

# Health

## AN ECOSYSTEM APPROACH

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### Breaking the Cycle of Poverty in Ethiopia

Agricultural and sanitary practices improve incomes and health

*Communities in the highlands of Ethiopia face what seems to be a simple problem: not enough food. Researchers working to increase food production in the region have discovered that it is not so straightforward, however. Too small landholdings, poor agricultural practices, a lack of potable water, and other factors contribute to a vicious cycle of deteriorating health and environments — and to increasing poverty. Supported by Canada's International Development Research Centre, they have also identified ways in which farming families themselves can break out of this cycle.*



ILRI: Abiye Astatke

Degraded land and water resources are factors in the rise of stunting, malaria, and water-borne diseases.

Hunger is hitting Ethiopia hard yet again. Late in 2002, relief agencies estimated that as many as 14 million people would need food aid. Most of those people live in Ethiopia's highlands, trying to scratch a living from the eroded and densely populated hillsides.

One such highland community is the Yubdo Legabato Peasant Association, a settlement nestled in the hills of Dendi District, about 80 kilometres west of the capital Addis Ababa. (In Ethiopia, a peasant association is not a farmers' self-help

group as the name might suggest, but the lowest tier of civil administration, equivalent to a village.) About 5 000 people live in the 25 square kilometres that comprise Yubdo Legabato, making their homes in *tukuls*, one-room huts of mud walls and thatched roofs. "There is quite a lot of poverty at the top [of the slopes]," says Abiye Astatke, an agricultural engineer with the International Livestock Research Institute (ILRI), who has worked in the community since the early 1990s. "People were moving there because of the scarcity of land, because they don't have any other choice."

#### Not enough food?

If one were to ask an average farmer in Yubdo Legabato to name their problems in life, the likely response would be similar to what the relief agencies say about Ethiopia: there's not enough food. In the past, agricultural researchers concentrated on trying to help the community's farmers produce more food by developing and introducing better agricultural technologies. One such effort, the Joint Vertisol Project (JVP), involved a consortium of national and international organizations to improve management of the often waterlogged topsoils in the valley bottom, known as vertisols.

The JVP researchers came to realize that the health of the valley bottom is affected by things going on in the rest of the watershed. They couldn't look at vertisols in isolation from the rest of the ecosystem. And they also became aware that

increased food production was making little dent in the poor quality of life of Yubdo Legabato's residents. Their problems were much more complex than simply a lack of food. "We realized people's lives were not going to improve just looking at the technology on its own," says Don Peden, Ethiopia director of ILRI, one of the agencies involved in the project.

In an attempt to look more broadly at the problems and to develop practical solutions, the JVP researchers embarked on a new project using what's known as the ecosystem approach to human health. This approach examines how environmental, economic, social, and cultural factors interact to affect human health.

The researchers felt that Yubdo Legabato was a ripe testing ground for the ecosystem approach. One reason was that the place is so poor that the potential for disease comes from many directions. Concentrating on just one issue would bring only incremental improvements in overall well-being, says Peden. "The level of poverty is so high, the state of the people's health is so poor, and there are so many contributing factors that to address any one of them alone is not going to make any difference," he explains.

With support from Canada's International Development Research Centre (IDRC), the research team launched a four-year project in 1998 using the ecosystem approach. Their theory was that the well-being of rural people — as measured by health, nutrition, and income — depends primarily on their agricultural, public health, and sanitary practices, and on the quantity and quality of natural resources available to them. The researchers also believed that understanding the connections and interactions between human well-being, natural resources, and agricultural practices could lead to recommendations for better technologies, policies, and behaviours to improve people's quality of life.

## Into people's homes

The study began by surveying the housing, sanitation, nutritional, and health status of the community. Working with the peasant association and farmer research groups, researchers went inside people's homes. They measured such items as the quality of water consumed by households, how much food family members eat during different seasons, and the pace of children's mental and physical development.

What they found makes for grim reading. For example:

- only 45% of households consume the World Health Organization's minimum standard of 2 200 kilocalories of food per adult per day;
- 42% of the children under 5 years of age are underweight;
- 75% of poor families share their sleeping quarters with livestock overnight; and
- 40% of children sleep on the floor.

From the data, the researchers were able to draw an overall portrait of life in Yubdo Legabato. The average family of six to seven people lives in a 30 square-metre mud and thatch



ILRI: Abiye Astatke

Livestock are indispensable to local livelihoods, but their mismanagement contaminates water sources.

hut and cultivates less than two hectares of sloping land. Most families cook inside the home using animal dung for fuel and keep livestock inside at night for warmth. Many family members sleep on the dirt floors, in a place where nighttime temperatures average 5°C in the cold season.

The community's women fetch their water mainly from streams and the river in places that look to them to be clean but are in fact "quite contaminated," says Astatke. Livestock come in contact with all but one of the community's 28 water sources, making most unfit for human consumption, especially during the rainy season when human and animal waste regularly wash into them.

Pressure on the land has increased significantly in recent years. Aerial photographs show that the amount of land under cultivation doubled between the late 1950s and the mid-1990s, while gullies formed by erosion grew by a factor of 14.

A significant proportion of Yubdo Legabato's women and children have poorer health and lower nutrition levels than those in other sub-Saharan African countries. In summary, said the researchers in a report, "The analyses show an ecosystem and its inhabitants in a poor state of well-being."

## The vicious cycle of poverty

The analyses also showed vicious cycles in which various factors interact to worsen the health of people and their ecosystem.

Land holdings are so small that farmers can't afford to let the ground lie fallow, reducing soil fertility. The land has become so degraded that it doesn't produce adequate fodder for livestock. In turn, livestock produce amounts of milk that are low even by Ethiopian standards. And the community often burns livestock manure as fuel instead of plowing its nutrients back into the land, further weakening crop production.

