now getting international support. This shows that EWCA is doing fine and the decision made by the government was appropriate and effective.

Implementing the existing laws, ECWA's main job is to protect PAs and wildlife from trespassing, poaching and other intrusions, and has the authority of

enforcement. Encroaching on PA is not allowed, and EWCA is trying its best to implement the laws and safeguard all PAs. However, there are too many obstacles that need solutions. Most of the communities living in and around the PAs are poor and it is not easy to force the people to move without pre-arranged livelihood options for them. In response, EWCA is trying to adopt some livelihood diversification means and arrange occupational training; this has not gone far enough, and will need to be managed and organized very carefully. We are also trying to engage the local communities more and introduce bylaws.

The other challenge we are facing now is a conflict of land use due to non-cooperation between the investment authority and EWCA. To address this, we have established a steering committee at a higher level where MoARD, EWCA, the investment authority and others will sit together and discuss before land is allocated to another use system. By doing that, it is possible to reduce the issues of unplanned investment. The main role of this steering committee is to avoid development at the expense of conservation.

Concluding his speech, Mr. Yeneneh said that the number of NPs is now 15, with three wildlife sanctuaries, seven Wildlife Protection Areas and 18 Controlled Hunting Areas. The current effort is aimed at better footing compared to previous times, yet needs to still go further as this is not enough. He said that EWCA also needs more partners to work with. EWCA's relationship with the regions is good, which promises to give it an edge when forming PAs and working on programs with other agencies.

Reflection from Dr. Admas

Dr. Admas is an expert working on wildlife and community based conservation. According to her, local communities believe it is wrong to kill wildlife; this is an input to coordinate with for our future planning. However, this is losing it value amongst the youth, who move from place to place in search of grazing land and water, and being separated from their elders for long time have developed a tendency to kill wildlife, both for food and even sport. This is complicated as they also carry guns. One important thing is that communities are willing to work with anybody who wants to support them and to see how cooperation and conservation can be sustainable. Development should never be at the expense of conservation, and there is the potential of generating income from wildlife tourism. The ongoing investment in the country should be monitored so as not to jeopardize our conservation efforts. Investment and conservation are crucial for the country, yet must work hand in hand without one compromising the other.

Comments and questions from the participants

- The Amharic word awre (meaning wildlife) has a negative connotation that indicates danger and thus undermines the value of wildlife. It would be better to consistently use the term yedur ensisat which is more neutral.
- Mr. Yonas has mentioned challenges, but this was not a comprehensive list and also should include solutions to each. For instance, poverty is not mentioned as a challenge, but it is.
- Yonas recommended the need for framework, but Yeneneh said that we have it. This is misleading and confusing.
- Investment is not a challenge by itself, but also the willingness to implement it following EIA.
- Population was mentioned as a challenge, yet India has over a billion people but has managed conservation sites better than Ethiopia. The issue is how to manage the population rather than just its size.
- It is also good to recognize that some NPs are big in size and unmanageable; this has to be mentioned as a challenge.
- Research outputs are not well used and this has to be included in the challenges list.
- It was mentioned that the new structural arrangement of EWCA was ok, yet this decision did not take into consideration the role of soil, forest and water, and is only based on generating revenue from the wildlife sector. Thus, such an arrangement cannot last long, and many people will also agree.
- The outputs of the meeting should reach decision makers for their review and hopefully for use in informed policy making.

To Mr. Yeneneh (EWCA)

- You say your relationship with the regions is smooth, but EWCA is only present in Addis and has no offices in the regions. How can your relationship with regions be improved and how can information transfer be more effective?
- While you were discussing stakeholders you did not mention anything about universities, why is that? Are they not your stakeholders? Shouldn't we rely on higher education to come up with capable trained personnel? How could EWCA influence education?
- There is no information on the internet about the PAs of Ethiopia and lecturers are unable to communicate up-to-date information to their students. What strategy do you have to overcome this?
- You say EWCA is working in harmony with MoARD, but how is this possible

when it wasn't possible when you were under MoARD. How has it become possible now that you are under a different organization?

