

Africa may be on the verge of becoming a continent of hope, and that would be a wonderful thing not just for Africa and Africans but for the whole world, because the world can't afford to have 600 million people left behind as the rest of the world moves forward. It's not only morally wrong, it's incredibly short-sighted.

Paul Wolfowitz, president of the World Bank
speech at the U.S.–Africa Business Summit, 23 June 2005

INNOVATIVE TECHNOLOGIES

Sweet Deal for Cocoa Production?

How can you not like a technology that gets the basic ingredient of chocolate to market faster? That's the promise of a cocoa bean-drying technology recently introduced in Uganda by the Italian chocolate company ICAM, based north of Milan. The idea is simple: farmers use plastic sheeting to amplify the sun's rays and dry beans faster and more thoroughly. According to a January 2005 report on SciDev.Net, an online newsletter of science and technology, a processing plant in Uganda's capital city of Kampala is the first in central and eastern Africa to use this new method. It's a method that may well help small farmers in this and other developing countries better compete in the global cocoa market.

Cocoa quality depends on several factors, including the beans' moisture content (generally, drier is better) and the absence of mold and fungi. Drying the beans reduces the risk of mold and fungi, and preserves the cocoa's desirable taste and aroma.

Typically, cocoa farmers spread harvested beans on the ground and dry them in the sun, down to about 10% moisture content. Exporters then purchase the beans and dry them further to an optimal 7–7.5%, either by sun-drying again or baking in ovens.

In the new method, plastic sheeting is suspended on an aluminum frame above the beans, which are raked out beneath on mats. The special polyethylene sheets convert the sun's ultraviolet rays to infrared, heating the beans to 50–60°C and allowing the beans to reach the requisite 7% faster than regular sun-drying. Joseph Adhum, managing director of JOACHIPO Commercial Enterprises (the Ugandan exporting firm that purchased the plastic in September 2004), told SciDev.Net his firm dried 26 metric tons of cocoa beans in just two days last November (traditional drying can take two

weeks). The company is testing the plastic for faster drying of tomatoes and sesame seeds as well.

The plastic is also designed to withstand harsh conditions of sun, wind, and rain. JOACHIPO and ICAM paid US\$60,000 for the sheeting—too expensive for growers, but within reach for exporting firms.

Advocates say the reduction in drying time could help boost Uganda's cocoa exports. Although British colonizers introduced the cacao plant (the source of cocoa beans) to Uganda in the early 1900s, cocoa has never become a major export crop compared with coffee. But with cocoa bean prices

done properly, doesn't pose a problem."

Growing cocoa beans offers small-scale farmers in Uganda and other tropical countries a livelihood from a product that has strong foreign demand and local environmental benefits, according to researchers at the International Food Policy Research Institute. Cacao bushes can grow on small parcels of land and on poor soils, two facts that make it feasible for small farms and women growers, noted institute scientists in their February 2002 report *Empowering Women and Fighting Poverty: Cocoa and Land Rights in West Africa*. Cacao bushes protect those fragile soils from erosion, and give needed shade to tree seedlings that can help restore biodiversity to cropland.

Furthermore, cacao can be planted alongside food crops, offering a cash source to small farmers who rely on their land for subsistence. More than 85% of the world's cocoa beans are grown by small-scale family farmers, mainly in West Africa but also in Southeast Asia and Latin America, says Bill Guyton, president of the World Cocoa Foundation, an industry-supported organization based in Virginia.

These factors can appeal to U.S. food sellers, who are finding market advantages in more transparent links to their overseas suppliers, especially when they can show a crop's environ-

mental and health benefits. For example, Newman's Own Organics, which sells organic chocolate, has seen a steady rise in sales each year, according to Camille Littlejohn, a customer service representative for the firm.

Consuming cocoa products in moderate amounts can be healthy, too. Sources including a review article published in the January 2005 issue of the *American Journal of Clinical Nutrition* note that flavonoids in cocoa have been found to improve vascular function and reduce risk of vascular disease. And research published in the June 2005 issue of the *American Journal of Hypertension* demonstrates for the first time that dark chocolate has an acute and potent dilating effect on muscular arteries and reduces so-called wave reflections, providing a mechanism for how chocolate may protect the cardiovascular system. —David A. Taylor



Making beans count. A new method of drying cocoa beans may allow Africa's small farmers to get better-quality products to market faster than before, allowing them an opening into the global chocolate market.

around US\$1,500 per metric ton, this crop promises nearly three times more return by weight than coffee.

