

Intellectual Property Rights Policy

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Chronic hunger persists in most African countries even as crop production reaches peak levels on other continents (Johns Hopkins 2000). In sub-Saharan Africa, more than 600 million people live on small farms measuring no more than a few hectares each. Low productivity due to biotic and abiotic factors is responsible for food insufficiency and malnutrition. The rapid increase in population (nearly 3 percent annually) causes even greater pressure on arable land and is bound to increase the frequency of starvation, for which Africa is so well known.

In Asia, nearly half a century ago the Green Revolution, which used new crop technologies, made increased food production possible. However, Africa has remained sidelined. Today the fastest growing technologies for increased crop production are biotechnologies, whereby inherent crop bioproperties can be manipulated to counter or enhance resistances and tolerances to disease, drought, insect pests, salinity, or nitrogen deficiencies or to improve food value through fortification (Lauderdale 2000; CGIAR 2002; University of California–San Diego and Africa Bio 2002). The annual growth in genetically modified (GM) crops has been more than 10 percent per year since 1996, when GM crops were first planted (IRMA 2002). From 1996 to 2002 the area planted in transgenic crops increased 35-fold globally, from 1.7 to 58.7 million hectares, grown principally by Argentina, Australia, Canada, China, India, South Africa, and the United States. It is noteworthy that of the six leading crops under GM cultivation, five are food crops, with soybeans and maize occupying the largest acreage.

As the focus now turns to critically examining the role of biotechnology in food security for sub-Saharan Africa, key areas have to be analyzed in terms of the

different positions of stakeholders and partners. The role of multinational companies and other stakeholders in the application of biotechnology should be defined with respect to biosafety issues and the costs of the technology. Many questions may be asked regarding the trade-offs, that is, the gains and losses of stakeholders, but among the key areas that require attention regarding the use of new biotechnologies to improve food security is the role of intellectual property rights (IPR), not only as it affects the costs of the technology but also as a matter of the gains to be made from reliable policies. This chapter focuses on policy issues concerning IPR in agricultural biotechnology, looking at its positive and negative elements with respect to the positions of stakeholders.

Biotechnology and IPR Issues in Southern Africa: A Need for Policies

The rejection of GM food by authorities in some southern African countries in 2002 and the ensuing confusion of the public comes as no surprise in a region with such little application of GM technology and hardly any policies on it (see Table 6.1). In comparison to high-technology countries, southern Africa, like most of Africa, lags behind in the use of gene technology for food production.

Table 6.1 Status of biosafety regulations and biotechnology policies or laws in eastern and southern Africa, 2004

Country	Status of biosafety regulations	Status of biotechnology policy	
		Policy	Law
Angola	None	None	None
Botswana	None	None	None
Ethiopia	None	Draft	None
Kenya	Guidelines developed by National Biosafety Committee	Draft	Draft
Lesotho	Biosafety Committee established 2001	None	Present
Malawi	National Biosafety Committee established	None	Present
Mauritius	GMO bill for National Biosafety Committee	None	None
Mozambique	None	None	None
Namibia	None	Present	None
Seychelles	None	None	None
South Africa	Present—Act 1997 Legislation enacted	Present	Present
Swaziland	None	None	None
Tanzania	National Biosafety Committee established	None	None
Uganda	Guidelines or draft regulations written	Draft	None
Zimbabwe	Guidelines established by the Biosafety Board	None	None

Source: Author's compilation.

Table 6.2 Status of laws on intellectual property rights (IPR) in southern Africa, 2004

Country	IPR instruments in place or under way	
	Patent or industrial property law	Plant breeders' rights
Ethiopia	Available	Not available
Kenya	Available	Available—International Union for the Protection of New Varieties of Plants (UPOV) 78
Lesotho	Available	Not available
Malawi	Available	Not available
Mauritius	Available	Not available
Mozambique	Available	Not available
Namibia	Being developed	Not available
Swaziland	Available	Not available
	Available	Available—UPOV 78
Tanzania	Available	Not available
Uganda	Available	Not available
Zambia	Available	Not available
Zimbabwe	Available	Available—national

Source: Author's compilation.