- You told us that EWCA is also trying to demarcate Protected Areas and National Parks. How are you going to deal with conflicts?
- You say the new arrangement is fine with EWCA, but the forestry sector is still under MoARD and EWCA is under another ministry. How can this be workable and sustainable as the animals are under one administration without their habitat? This makes the forest seem meaningless in Ethiopia? Don't you feel this has to be corrected?
- We have undervalued our natural resources, so how can we influence policy makers without showing them the opportunity costs and the value of biodiversity?
- Someone has said that development and conservation are synchronized, but there are doubts that this is true. This needs to be verified.
- How is demarcation undertaken? Is it in cooperation with local communities and elders?
- Who is coordinating the streaming committee that was spoken of? How frequently do they meet, or is it only when needed? How effective is this committee as we have not heard any success stories?
- What is your relationship with the investment authority? What is your position on land development by investors?
- Statistics show that crime against the environment and wildlife is very high in Ethiopia. What are the current statistics and what is being done about it?
- You say EWCA will take to court these who break rules; does this apply to the community or only to investors?
- There are policies on investment and conservation, every policy should be applied and enforced. The investment policy of the country is encouraging investment and it was raised that there is an ongoing land distribution in and around Gambella Park, and similarly the pasture land at Omo was given to investors and is encroaching on the Omo National Park. What can be done to reconcile such arrangements and what is being done so far to avoid such overlaps?

Responses from Panelists

EWCA does not have similar institutional arrangements in the regions. Some of the regions are establishing new forestry and wildlife institutions, and in the rest there are bureaus of agriculture that will be responsible to deal with us. We need to have more or less similar arrangements (between the federal government and the regional governments), but that will be a process.

Universities are our major stakeholders, said Yeneneh, and if I did not mention that, it was by mistake. We are working with universities by hosting their students and they are important stakeholders. Currently there are a few universities giving courses on wildlife and this has to continue as we need trained manpower.

We have a web site under development. It is not complete yet, but we are still working on it.

We are working with MoARD and other sectors on the national steering committee for the time being. It is working as our relationship with all partners is good.

Regarding the monetary value of our PAs, this is important data and yet costly to obtain. Indeed, we must work to collect this information. But currently there is a common understanding that conserving our resources is important for our continued development and higher level decision makers are getting aware of that. The information we receive from a survey of the value in PAs could influence policy makers.

EWCA is responsible to take to court anybody who breaks the laws. When there is conflict between the communities and the investors, the law has to be respected. But this does not mean that we rush to court; rather we will arbitrate and try to solve the issue without legal proceedings. The main issue we are facing now is the communities living in and around PAs are poor, and we cannot simply tell them to relocate without giving them alternatives. EWCA is trying to implement livelihood programs to compensate these communities.

Policy harmonization is a very serious issue. Yes every policy is there to be implemented. However, policy should be reconciled and should not be contrary to others (such as from one agency or ministry to another). Accordingly, the investment and conservation policies should be reconciled and work hand in hand not to ensure development at the cost of conservation.

Responding to the question on how national parks will be protected effectively without being gazetted and having legal boundaries, Mr. Yeneneh mentioned that at this time only Awash and Semien National Parks have been demarcated and gazetted, but EWCA is trying its best to demarcate every PA with the participation of the local communities. Then, they will be formally announced through publication in the Federal Negarit Gazeta and the development of a management plan will follow.