The technology's advocates say the plastic also kills mold and fungi more thoroughly, and thus makes it easier for Ugandan cocoa to meet European health requirements for imports. Some experts, however, say that's not currently a problem. Jason Wolfe, program officer at Enterprise Works/VITA, a nonprofit technical organization, says the main issues for growers and exporters are not health problems, but knowledge of which grades of beans are desired by the market. Likewise, Peter van Grinsven, field research manager for the Cocoa Sustainability project of Masterfoods BV (which owns the Mars snack and candy company), is skeptical of the plastic's benefits. He says, "Conventional drying, if

MEETING REPORT

Genetics at the Community Level

Francis Collins, director of the National Human Genome Research Institute (NHGRI), picked up a guitar and sang to close out the Seattle community genetics forum. To the tune of the 1961 rock-and-roll song “Runaway” and enthusiastic audience response, he imagined the thoughts of a person in 2015 upon seeing their personal genomic data for the first time: “As I walk the bases/in all three billion places/I wonder/am I built for strong endurance or loss of health insurance?”

Ethical, legal, and social issues were a primary focus of the 21 May 2005 community forum, held at the University of Washington (UW). “This is a historic time for our species,” said Collins during his keynote address. “We have, for the first time, the ability to read our own instruction book. We have the responsibility to do so in ways that don’t injure people.”

About 300 students, teachers, and community members attended the event, which was organized by the UW Center for Genomics and Health Care Equality (with funding from NHGRI) and the UW Center for Ecogenetics and Environmental Health (with funding from the NIEHS). The centers were assisted by an advisory committee of UW genomics experts.

Advances in genomic science—such as genetic testing to determine optimal medication dosing—are making “personalized medicine” a reality, said Collins. At the same time, the increasing ability to collect genetic information about individuals raises concerns about how that knowledge may be used, perhaps by potential employers. Collins also raised larger issues: “Will knowledge of human variations reduce prejudice or increase it? Will we succumb to genetic determinism, neglecting the role of the environment and undervaluing the human spirit?”

High school students at the forum included winners from the 18 March 2005 Student Biotech Expo, sponsored by the nonprofit Washington Biotechnology and Biomedical Foundation. Several students reprised prize-winning performances. A rap called “Doggin’ Genes,” written and performed by Heather Earp and Hana Fallisgaard of Shorecrest High School, described the sequencing the dog genome. A two-person play about genetic testing, written and performed by Maya Sugarman and Rhianon Bronstein of Garfield High School, explored the quandaries of undergoing

genetic testing for a disease for which there is no cure.

Staff from throughout NHGRI attended the forum to hear community concerns and take them back to institute programs, said Vence Bonham, chief of the NHGRI Education and Community Involvement Branch. Forum presentations and breakout sessions focused on topics including medical uses of genetic information, racial profiling and DNA evidence, behavior and genetics, and genetic discrimination related to employment and insurability. Panel discussions covered a wide range of additional topics including the cost and availability of genomic medicine.

“Most Native American people don’t have access to available treatments that could make them better,” said speaker Ralph Forquera, executive director of the Seattle Indian Health Board. Until access to basic care is improved, he said, advances such as genome-based personalized medicine are “fluff,” and will benefit only affluent people.

Makani Themba-Nixon, executive director of the nonprofit Praxis Project, wondered if an overemphasis on genomic research could obscure the importance of sociopolitical considerations such as links between environmental pollutants and health. Collins said that large-scale studies that include data on environmental exposures as well as genetics are needed to better understand genetic effects on health. “It would be expensive,” he said. “It would have to be a political priority.”

Speakers and meeting participants also discussed the need for better understanding of genomic science among community members and health care providers. Sharon Terry, president of the nonprofit Genetic Alliance, commented that, until her sons were diagnosed with a genetic disorder, she “didn’t know a gene from a hubcap.” Added Forquera, “We need to find a way to make genomic information interesting, engaging, and accessible.” Presenters gave several examples of effective nonlecture formats for conveying genomic information, including the use of individual case studies in discussing genetic testing. Elaine Armstrong, a high school teacher from Battle Ground, Washington, said case studies are useful in the classroom, because they grab the students’ attention.