The proceedings of a regional conference on IP and biotechnology in eastern and southern Africa clearly indicate deficiencies in biotechnology policies in most of the 13 countries studied (Kabare and Wekundah 2002). Apart from Kenya, Malawi, Uganda, and Zimbabwe, where national draft policies on biosafety exist, South Africa is the only country with advanced biotechnology policy strategies and the only country in Africa today growing GM crops on a commercial scale (Tables 6.1 and 6.2).

Effective biosafety regulations must have legal backing, that is, they must be supported by an act of a country's parliament or congress. It is for this reason that Kenya has embarked on rigorous discussions to develop a national biotechnology policy and biosafety bill for enactment. In the meantime, existing biosafety guidelines implemented under the National Council of Science and Technology Act are effective in vetting applications for purposes of receiving and handling GM materials as well as carrying out research. For southern African countries, there is an urgent need for implementation of similar processes.

The Importance of IPR Systems

Promoting Innovation

For centuries millions of intellectual property rights have been granted throughout the world under various IP laws of various countries but for similar reasons:

to encourage an inventor (innovator) to disclose his or her invention (innovation) to the public and thereby promote the progress of science and the useful arts. This arrangement may be looked at as a bargain or contract between a government and an inventor whereby the inventor discloses the invention and the government in return provides the inventor with a “monopoly” for a period of time.

This contract is a strong foundation for intellectual property rights, which are governed by laws that create an important government system that provides incentives for inventors or innovators for the development of new technology and ideas for the society.

IPR have revolutionized society technologically, industrially, and thus socio-economically. The doctrine of inventors’ disclosing their ideas and governments’ granting them monopolies in return has facilitated the enrichment of nations with technological information that is vital not only for promoting the progress of science and the useful arts, but also for the facilitating direct foreign investment through technology transfer.

As a cornerstone of the modern economic policy of any nation and a catalyst for development, IPR have been recognized as important tools for trade and thus have been integrated into global issues like the formation of the World Trade Organization (WTO), to which all the countries of southern Africa are party. The implication of this is that attracting investment in this world’s liberalized economy will become harder for countries with weak or ineffective IPR systems. Given that all the southern Africa countries are parties to the WTO, there is a need to develop their IPR systems so that they can participate equitably in the global systems.

Apart from trade facilitation, IP is a rich source of information for the general public on widely diverse research and inventive developments all over the world. IP offices generally are gold mines of such information, which originates in all countries and is stored in databases in national or regional IP offices. Therefore this information is invaluable for industrialization, because detailed descriptions of the inventions can form a basis for manufacturing products. Some of the well-known technologically advanced countries effectively use this information for their industrial development, taking advantage of inventions that have fallen into the public domain. The databases used to store this information can also be used by research institutions in their planning and research and also by government departments for policy development.

In sub-Saharan Africa, IP databases can be accessed at the African Regional Intellectual Property Organization (ARIPO) based in Harare, Zimbabwe, and at the African Intellectual Property Organization. The ARIPO’s database holds 30 million patents. Some national offices are currently building up their databases and working toward networking of their offices for easy access under a program supported by

the World Intellectual Property Organization (WIPO) based in Geneva. Kenya has 15 million patents in its Documentation Centre, which is accessible to the public.

In spite of the availability of these treasured databases with enormous industrial potential, most members of the public in sub-Saharan Africa hardly ever use them. Extensive publicity and awareness creation is urgently needed to sensitize African governments to the advantages of IP offices as a source of technology for industrial development, including information for production and processing of foodstuffs, pharmaceuticals, chemicals, and equipment.

Regional and International Obligations and the Current Status of IP Knowledge in Southern Africa

Like several other African countries, southern Africa countries have acceded to one or more regional or international laws, treaties, protocols or agreements on intellectual property rights (Table 6.3). These laws obligate member states to protect IPR in their territories. Both the WIPO and the WTO play key roles in the management and enforcement of IP laws internationally.