Gender and Biodiversity

Dr. Alganesh Tesema
Institute for Biodiversity Conservation

1.1 Ethiopian Biodiversity and its Significance

Ethiopia is part of the horn of Africa, between 3 and 15 N and 33 and 48 E with a land area of 1.12 million square kilometres. It is believed that Ethiopia is one of the world's richest countries in terms of biodiversity. The main reasons are the physical features of the country, the natural ecosystems, the Ethiopian plateaus dissected by a large part of the Great Rift Valley, the Chain Mountains interrupted by deep gorges and 12 river valleys. As a result of this and other historical developments coupled with primitive way of agricultural systems the country is favoured with an immense diversity of fauna, flora and micro-organisms. Eighty percent of the country's population live in rural areas. They depend directly on biological diversity for their basic needs such as food, fuel, medicine, shelter and transportation. Ethiopian farmers and biodiversity are interdependent and interrelated. Biodiversity is crucial to the well being of Ethiopia's society. It gives free of charge services such as clean water, pure air, soil formation and protection, pollination, and crop pest control. Biodiversity loss is no longer solely an environmental issue; it is also an economic one. Biodiversity loss is primarily affecting poor farmers, both men and women alike.

1.2 Floral Variability and Genetic Diversity

Ethiopian flora is found throughout the country from lowland (at sea level), to extreme highland (4620 m.a.s.l). The country's flora is estimated to include about 6000 species of higher plants of which about 720 are endemic. As Ethiopia has a diversified ecosystem, this situation creates immense amounts of varied and diversified floral species. The country's diversified environment houses an impressive array of plant species that are specially adapted to life in a very sunny climate. These ecological features endow the country with a variety of agro ecological zones, making it a primary and secondary centre of diversity for many economically important crops such as; Eragrostis teff, Guizotia abysinica, Enset ventricosum, Coffee Arabica, Chata edulis, Rhamnus prinoides, Hygenia abysinica, Caleus edulis, Coccinia abysinica, Brassica

carinata, Triticum durum, Triticum eastivum, Hordeum vulgare, Sorghum bicolour and others (Vavilove, 1951).

In a small, isolated pocket on the Ethiopian plateau, Vavilove in 1951 found hundreds of endemic varieties of ancient wheat and wheat with violet grains not known anywhere else in the world. Natural and artificial forces influencing the crops including vast ecological variations (Bechere et al., 1996), isolation, differences in agricultural practices (Bekele, 1984), and natural cross fertilization (Tessema and Belay, 1991) explain this diversity.

Ethiopia also offers favourable conditions for the production of a number of cultivated species including pepper, garlic, shallot, tomato, cabbage, carrot, beetroot, and pumpkin, as well as several tropical, subtropical and temperate fruits that are successfully grown. Ethiopia is either a primary or secondary centre of origin for spices like Aframomum correrima, Piper longum, Nigella sativa, Carum copticum, Coriandrum sativum, Thymus schimperi and Trigonella foenum-graecum. There are also about 170 wild edible plants (CBD, 2005) widely distributed throughout the country that are consumed in different parts of the country. About 80% of the Ethiopian population depend on traditional medicines from indigenous plants.

1.3 Faunal variability and diversity

The broad range of ecosystems and great diversity of habitat in Ethiopia give an opportunity to have high faunal variability and endemism. The existence of variable faunal species assures the survival of other organisms. A total of 2864 faunal species are found throughout the country, of which 125 are endemic. Ethiopia has the largest livestock population of Africa and the third highest in the world (CBD, 2005). It is also recognised as a centre of diversity for animal genetic resources. However, its genetic diversity has not yet been properly researched and scientifically documented.

1.4 Importance of Micro-organisms

Micro-organisms (MOs) are the subset of biodiversity and the janitors of the earth. Without MOs, life cannot exist whatsoever. MOs stand as a guard everywhere. MOs play an important role in agriculture, industry, medicine and the environment. In the field of chemical industry, MOs are used in the production of compounds. In the food industry, microbial activity is used in the production or preservation of food and they also have the ability to upgrade low protein materials to high protein foods (Wood, 1985). MOs are the most effective tool to eradicate chronic crop pests; as biological control certain spp of bacteria (Bacillus thuringiensis) have been used in the control of insect pests.

