

FAO in the 21st century

**Ensuring food security
in a changing world**

 **EXECUTIVE SUMMARY**

Food and Agriculture
Organization of
the United Nations





A decade into the 21st century, the world is facing a number of complex challenges, with serious implications for the state of global food security. The world's population is projected to reach 9 billion by 2050 and rural-urban migration is increasing considerably, with growth concentrated in today's developing countries. Globalization is affecting the agriculture sector and, together with economic expansion and urbanization, this is contributing to changing patterns in food consumption. Natural resources are under unprecedented pressure from human activities, and marked climate and environmental changes are occurring, resulting in more frequent disasters and emergencies.

The book, published in English, details current knowledge of these complex challenges and discusses likely implications for the food and agriculture sector and for hunger and poverty reduction efforts, including FAO's role in assisting its member countries in the coming years. Development practitioners, planners, decision-makers and all members of the international community with a genuine interest in hunger and poverty reduction will appreciate its broad and up-to-date coverage of global food security issues.

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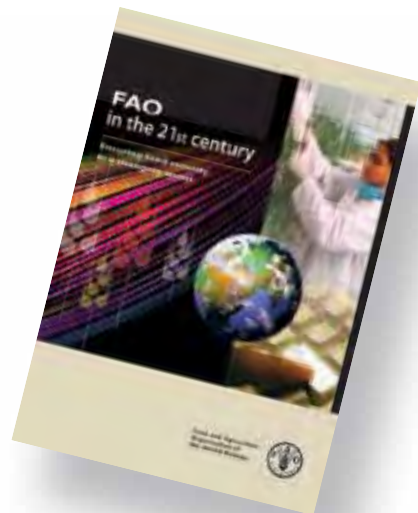
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Ensuring food security in a changing world

EXECUTIVE SUMMARY



FAO's overriding mandate is to work with and assist its member countries and the international community in ensuring global food security, where "all people at all times have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". On a world scale, food production capacity is sufficient to satisfy this basic human right. Yet, both the number and proportion of undernourished in the world have increased in the last half decade, peaking in 2009 to more than 1 billion – one in seven – people.

The Organization's targeted measures to reduce poverty and hunger are underpinned by its unique global resource base: its multidisciplinary technical expertise; global statistical collation and impartial analysis; and legal policy advice and treaty depositories; as well as the innumerable international policy-making and standard-setting committees and commissions it hosts and the world summits it has organized. FAO actively supports member countries' initiatives for sustainable development, through the transfer and sharing of knowledge and by maintaining international awareness of the critical role of agriculture in global development.

Despite these comprehensive initiatives, a decade into the 21st century the world is facing a number of complex and interrelated challenges, which have serious implications for the efforts of FAO, its member countries and partners to achieve global food security:

- ***The world's population is rapidly expanding*** and is projected to reach 9 billion by 2050, with most of the growth in today's developing countries.
- ***Rural-urban migration is increasing considerably***, again predominantly in developing countries, with urban areas accounting for 70 percent of the global population in 2050 (against today's 49 percent).
- ***Changing patterns in the types of food consumed*** are resulting from economic expansion, globalization and urbanization.

- **Natural resources are under unprecedented pressure** from human activities.
- **Marked climate and environmental changes are occurring**, including more frequent disasters and emergencies.
- **Globalization is affecting the agriculture sector and food security**, with major implications for the free trade of food and access to markets and information as well as the availability of land for food production and food prices.

In addition, domestic and official development assistance for the agricultural sector is woefully insufficient, which is hampering efforts to attract private investment in food production, particularly by small-scale producers; and the agriculture sector's economic importance and potential in developing countries are not adequately reflected in formal domestic policy-making.

FAO in the 21st century: Ensuring food security in a changing world details the current knowledge of these phenomena and their key drivers. It discusses likely implications for the food and agriculture sector and for hunger and poverty reduction efforts, including FAO's role in assisting member countries in the coming years.

Major challenges from the food security and agricultural perspective

■ Hunger: taking stock of the global situation

With a focus on FAO's continual efforts to enlist the concerted action of the international community, *FAO in the 21st century* recapitulates the key food summits and conferences called over the years. It devotes particular attention to the 1996 World Food Summit, discussing its ambitious target of halving the current number of undernourished people by 2015 as well as the UN Millennium Development Goal No. 1, which aims to halve, "between 1990 and 2015, the proportion of people who suffer from hunger". These targets have become the benchmark for monitoring progress in political action towards eliminating hunger, and the FAO methodology on which both are based is recognized as the only currently available method of calculating global and regional estimates of the prevalence of undernourishment.