For example, agropatents are provided for under section 5 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) (WTO 1994). Article 27 of the agreement stipulates that patent protection is available for all inventions in all fields of technology, including agriculture and related sciences. Agroprocesses and agroproducts and their use are patentable, and patent rights are enjoyed without discrimination as to the place of invention, the field of technology, or whether the products are imported or locally manufactured.

Although Article 27(2) of the agreement allows exclusion from patentability of inventions that are contrary to public order or morality, including that regarding the protection of human, animal, or plant life or health or the avoidance of serious prejudice to the environment, Article 27(3)(b) provides that “protection of plant varieties must be done either by patents or by an effective sui generis system or by any combination thereof” (WTO).

Only a few African countries have institutionalized laws for the protection of plant varieties (Table 6.2). The International Union for the Protection of New Varieties of Plants (UPOV) system is viewed with great hostility by most southern African countries with the exception of Kenya and South Africa, which are members of the 1978 UPOV system.

It is not quite understood why southern African countries view the UPOV system with such suspicion, but arguments against it are that the system is excessively monopolistic and protects the breeder to the disadvantage of farmers’ rights and indigenous knowledge. This is in relation to clauses in UPOV 91 that prohibit

Table 6.3 Participation of southern African countries in various intellectual property agreements, 2004

Agreement	Participating countries
Madrid Agreement Concerning International Registration of Marks	Algeria, Egypt, Kenya, Lesotho, Liberia, Morocco, Mozambique, Sierra Leone, Sudan, Swaziland, Zambia.
Berne Convention for the Protection of Literary and Artistic Works	Algeria, Benin, Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of Congo, Djibouti, Egypt, Gabon, The Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Zambia, Zimbabwe
Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of Registration of Marks	Algeria, Benin, Guinea, Malawi, Morocco, Mozambique, Tunisia, Tanzania
Paris Union	Algeria, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of Congo, Djibouti, Egypt, Equatorial Guinea, Gabon, Gambia, Guinea, Guinea Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe
Hague Agreement Concerning the International Deposit of Industrial Designs	Benin, Côte d'Ivoire, Egypt, Morocco, Senegal, Tunisia
Patent Cooperation Treaty	Algeria, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Equatorial Guinea, Guinea Bissau, Kenya, Lesotho, Madagascar, Malawi, Niger, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe

Source: Author's compilation.

on-farm sale by the farmer and the sharing of seeds. However, countries that have embraced UPOV 78, such as Kenya, see its advantage as stimulating trade in horticulture, in which access to quality seed and horticultural material such as flowers and vegetables facilitates global trade in these commodities. But perhaps the most significant impact of a plant protection system is its stimulation of research in agricultural productivity.

In order to address issues of farmers' rights and indigenous knowledge, in 2002 the Organization of African Unity published the *African Model Law* for protection of the rights of local communities, farmers, and breeders and for the regulation of

access to biological resources (Ekpere 2000). The document is set out as a model for use by African countries that wish to develop their own national laws. However, to date no such laws have been enacted.

Although southern African countries have acceded to one or more regional or international laws (treaties, protocols, or agreements) on IPR, there is a lack of clear-cut policies on IPR in most countries of the region. Formulation of policy and legal frameworks is complicated by the society's lack of appreciation of the role of IPR in development. In recognition of the foregoing, governments of the region need to devote resources to the development of mechanisms for the management of IPR within their territories.

Controversies over IPR in Biotechnology in Southern Africa

IP protection of agrobiotechnology has caused a storm in SADC society. Most of the controversy centers on the threat to food security (Kuyek 2002; Friends of the Earth International 2003; Hivos and Friends of the Earth International 2003). Arguments against IPR are that they confer monopolistic status, placing needed products beyond the reach of poor countries. Fears abound that patents are restrictive and threaten the freedom of farmers to access seed. Ethical questions are asked as to whether private companies have a right to own fundamental biological components of life. This has been a factor influencing sub-Saharan Africa's stand on Article 27(3)b of the WTO TRIPS agreement, which states that there is to be no IP protection for life forms (WTO 1994).