Faunal & floral variability	species	endemic
Fauna	6.000	720
Domestic animals	74	---
Fish	163	38
Birds	861	16
Reptiles	201	9
Amphibians	63	24
Wild animals	277	31
Arthropod	1.225	7

Table 1: Ethiopian faunal and floral number of species

1.5 The role of women and men in sustaining biodiversity

Gender and gender roles affect economic, political, social and ecological opportunities. The social roles of men and women and the power relations between them usually have a profound effect on the use and management of natural resources. Women and men have different labour responsibilities and decision-making processes. According to their needs, both often use and manage resources in different ways. The different perspectives and knowledge of women and men is critically important for biodiversity sustainability and food security. However, all of this is not yet fully documented and available for its most efficient use.

2. Why do we focus on Ethiopian Biodiversity?

World genetic resources are not evenly distributed; they are concentrated in a specific areas. But in Ethiopia it is a different story. All regions of the country have common variants and all variants are evenly distributed in all regions. But, each has their own specialities. Few studies have been done on Ethiopian Genetic Resources. Existing studies have focused on few areas of the country. As mentioned before, the country has complex ecological zones. As the study indicated, every part of the country has its own ecological characteristics which favour immense species diversity with unique characteristics. The country's complex ecosystem makes favourable conditions for natural hybridization and the development of new variants.

3. Global past experience of gender contribution

According to a United Nations document in the 1950s, Japanese women protested strongly against pollution from industries and the Japanese government prescribed pollution prevention measures. In Kenya, the Greenbelt Movement was founded by Wangari Maathai. Launched on Earth Day in 1977 by the National Council of Women, this environmental campaign resulted in the mobilization of thousands of women planting indigenous trees.

The movement's work has spread to other countries through the Pan-African Green Network. Since 1974, Brazilian women have organized protests against chemical-based agriculture, and lobbied for environmental protection laws. In Thailand, Tunjai Deetes initiated sustainable development efforts in 28 villages of five tribal groups (UN, 2009). As a result of her leadership and dedication, many of the hill tribes have developed into self-reliant communities that now serve as national models in sustainable agriculture and resource conservation (UN, 2009).

4. Gender & Biodiversity

4.1 What is gender?

Gender is not based on sex or biological difference. It is the distinction between women and men by socio- cultural factors, socially constructed differences obtained through living in a certain society or culture.

4.2 How the work of women continues biodiversity

Women are gardeners, peasant farmers, and collectors of forest fruits, wild herbs, forest feed and valuable seeds. They are livestock owners, food crop growers, and seed conservers. Depending on habitat and social tradition, the exact modalities of how women look after food differ widely. As Ethiopia is known in cultural diversity, it is precisely this cultural diversity which supported biodiversity.

The management of ecosystems, and plant and animal resources is often based on knowledge preserved by women over the centuries and women's choices of plant and animal resources are based on adaptation to local environmental conditions, the multiple uses of these resources for fuel, fodder, clothing, household items, medicine and sources of income.

There are about 55 species of Amaranthus all over the world, 11 of which are found in Ethiopia. It is found in disturbed areas and it will regenerate by itself. Most of Ethiopian women are very familiar with this species, but it is used only when there is a shortage of food. Most of male farmers consider these species as weeds. According to women traditional healers Amaranthus is useful for traditional medicine.

4.3 Knowledge for managing biological systems

From a historical perspective, women and men have knowledge about different things, different knowledge about the same things, and women and men may organize their knowledge in different ways. Men and women may receive and transmit their knowledge through different means. Despite these differences, it is critically important to effectively use their knowledge to sustain biodiversity.

4.4 How women and men choose certain food crop seeds

Women consider cooking time, meal quality, taste, resistance to bird damage and ease of collection, processing, preservation and storage. In contrast, men are more likely to consider yield, suitability for a range of soil types and ease of storage. Both are essential for human welfare. These different selection criteria complement one another in order to provide the best seeds for growing, harvesting, and consuming.