“I was pleased to talk with such a diverse range of participants representing many different communities,” said Collins after the meeting. “What I am most excited about is to see what happens next, and to find ways to continue to actively engage members of the public in this dialogue.” —**Kris Freeman**

Brazilian Biodiesel Blasts Off

With its immense agricultural sector, Brazil has the raw materials to become a leader in biodiesel production. Now it’s building the capacity to turn these resources into fuel. This spring the country saw the opening of its first two biodiesel production plants. Brazilian president Luiz Inácio Lula da Silva said the national biodiesel program will provide not only fuel but also jobs in some of the country’s poorest areas. By 2008, Brazilian investment in biodiesel will reach US\$515 million, with production nearing 211 million gallons. Brazilian gas stations were first authorized to sell biodiesel in January 2005. Fuel distributors can add up to 2% biodiesel to conventional diesel. In 2008, the addition will become mandatory.



More Muscle Needed for Built Environment Research

Over half the U.S. population fails to meet the Surgeon General’s recommendations for physical activity. How much are the surroundings we build for ourselves to blame? And of the myriad ways available to alter the built environment, which would have the greatest impact on physical activity levels? A January 2005 report by the National Academies’ Transportation Research Board and the Institute of Medicine says more interdisciplinary research is needed before these and other questions can be answered. The report calls for a multiagency collaboration to develop and fund an appropriate research agenda.

Fewer Foodborne Illnesses

A concerted federal effort appears to be paying off in fewer cases of some foodborne illnesses, according to the 15 April 2005 *Morbidity and Mortality Weekly Report*. From 1996 to 2004, the incidence of *E. coli* O157 poisoning decreased 42%, *Campylobacter* infections decreased 31%, *Cryptosporidium* infections decreased 40%, and *Yersinia* infections decreased 45%. *Salmonella* infections overall were down 8%, although only one of the five most common strains decreased significantly. *Shigella* infections also did not change significantly, and *Vibrio* infections saw a 47% rise.

FDA recommendations enacted in 2002 have led to improvements in commercial food handling systems, and educational programs have informed the public about preventing food hazards. The report says more work is needed across the farm-to-table continuum to understand and control still-problematic pathogens.



FOOD SAFETY

A Tea-Time Mystery

When a 52-year-old Missouri woman approached physicians in 1998 complaining of stiffness and pain in her spine, the symptoms were at first attributed to “disc disease.” But a series of laboratory tests showed that the woman had abnormally thick, dense bones and strikingly high levels of fluoride in her urine—hallmarks of skeletal fluorosis, a disease that has been diagnosed only a handful of times in the United States.

The only way to develop skeletal fluorosis is to ingest or inhale too much fluoride. The woman’s drinking water had only about 2.8 parts per million (ppm) fluoride, well below the Environmental Protection Agency (EPA) limit of 4.0 ppm. Other sources of fluoride were also eliminated: She didn’t swallow her toothpaste, she didn’t work with pesticides, and she didn’t live near a mine. So where was she getting all the fluoride?

Then the woman revealed she had drunk up to two gallons of extra-strength instant tea every day of her adult life. Physician Michael Whyte of Washington University School of Medicine and his colleagues decided to measure the fluoride levels in her tea preparation.

They found that, counting the fluoride in her water, the woman was ingesting 37–74 milligrams of fluoride per day. EPA studies suggest that severe skeletal fluorosis could occur over the course of 20 years



Tea total. Some instant teas may exceed safe levels of fluoride, suggesting a little refreshment goes a long way.

from a continuous exposure of 20 milligrams of fluoride per day.

Whyte and colleagues then tested 10 instant teas available in grocery stores. They found average fluoride concentrations of 1.0–6.5 ppm in regular-strength tea made with fluoride-free water, with several brands exceeding the Food and Drug Administration limit of 1.4–2.4 ppm for bottled beverages. Their study appears in the January 2005 issue of *The American Journal of Medicine*.

Whyte believes that individuals who drink large volumes of instant tea for a prolonged period may be putting themselves at risk for skeletal fluorosis. But Joe Simrany, president of The Tea Association of the USA, believes that the Missouri incident was highly unusual. “It had less to do with tea than it had to do with excessive behavior,” he says.