It is estimated that the countries of the Organization for Economic Cooperation and Development hold 97 percent of all patents and global corporations 90 percent of all technology and product patents (11) related to living materials. This lopsided ownership of living materials is a potential source of contention, particularly because of the monopoly it provides to only a few foreign companies.

On the other hand, multinationals do spend enormous resources to develop improved agricultural products. IPR form the core of their financial base and may even catalyze mergers, business deals, and ascription of status. This notwithstanding, there is a growing need for partnerships and collaboration between African institutions and these multinationals in the area of technology transfer. IPR are needed to facilitate agreements and ensure an environment of trust. The basic fact is that no company that had spent large sums of money would risk collaboration if protection of its product was uncertain. Research is expensive and may require considerable time input. It requires the use of skills and costly equipment that push up the value of the final product. Compensation for such involvement becomes a necessity, and IPR may serve as a medium for negotiations and reward.

During the October 2002 World Summit on Sustainable Development in Johannesburg, South Africa, heated debates occurred in various forums on the ills of IP as a medium for trade. Examples from group discussions can be found in the brief provided by Genetic Resources International or GRAIN (Kuyek 2002). Claims were made that the multinational seed industry's expansion into Africa had come with intense pressure in favor of IPR, but with no intention to make the technology freely available to farmers. Views expressed at this meeting were that African agriculture does not require IPR because such agriculture is led by farmers, funded by the public sector, and based on collective knowledge. Anti-IPR activists claimed that protection regimes undermine farmers' rights, foster dependence on foreign companies, allow piracy of farmer-developed crops, and threaten food security and agrobiodiversity. But contrasting views were that because of the need to increase productivity, the situation in Africa is no longer static; it is evolving all the time. Local companies, national research institutions, nongovernmental organizations, and farmers' associations are increasingly engaging in biotechnology and other improved agricultural techniques such as tissue culture and marker-assisted selection for higher agricultural yields (Persley and MacIntyre 2001; Persley 1999; Ismael, Benet, and Morse 2001; Bennet 2003; KUZA 2002; Mugabe 2003). Soon genetic modification will become common (University of California–San Diego and Africa Bio 2002).

The Conceptual Framework and Policy Trade-offs

The numerous pros and cons of IP and biotechnology in agriculture clearly underscore the need for comprehensive policy guidelines, not only as a prerequisite for the application of GM technology in food production but also for public assurance of its safety.

The effect of IP on the costs of GM technology is recognized as a potential hindrance to its application in Africa. This concern is shared not only by African authorities but also by international research organizations and some multinational companies (*Genet Archive* 2003; U.S. Embassy, Tokyo, 2003). Apart from straightforward negotiations between potential users and IPR owners, in which the IP may be acquired through contractual licensing, outright purchase, or partnerships, the need to minimize costs, particularly to deserving poverty-stricken developing countries, may require goodwill arrangements including donations. In view of this, a concerted effort appears to be in the making through the recently established African Agricultural Technology Foundation (AATF). Supported by the Rockefeller Foundation and set up in Nairobi, Kenya, under an African-controlled board, the AATF has an ambitious mandate to link the needs of resource-poor farmers with

potential technologies acquired through royalty-free licenses, agreements, and contracts. It is expected that multinationals will line up to donate technologies to this noble cause.

Positive reactions to the AATF from corporations such as Monsanto, Dupont, Syngenta, and Dow Agro Sciences demonstrate the goodwill internationally, but it is yet to be seen what impact this approach will have on GM acceptance in Africa and how soon benefits can be felt. Biosafety concerns and lack of biotechnology policies are likely to impede developments.

Several other agencies are involved in the brokerage or application of modern technologies for Africa's agriculture. These include the International Service for the Acquisition of Agro-biotech Applications, the Collaborative Agricultural Biotechnology Initiative of the U.S. Agency for International Development and the Consultative Group on International Agricultural Research (CGIAR). The latter's broad mandate includes mobilization of cutting-edge science to reduce hunger and poverty, improve nutrition and health, and protect the environment. Made up of 16 international agricultural research centers and working in 150 countries, the CGIAR has had a significant impact in some sub-Saharan African countries, where new varieties of cereal and lentil crops are increasingly being grown by farmers. New programs such as those to develop insect-resistant maize, quality protein maize, and *Striga*-resistant and viral-resistant cassava and sweet potatoes are bound to have a positive impact on the economies of small-scale poor farmers.