4.5 Local communities Action for Biodiversity

Local community's diversified culture gives an opportunity to have immense knowledge on managing and conserving biodiversity. Their wise selection criteria favours variability; their varieties create immense diversity; they are preserved in their proper stores, they survive adverse conditions, and they successfully fulfill the needs of humans. Ethiopian local farmers are keen observers and knowledge conservers. But, without any automated and manuscript support. They always use their brain and hands.

Ethiopia has long standing traditions and customs that have transferred knowledge without any supportive tools, except by word of mouth, from generation to generation. However, today there is a great concern about knowledge erosion, which means there is a generation gap. Accepting and documenting traditional knowledge is not observed. Genetic resources are over utilized and the climate is changing. It has also apparent that there is negligence in conserving biodiversity.

Do we have methods to maintain biodiversity? Yes, if we

- integrate different perspectives
- work hard
- do and not just say
- respect and protect biodiversity
- realise the dangers of biodiversity loss

5. How traditional medicinal plants are used in rural & urban areas

About 85% of the people in Ethiopia depend on traditional medicine for their health. A study was made on the utilization of two medicinal plants by Dama Kessie and Tena Adam on 100 men and 100 women. The study indicated that 85% of urban women used both medicinal plants, while only 15% of the men use both. But in rural areas it was utilized by both 100% of the women and 100% of the men.

6. Gender and Development

Two thirds of the forty five million illiterate in Ethiopia are women and seventy percent of our poor people are women. We conducted a little study at the Institute of Biodiversity Conservation (IBC) and the National Research centre on human resources and educational status in Ethiopia. The study indicated that the number of males in IBC is higher (132) than females (79). Similarly, the number of males in the National Research Center (NRC) is higher than females. It is understood that an increasing number of women researchers means an increase in agricultural development. But, it is observed that there are fewer women researchers than men. The study indicated that there are 2 women with PhDs in NCR while there are 85 men.

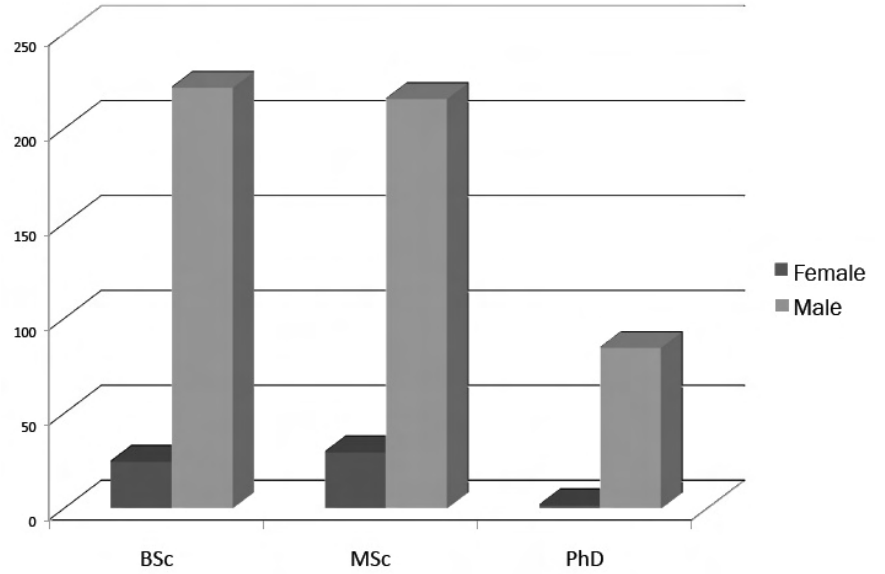

Figure 1: Educational status in NRC (2003)

8. What are the Challenges?

- The majority of plant biodiversity research is not gender sensitive. This has led to incomplete scientific results with respect to the diversity, characteristics and uses of plants, and the causes and potential responses to genetic erosion.
- It is also lack of development of clear guidelines, to mainstream gender into biodiversity management.
- Establishment of networks to promote gender mainstreaming within biodiversity conservation and management.
- Gaps between primitive & new generation