This low agricultural productivity leads to inadequate income for the farmers and consequently hunger, malnutrition, and disease. Poor farmers are in turn unable to spend money on making their land more productive, improving their housing, or buying medicine. Unhealthy farmers find it difficult to work their land and productivity drops further.

According to agricultural economist Mohammad Jabbar of ILRI, the bottom line is: "If people don't adopt some improved agricultural technologies, the land will not be able to sustain them."

## Farmers identify their problems

The research team wanted to find out if the people of Yubdo Legabato could identify their own health problems and develop action plans to solve them. Researchers asked community members what criteria they used for assessing their health, what factors caused their problems, and eventually, what they thought should be done about them.

In the initial discussions, the factor that was always top of the list was not having enough to eat. The farmers often attributed all their problems to *dhabuu*, a word in the Oromiya language that translates loosely as "not owning enough." The researchers encouraged the farmers to think more broadly about the sources of their problems, and more factors came to light: a shortage of livestock feed; lack of potable water in the dry season; increasing soil erosion; a perceived increase in the incidence of malaria, measles, and water-borne illnesses.

Helping community members to identify connections between their agricultural practices, their use of natural resources, their sanitary practices, and their health was the next step. The researchers had collected so much data on so many households, they were able to thoroughly analyze which factors were related to which problems. Overall, the results clearly showed that agriculture, environment, human nutrition, and health are inseparably linked, demonstrating the need for a holistic approach to problems of human well-being.



ILRI: Abiye Astatke

Housing and the way in which households manage their resources give rise to many of the health problems that plague communities in the Ethiopian highlands.

Among the findings:

- Households that had already adopted technologies to improve crop production — such as growing cereals together with legumes or a tilling technique to reduce water-logging — tended to have more to eat.
- People who fell ill during the study were more likely to come from households considered "food insecure."
- Children who scored poorly on measures of cognitive development were more likely to come from households where fruit and vegetables were less often available and where cooking was done inside the home.

This last measure came from testing such things as shape recognition and motor skills among infants and toddlers ranging from 6 to 42 months. The results suggest that many children receive such poor nutrition that their cognitive development is being impaired. "Dealing with the state of the kids now is absolutely fundamental if you want the next generation to be sustainable," says Peden.

## A 10-fold increase in income

The researchers next turned their attention to the impact of potential solutions. To test whether a combination of improved agricultural technologies could substantially improve the lives of people in Yubdo Legabato, the team created a computer model that took into account the potential positive and negative outcomes of various actions in the ecosystem. The results suggest that the people of Yubdo Legabato can not only break the cycle of poverty, they can smash it to pieces.

The computer model says farming families could, over a 12-year period, have enough to eat and see their incomes increase 10 times. This would require better management of the existing natural resources by adopting agroforestry, applying manure and inorganic fertilizers, improving drainage, and planting high-yield crops.

The huge potential for increased income and better health comes from the cumulative effect of various changes. For instance, the researchers say not cooking indoors with manure as fuel could reduce people's respiratory problems. Improving household design could make houses warmer, encouraging people not to keep animals indoors. Introducing agroforestry could provide animal fodder and reduce soil erosion. All of this could improve the community's health and nutrition.

The research team encouraged farmers to think about whether they could begin to make some positive changes on their own rather than wait for assistance from outside. Once people learned that their hygienic practices could cause health problems, they took matters into their own hands. "People built different houses for their livestock, people built a separate room for cooking their food, and also started building raised platforms for sleeping," says Astatke.

The researchers collaborated with the community to design a simple, affordable means of purifying water to reduce the high incidence of gastrointestinal illnesses. They adapted a slow sand filtration system, using 100-litre clay vessels made by local potters at a cost of about US\$4 each.

Encouraging more widespread adoption of the recommended practices is one aim of the project's next phase. But for the farmers to be willing to adopt some technologies, they must believe their investments will not be wasted. Ethiopian farmers have no formal land tenure. Since the overthrow of Emperor Haile Selassie in 1974 and the end of the long-standing feudal system, the Ethiopian government has owned all land, allocating it to families for their use. But the government offers them no guarantee of long-term land rights. "Animals are seen as a more important measure of wealth than land because land they can't sell," says Jabbar.

The policy gives farmers little incentive to invest in immovable improvements such as planting trees or constructing better homes. Even the practice of sleeping on dirt floors can be traced to insecurity of land tenure — why spend the money to build a bed when you may have to leave it behind at a moment's notice? Some farmers are unwilling to borrow money for fertilizer at the beginning of planting season because of the risk they may not hold the land come harvest time.

But senior government officials are more openly than ever before discussing the need for secure land tenure, raising hopes that policy change is on the horizon.

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## Ecosystem Approaches to Human Health

Human health and well-being are intimately tied to the health of the ecosystems that sustain life. Yet the potential for improving health by better managing the local environment is an avenue rarely explored in mainstream health programming. Through its Ecosystem Approaches to Human Health (Ecohealth) Program Initiative, IDRC aims to identify the web of economic, social, and environmental factors that influence human health. Communities can then use this knowledge to better manage ecosystems and improve the health of both people and the ecosystem.

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ILRI: Don Peden

Cognitive and motor skills testing suggest that food insecurity and poor health constrain normal child development.

## Lessons for highland communities

The researchers believe the lessons learned in Yubdo Legabato can be applied not only to other parts of the Ethiopian highlands, but also to highland communities throughout eastern Africa and around the world. The project team is working on plans to test whether the links and interactions they uncovered in Ethiopia between human health and the ecosystem are applicable in such places as Uganda, Nepal, and Peru.

This *Case Study* was written by Mike Crawley, a writer based in Kenya, for IDRC's Communications Division.



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