Ongoing lab tests and research on *Bacillus thuringiensis* (*Bt*) maize in Kenya and Zimbabwe under the IRMA (Insect Resistant Maize for Africa) project of the International Maize and Wheat Improvement Center of Mexico (CIMMYT) are forerunners of increased GM activity in sub-Saharan Africa (IRMA 2002). In this case experimentation is being carried out with *Bt* genes found to be active against stem borers, which in Kenya reduce maize production by more than 20 percent. *Bt* genes developed by the CIMMYT, in combination with cry genes from Canada and Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), are being evaluated for their effectiveness against African stem borers. In such cases IPR implications have to be addressed.

For example, it is necessary to determine whether the required technology is under protection or whether the protection has expired (as it does after 20 years for patents), in which case it is in the public domain and can be used freely without reference to the owner. Moreover, IPR are territorial, and if a technology is not protected in a particular country by designation, it can be used in that country without reference or remuneration to the owner of the technology. Therefore African countries stand to benefit from the many technologies available globally at minimum cost.

A search of the IP databases at the Kenya Industrial Property Institute and at the Harare-based ARIPO reveals that the cry genes used in the IRMA project are not protected in Kenya. Under the principles of IP protection, such technologies can be used locally without compensation to the owner of the patent. The current mood of multinationals encourages donations or availability of technologies to developing countries at no cost or at low cost.

With such flurry of goodwill among multinationals, international research agencies, and benevolent brokers, it is imperative that African countries be alert and have the correct tools to assess what is good for them. Not every technology for food production is desirable. An example is the use of the infamous “terminator gene,” which was the subject of a hue and cry voiced a few years ago (Oliver et al. 1998; Deak 1999; *RAFI Communique* 2000). Both scientists and the public—who may or may not have understood the essence of the problem—objected simply because they smelled something wrong with a technology that would interfere with self-reproduction and the perpetuation of biological material. What is most critical, however, is that African countries have the capacity to decide what is and what is not good technology for them and be able to accurately defend their position. Otherwise, the recipient of a goodwill donation of IP could be the loser in the absence of informed assessment. This again calls for credible biosafety and IP policies to guide the adoption of technology for increased agricultural productivity.

This does not in any way discredit the goodwill of companies and agencies that participate in efforts to address the food crisis in Africa in a benevolent manner. In fact it would be sad to discourage such involvement through careless activism. There is a need for close collaboration among all partners, policymakers included, in the promotion of biotechnologies for food security in Africa for win-win outcomes.

As the previous observations and examples show, it is possible for institutions in Africa to acquire needed agrobiotechnologies cheaply for their food production programs by making use of technologies not protected in their respective countries or those in the public domain. It is also worth noting that for centers under the mandate of the CGIAR system the research performed by the centers is to be used for the alleviation of poverty in resource-poor countries, so any IPR claimed for the centers' products should be free of charge to the system's target countries.

In this respect, the CGIAR centers are bound by the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR), which was agreed to by member countries of the Food and Agriculture Organization in 2001. The ITPGR requires that certain genetic materials held by the centers be designated to remain in the public domain for free access by the world community.

It is in this light that networking on biotechnology issues in Africa is absolutely important. Established awareness and public education networks such as the

African Biotechnology Stakeholders forum (ABSF) and Africa Bio have a critical role to play in the sensitization of policymakers, the public, and multinationals on trends in biotechnology that might affect them. To date one can say that these networks have made a formidable first step in this endeavor by delivering information on the initial concepts of biotechnology. The ABSF should be commended for facilitating discussions on biosafety policies in Africa by means of its outreach activities involving parliamentarians, reporters, scientists, and policymakers.