9. The way forward

- Biodiversity conservation cannot be sustained without the involvement of local communities. Therefore, it should respect the different knowledge, needs and access to resources.
- Understanding men's and women's differences will be vital for the future success of community-based conservation.
- The significant contribution of women to the management of biodiversity, and to economic production should be properly recognized.
- Encourage the enrollment of girls to increase the number of female agriculture professionals, researchers, decision makers and extension workers
- There is a gap between the older and new generations. Therefore, it should be filled by documenting & transferring indigenous knowledge

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Discussion

Mrs. Yalem Tesfay
Institute for Biodiversity Conservation

Mrs. Yalem indicated that the presentation has covered various issues related to gender and biodiversity and the role of women in conservation. She added that women are the primary savers and promoters of biodiversity. However she said they don't have the right to use what they have saved and this is the main issue discouraging them. She said male dominance is still strong, mainly over resource usage. She emphasized the need for legal framework that will help safeguard women's access to benefit sharing. Thus, we need continuous awareness creation to realize gender equity and access to resources. She also revealed that though Ethiopia is known for its large biodiversity base, it has not been used to its potential. There is a need for more participation of local communities. Mrs. Yalem acknowledged IBC's role in raising awareness on conservation and use rights. According to her all the stakeholders are being left behind and must do their part to reap the benefits.

Comments and questions by participants

One participant said that a few months ago Prime Minister Meles had promised favoring women for employment and yet these presentations have told us that this has not been implemented.

Other participants said that most of the time dirty jobs are pushed on women. Yet we are saying that we are gender activists, and this trend needs to change. There is an Amharic proverb "Yewha gulbetena Yeset Tibeb Yesteh", that implies how women are wise in managing everything, including biodiversity conservation.

Another comment given was that the presentation only focused on and gave examples from the central parts of the country, and there is a need to also include the pastoralist areas. Among the pastoral communities women have tremendous knowledge in terms of fodder species, herbaceous species, medicinal species, and so on, and we have to recognize and give examples of these communities whenever we are talking about gender in such a forum.

One participant said that there has been no attitude change and there is much work needed on gender equality, while another participant argued that this is not true and there has been significant change by sharing his own experiences and that of others. All participants agree on the need to further promote equality as simply telling past history does not help any. An important point was raised about the need to encourage women, as most do not realize their own potential and in most challenging cases just say "I cannot do it"; this

attitude has to change. Regarding employment related issues, women should be promoted and encouraged; otherwise they will not realize their potential, which has consequences.

- Dr. Alganesh used the words primitive and new generation; what does this mean and to whom does it refer?
- On your way forward, you talked about the differences between men and women, which differences are you speaking of?
- Though we have to give emphasis to women, we should also recognize the existing changes that equality is improving; what do you say about this?
- There has to be research on the participation of women. What do you suggest?

Responses and reflection by the presenter

Dr. Alganesh said she used the words primitive and new generation to describe job descriptions many years ago in the development of mankind. Studies show that job descriptions were developed during primitive times, when men went out to the forest for hunting and women remained at home cooking and doing domestic work. That has influenced the present occupations. Indigenous knowledge is considered to be primitive, which is now being disregarded by the present generations. Such reluctance to accept IK has resulted in the discontinuity of the transfer of knowledge and that is why we say we need to document this knowledge before it is lost forever.

Dr. Alganesh also commented on change and she said it is true that women were disfavored in the past, and although there are some changes now, it is not enough. Strengthening her argument she mentioned though there are changes, the majority of policies do not favor women, such as positions in various government organizations are not open for the appointment of women, and this scenario needs to be improved. We need greater equality as this will enhance sustainable development.

As a solution she suggested the immediate start up of gender mainstreaming. In addition she said, there must be meaningful support from government organizations to minimize the gender gap. We need to give women opportunities they have not had before.

About the differences in knowledge of men and women, there are studies indicating their differences in perception and knowledge on some species between women and men. The point of the presentation is about capitalizing on this difference to maximize conservation efforts.