So should the average tea drinker be concerned? “It may be that certain brands ought to cut down the amount of fluoride in their tea or add a warning label to their product,” says Michael Kleerekoper, director of research for bone and mineral metabolism at Wayne State University, “but it would be a real mistake to throw out the baby with the bathwater.” He adds, “I drink tea—it’s wonderful on a hot summer’s afternoon.”

Whyte, who also hasn’t stopped drinking tea, says, “Our research is a call for better understanding of fluoride levels in various teas.” He is now investigating the fluoride levels of bottled tea preparations.

Meanwhile, the woman in Missouri has stopped drinking tea, and her pains have abated. She has since switched to lemonade. —Michael Szpir

DIET AND NUTRITION

Olestra’s Second Wind

Olestra, the nonabsorbable fat substitute, has had a rocky past. Originally explored as a cholesterol-lowering drug, olestra was approved in 1996 for use in fat-free snack foods with the proviso that these snacks carry a warning about possible cramping and loose stools. The Food and Drug Administration dropped this warning in 2003 after determining that initial reports of such effects did not hold up in postmarketing studies. Now olestra may be set to take on a new role: as a way to rid the body of toxicants such as dioxin and polychlorinated biphenyls (PCBs).

“It sounds like a snake oil pitch,” admits chemist Ronald Jandacek, an adjunct professor at the University of Cincinnati College of Medicine who once worked for olestra developer Procter & Gamble. Jandacek and his colleagues fed mice the radioactively tagged toxicant hexachlorobenzene (HCB) and tracked its levels in the brain and liver during a weight-loss-and-regain diet cycle,

which parallels the “yo-yo diet” pattern many Americans follow.

In the first weight loss, HCB increased threefold in the brain, fell with weight regain, and increased with the second weight loss. In the liver, HCB acted differently, increasing with weight regain. When the researchers added olestra, fecal excretion of the toxicant soared 30 times, and its accumulation in the brain fell by half. The study details appear in the February 2005 issue of the *American Journal of Physiology—Gastrointestinal and Liver Physiology*.

Jandacek and colleagues have also completed a preliminary study looking at excretion of HCB in mice during normal food intake and fasting. Olestra appears to enhance the rate of excretion during both, with excretion during the fasting period slightly higher than during the fed period.

“Olestra may be a logical means for biological remediation to remove toxicants,” says Bernard Hennig, a professor of nutrition and food science at the University of Kentucky, adding, “[this work] needs to be confirmed in humans.” Jandacek hopes to eventually feed olestra chips to people living

in an area with known organochlorine contamination and monitor toxicant excretion.

In a few case reports, feeding olestra chips to human victims of dioxin poisoning has already been shown to reverse effects. A case report in the June 2005 issue of the *Journal of Nutritional Biochemistry* describes a patient exposed to high levels of Aroclor at work. Under the supervision of researchers at the University of Western Australia, Perth, the patient ate 16 grams of olestra chips daily for two years. His adipose Aroclor levels dropped from 3,200 parts per million to 56, and his physical symptoms disappeared.

The Center for Science in the Public Interest, which opposed the removal of olestra warning labels, is cautious about recommending olestra for toxicant removal. “More power to them if it works as a medicine,” says executive director Michael Jacobsen. He warns, however, that olestra blocks the absorption of cancer-fighting carotenoids such as beta carotene and lycopene, and advises people to replenish these nutrients by eating carotenoid-rich foods like carrots and tomatoes at different times than olestra chips. —Carol Potera

ehpnet

WHO/AFRO Division of Healthy Environments and Sustainable Development

The people of Africa are besieged by a wide range of diseases that are hard to eradicate because of widespread lack of sanitation and medical facilities. A number of factors—including poverty, lack of technology, undeveloped infrastructure, and political conflict—mean that the vast mineral, water, and forest resources of the continent for the most part are not sustainably managed, leaving ecosystems degraded, biodiversity severely affected, and human health at risk. The World Health Organization Regional Office for Africa (WHO/AFRO) has implemented a Division of Healthy Environments and Sustainable Development to identify, control, and prevent environmental conditions that adversely impact human health in the context of sustainable development. The division has set up a website at <http://www.afro.who.int/des/index.html> to educate the public about its activities.