At a different level, nongovernmental organizations in Africa must take up the mantle and get involved at the level of research and transfer of technology, as well as at the advocacy level. Thus activities spearheaded by the Biotechnology Trust of Zimbabwe, the Biotechnology Trust of Africa, A Harvest, the National Biotechnology Development Agency of Nigeria, the Association for Strengthening Agricultural Research in Eastern and Central Africa, and national agricultural research institutes are continuing to provide the farmer-scientist participation that is vital to the better understanding, transfer, and use of biotechnologies.

Research, Capacity Building, and Communication

Due to the importance of IPR as the vehicle for innovation, there is an urgent need for increased capacity in this area within southern African countries. Training in IPR issues takes a long time, especially if one considers the need for skillful agents either to construct patent applications or examine the details of applications for the purpose of registration or for determination of the IP status of a technology. In either case, one has to acquire skills in scientific, legal, and other areas relevant to the administration of IP generally or to awareness creation.

IP offices in southern African countries are scantily staffed. One reason is that governments do not appreciate the importance of such offices. Pressure must now be put on governments to increase the capacities of IP offices in the face of increasing global trade requirements and for national application of IP systems for development. For this to be achieved, governments must allocate adequate funding for staff development and for the effective administration of IP offices.

Governments need to enact or amend various laws to accommodate changes in the local, regional, and international scene, including conformance to the TRIPS agreement. However, it should be understood that IPR should be exercised coherently to the mutual benefit of rights holders and consumers. Regional and international laws on IPR should balance the rights and duties of rights holders vis-à-vis the poor. The laws should reflect the needs of developing countries, particularly their impact on the social and economic development of these countries. In this regard, various international bodies on IPR should work closely with all relevant stakeholders to ensure that the laws do not conflict with public interests.

Outreach activities to give correct information to the public are absolutely necessary. In this respect, there is a need for training of officers and media reporters on issues concerning biotechnology and IPR. A great deal of harm has been done by sensational and inaccurate reporting in southern African countries. Public opinion has been set so negatively that a greater effort is needed to provide objective analysis of biotechnology, IPR, and genetically modified organisms (GMOs). Most important, accurate information and awareness need to be provided to government officials and consumers who have to make decisions as to whether GM technology is needed and is a safe way to enhance food security in southern Africa.

Ethical Issues

Scientific discovery is supported and permeated by moral values. This matters in different ways, depending upon the scientist's social role. At its core, science is an expression of some of our most cherished values. The public largely trusts scientists, and scientists must in turn act as good stewards of this trust. In many African countries a highly disturbing ethical issue related to IPR is raised by the prospect that scientists in industrial countries might patent naturally occurring organisms in developing countries. At issue are access, sharing of benefits, and scope of patents. Is there scope for repatriation of (or compensation for) germ plasm? What are the implications for African countries given their limited capacity to engage with the rest of the world? Is there scope for compensation based on moral pressure? These questions have yet to be consistently posed or answered, but that is likely to change in the very near future.

Conclusions and Recommendations

The preceding analysis suggests the following conclusions and recommendations for southern Africa:

1. Southern African countries have an urgent need for comprehensive policy guidelines for biotechnology application that target biosafety laws and provide clear directions on the handling of GMOs.
2. These countries have an equally great need for policies on IPR that define the role of protection in agricultural inventions, including the desired extent and use of IPR as well as cost and access implications.
3. Attention should be given to capacity development to provide the skills needed for policy development, enactment of laws, and implementation of technologies for increased agricultural production and food self-sufficiency.

4. Partnerships should be encouraged between stakeholders, including multinational companies, international agencies, national research institutions, companies, and nongovernmental organizations, for enhancement of technology transfer to address food security in southern Africa.
5. It is key to create an awareness of the role of biotechnology and its potential impact on food security for southern African countries. Therefore, it will be advantageous to encourage networking and the use of local groups in advocacy and awareness creation efforts aimed at developing an informed society.
6. Southern African governments should ensure the provision of funding for capacity building and the development of laws, policies, structures, and an environment altogether conducive to increased food production.

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