Conference Wrap-Up

Dr. Asferachew
Wrap-up Presenter

Dr. Asferachew began by commenting on the theme of the workshop "Connecting biodiversity with people well-being". He said that the majority of the workshops and discussions in the past two years are almost exclusively about climate change. This time the organizers chose the important theme of biodiversity. Not only did they pick an important theme, but also focused on its positive role to mankind, and the papers and presentations were selected in such a spirit, and all this is very positive. It is positive because the workshop brought various stakeholders together who have a stake in biodiversity and development, and tried to link these two so that they can work hand in hand, not trying to gain an advantage over the other. This cooperation is imperative as we move forward.

He then commented on the points raised during the discussions. Among the major points raised he reiterated that there are many workshops, but little is done on the ground. Dr. Asferachew emphasized the need to do something based on what was discussed during this workshop.

The other point raised was the need to protect the environment. Besides this, he said that the workshop recognizes that Ethiopia has immense biodiversity, which is a potential for our economic development. At issue is how we can effectively manage this resource to enhance our economy, all the while maintaining its conservation and ensuring its perpetuation.

Dr. Asferachew also repeated the need for economic growth, which has been mentioned many times by participants, and he said yes we need development but the workshop is trying to scrutinize how to balance development with conservation, so we can continue growing while ensuring our resources will be used by the current generation without compromising the need for future generations. As human beings this is our moral obligation to guarantee. He said we can't use everything now and expect our children to survive. He then move on to the presentations and mentioned some of the points in each of

them. He said that various points were raised, discussed and enriched by the participants and thus all the comments given have to be included by the presenter without any reservations as the points raised by the discussants and attendants are crucial in making the papers palatable and comprehensive.

He then mentioned his worry as none of the presentations touched on wetlands. He said important topics like agro-biodiversity, biodiversity and gender, protected areas, community protected sites, bio-culture and the like were presented and discussed, yet an important part of such a workshop was overlooked. The wetlands not only fit well into this theme, but they are also among the main ecosystems in Ethiopia facing dramatic challenges, diminishing alarmingly and requiring an urgent response.

Commenting on the agro-biodiversity presentation, our agro-biodiversity has immense potential, yet we are getting little or possibly even no financial return from these resources. Dr. Asferachew then asked what has Ethiopia gained from being among the nine Vavilove Centers of agro-biodiversity? The answer is almost nothing. Is Ethiopia getting a good return from our organic coffee? No. Thus, as the communities who are responsible for conserving all these resources are not receiving any returns from it, the resources are now being disregarded and are diminishing.

Suggesting how to address such issues, we need to mainstream agro-biodiversity in our relevant programs, work on marketing, promote farmers' varieties, encourage more organic products while connecting them with the right markets, and also establish incentives mechanisms to encourage conservation.

On bio-cultural diversity, the presentation was very comprehensive not only because it included various ideas but also because of the participation of community representatives in the discussions. This has allowed us to hear from the communities themselves on how they value, depend on and conserve resources and the challenges they face at this time in particular. According to Dr. Asferachew this will be pivotal in decision making. He also encouraged the integration of all activities of our programs by the communities.

Talking about the protected areas, community based conservation sites need an innovative approach as they will not complement what the government is doing, but are a feasible approach as the communities themselves are undertaking it.

EWCA's representative verified that the institute is on good track and that is much appreciated, but he did not give us any indicator showing their progress such as investment on infrastructure or other statistics.

Concerning the impact of gender on biodiversity, different cultures, practices, and perceptions must be put aside, and the knowledge of both men and women must be recognized as a significant contribution to our agro-biodiversity conservation.

It was very encouraging that the workshop focused on discussing positive issues rather than dwelling more on negatives issues. While we need to continue encouraging women's role in conservation, we should not forget men's role as well.