The homepage features overviews of the division's 12 focus areas: coordination of macroeconomics and health; environmental health policy; environment and promotion of health; environmental risk assessment; food safety;



Division of Healthy Environments and Sustainable Development – WHO/AFRO



health action in times of crisis; health in sustainable development; long-term health; occupational health; poverty

and ill health; protection of the human environment; and water, sanitation, and health. Each area has its own subpage with links to relevant publications and other related resources.

Work in the environmental health policy arena concentrates on assisting countries in developing and implementing environmental health policies, and in building and strengthening nations' capacity to offer sound environmental health services. Falling under the umbrella of environmental risk assessment are initiatives to improve and promote drinking water quality, chemical safety, environmental health impact assessments and mapping, sustainable management of biomedical wastes, and radiation safety.

One of the more in-depth sections of the website covers food safety. Contained here are fact sheets for health care workers on topics such as genetically modified foods, mycotoxins, informal food trading, groups at high risk for foodborne illness, and hand-washing to prevent disease, among others. This section also includes profiles of 28 African countries with statistics on population, food production and consumption, food-related legislation, and other related topics. Other links go to the WHO's main food safety pages and a photo gallery depicting the many problems encountered by Africans in obtaining safe food.

The occupational health section provides a link to the WHO/International Labour Organization Joint Effort on Occupational Health and Safety in Africa site, available in English, French, Portuguese, and Arabic. This effort aims to bring occupational safety and health professionals from throughout Africa together in a collaborative network. Also available is contact information for the two occupational health training centers on the continent and links to WHO publications on the subject. The protection of human environment section has profiles for the 46 African countries under the jurisdiction of the WHO/AFRO. The profiles list details about the environmental health laws in each country, and in some instances about plans for developing and implementing new policies.

The water, sanitation, and health section has information on the Africa 2000 Initiative. Launched in 1994 by the health ministries of the 46 WHO/AFRO nations, this initiative seeks to expand water and sanitation services throughout Africa. This section also has information on the Participatory Hygiene and Sanitation Transformation Initiative, a program developed by the WHO and other partners to promote community management of water and sanitation resources. —Erin E. Dooley

Animals and Airspace

Animal feeding operations (AFOs) are generating concerns over the possible health impacts of their emissions. In January 2005 the U.S.

EPA announced a new public-private agreement to help characterize the air pollution created by the nation's approximately 450,000 AFOs. This measure establishes a two-year industry-funded emissions monitoring program to give federal agencies data to help shape appropriate AFO emission regulations. Pollutants to be monitored include particulate matter, hydrogen sulfide, volatile organic compounds, ammonia, and nitrogen oxides.



Goldman Environmental Prize 2005

Each year the Goldman Environmental Prize is awarded to activists from six geographic regions who often face life-threatening situations while encouraging their peers, governments, and international organizations to work toward preserving the environment. The winners for 2005 are:

- Isidro Baldenegro López, of Chihuahua, Mexico, who organized sit-ins and marches that got logging bans enacted for old-growth forests of the Sierra Madre range.
- Corneille E.N. Ewango, of Epulu, Democratic Republic of the Congo, who protected the Okapi Faunal Reserve through years of civil war. He hid the reserve's herbarium collection, computers, and data in the forest, and confronted military commanders when troops began poaching primates and elephants in the reserve.
- Kaisha Atakhanova, of Karaganda, Kazakhstan, who led a coalition of 60 grassroots environmental groups in successfully lobbying to prevent nuclear waste from being commercially imported into her country. Kazakhstan already suffers massive pollution from Soviet nuclear testing and stockpiled radioactive waste.
- José Andrés Tamayo, of Olancho, Honduras, who organizes protests against unregulated logging and drew government attention to corruption in the country's National Forestry Agency, resulting in the general manager's resignation.
- Stephanie Roth, of Rosia Montana, Romania, who is fighting Europe's largest open-cast gold mine being built in Rosia Montana. Efforts spearheaded by Roth led to the World Bank withdrawing its support for the project.
- Chavannes Jean-Baptiste, of Papay, Haiti, who founded the Peasant Movement of Papay to educate Haitians about deforestation, alternative energy, and sustainable agriculture. The group has planted more than 20 million forest and fruit trees to help stabilize soil and provide food.