In summary Dr. Asferachew put forth the following major issues as points of concern:

- Biodiversity is depleting
- There is a knowledge gap and research has to seek to mend these
- There is a need for updating information, and to establish web sites
- Our knowledge on biodiversity needs to be expanded as it is currently incomplete and there needs to be databases of information that can be accessed by all stakeholders
- The need for community participation in all aspects of conservation and development
- The need for financial resources to protect our biodiversity as these programs are not cheap, nor is building the capacity of IBC and other relevant institutions
- The need to address and find resolution to the issue of population growth and how our environment can support and feed the existing population
- The need to reconcile the demands of economic growth and conservation
- The need to use appropriate EIA during planning and implementation phases
- The need to communicate the outputs of the workshop to decision makers and what innovative approaches are planned to influence them
- There is a tendency in workshops and seminars to talk a lot, but participants must also be proactive about the issues discussed

Green Forum Declaration 2010

Preamble

More than 150 participants, representing government agencies, non-governmental organizations and other environmental stakeholders, assembled in Addis Ababa on 29 and 30 September 2010 for the Green Forum Conference "Connecting Biodiversity with People's Wellbeing" to discuss how to conserve and sustainably utilize Ethiopia's rich biodiversity without compromising the possibilities for human development.

Against the background of declining numbers of animal, plant and microbe species, including genetically important varieties essential for Ethiopia's food sovereignty and economic growth, the Forum learned about the strong link between culture and environment and the importance of strengthen local cultures and relevant Ethiopian institutions as an essential contribution to the conservation of biodiversity.

Based on this common understanding, the Forum agreed that immediate action is necessary in several fields and called upon the relevant stakeholders to:

- Value the potential of Ethiopia's biodiversity as a major resource to find responses to the challenges of climate change and the need for increased food production
- Building on Ethiopia's existing commitments stated in the Convention on Biological Diversity and honouring the right of nations and nationalities to promote their own culture, as enshrined in the constitution, special recognition should be given to the importance of customary laws and the positive role they can play in the conservation of biodiversity
- Promote research on the status of indigenous biodiversity and cultures, as well as potential risks and current trends

- Strengthen institutional cooperation and coordination of institutions working in the area of biodiversity conservation with relevant federal and regional government institutions as well as NGOs/CBOs for effective implementation of laws and regulations on biodiversity and the promotion of community based conservation practices

On agriculture

- Reject genetically modified seeds and reduce dependency on imported enhanced seeds associated with high costs for import and patent rights and often requiring additional inputs such as synthetic fertilizer and pesticides.
- promote localized research on farmer's seed varieties and indigenous livestock breeds with a view to increasing yield and enhancing adaptability to regional climate conditions. The research must encompass improved resource management and farming methods.
- Recognize and use the expertise of farmers in all agricultural research efforts, with particular emphasis on the role and knowledge of women
- Promote organic nutrient cycling involving livestock and compost to replace chemical fertilizer
- Mainstream issues of agro-biodiversity, with a particular view of incorporating the traditional knowledge of farming communities into the relevant programmes, policies, and strategies
- Welcome national and foreign investment, but stress the importance of thorough social and environmental impact assessment (EIA) studies. The legal framework for EIAs should be revised to require the active participation and the consent of the communities concerned and to include more standardized methodologies and measures guaranteeing the quality of such studies.

On Protected areas

- Urgently facilitate legal gazettement of protected areas as a basis for taking action against any level of encroachment into these areas
- Legally recognise community-based conservation areas as one of the Ethiopian Protected Areas category
- Establish and implement mechanisms for effective participation and benefit sharing of local communities neighbouring protected areas
- Build capacity and infrastructure for generating revenues from protected areas (i.e. as tourism) as a basis for benefit sharing with the local communities

- Ensure Free and Prior Informed Consent of local communities when including and establishing new areas in to protected area categories.

On Public Education

- Engage the media to contribute more actively to the information of the public about the link and value of cultural and biological diversity
- Encourage Schools and institutions of higher learning to integrate elements on local culture and traditional knowledge and the value of biodiversity in their curricula, building on the environmental science curriculum in elementary schools already contributing to sensitizing students to their local environment.

Addis Ababa, 30 September 2010