Taking stock of the hunger situation today, *FAO in the 21st century* explains the 2009 peak in the number of hungry people, a consequence of the global food and fuel crisis of 2007–2008 and subsequent financial crisis (the "triple F" crisis). The effects of the disruption of global commodity markets, especially food, in this period led FAO to schedule the highly attended High-Level Conference on Food Security in 2008, followed by the 2009 High-level Expert Forum on "How to Feed the World in 2050", which preceded the World Summit on Food Security. In addition to obtaining renewed pledges on hunger reduction targets, the first event enabled FAO to communicate the key message that food security depends on increasing food production, particularly by small farmers in developing countries. The 2009 Summit also obtained the international community's commitment to improve international coordination and governance of food security, namely through

reform of FAO's Committee on World Food Security; its promise to reverse downward trends in domestic and international funding for agriculture and food security; and its decision to promote new investments in agricultural production and productivity in developing countries in support of poverty reduction and food security.

Population, food demand and agricultural production

The role of the agriculture sector in driving economic growth that benefits the poorest and food-insecure is underlined throughout the book, as is the requirement for the sector to provide food, fibre and energy for a rapidly growing and urbanizing population, with changing dietary demands.

To satisfy the needs of 9.2 billion people in 2050, overall food production will have to increase by about 70 percent and production in the developing countries will virtually need to double. Demand for cereals for both food and animal feed will reach around 3 billion tonnes by 2050, compared with 1.8 billion tonnes today, and with the advent of liquid biofuels, demand could increase even further. Demand for animal source foods – meat, dairy, fish and aquaculture products – as well as vegetable oils will grow even faster, largely as a result of higher incomes in developing countries. Livestock already constitute 30 percent of agricultural GDP in the developing world, and the subsector is one of the fastest-growing in agriculture.

To achieve sufficient increases in food production, agriculture will be obliged to rely on a smaller rural workforce, adopting more efficient and sustainable production methods, while at the same time adapting to and mitigating climate change.

The multidisciplinary food system approach is advocated as a necessary strategy for ensuring urban and peri-urban food quality through shorter food chains, strong urban-rural linkages and sound management of natural resources. Moreover, it is an essential measure for preparing for climate change.

■ Pressure on natural resources

Linking land and water management

The availability of quality land and water resources is critical for food security, and further intensification of their use is required to meet the world's food needs in the future. The negative effects already incurred by population pressure, dietary changes, biofuel production, pollution and unsustainable practices are clear from statistics in *FAO in the 21st century*. For example, one-third of global arable land has been lost through erosion in the past 50 years, with ongoing losses of an estimated 10 million ha each year. This implies yet more conversion from prime grassland, woodland and forest ecosystems to compensate.

Rather than drastically changing land-use practices, the recommendation is broad adoption of adaptation and mitigation measures and a paradigm shift to land resource governance based on the principles of sustainable land management (SLM), which direct involvement of local land users and based on social, participative approaches. Among the intensive agro-ecology practices included in SLM are conservation agriculture, agroforestry and improved rainwater management.

Water has a crucial role in poverty alleviation and food security, and access to water resources is directly linked to land-use practices, both for intensive agriculture and animal production. The interface between land and water use rights is noted as a critical factor, including transparency and stability of tenure and use rights.

The management and control of freshwater to irrigate crops and water livestock will be essential for sustaining livelihoods and economic development in the future, particularly as growing consumption of animal protein continually increases water use for fodder crops and watering of livestock.

Growth in irrigation has been spectacular over the past 50 years, largely due to investment in necessary public goods as well as farmers' investment of capital in irrigation systems. It has enabled significant increases in productivity as well as reductions in hunger through increased food production and reductions in poverty through increased farm and non-farm rural employment. However, climate variability and depleted groundwater resources are now urgent challenges that call for greater knowledge and technology application, together with more strategic investment.

To support required productivity while mitigating environmental impacts, *FAO in the 21st century* recommends a return to an integrated, ecosystem approach to natural resource management that respects the integrity of linked land and water systems. Advanced technological knowledge needs to be combined with institutional approaches that are inclusive of land and water users. Conservation of forests and wetlands will be particularly important, owing to their role as regulators of the hydrological cycle.

Forests and mountains

Degradation of forest ecosystems through mismanagement, land conversion, fires and other causes – insect pests and diseases, natural disasters and invasive species – remains a serious challenge. In addition to providing forest products, forests and wooded land play an ever important role in conserving soil and water, biological diversity and mitigating climate change. While progress has been made in reversing loss of forest area, deforestation and uncontrolled conversion continue at an alarming rate in many countries – a phenomenon that is expected to worsen with population growth. In the case of land management, a cross-sectoral approach is required to achieve the goals of “no net loss” and sustainability. Likewise, in the face of pressures from population, globalized industry and agriculture and the consequences of climate change, sustainable management is advocated to maintain the integrity of mountain ecosystems, which are among the world's greatest sources of biodiversity for food security.

Achieving food security while conserving biodiversity

An integral and fundamental component of natural resources, biodiversity is threatened by the same factors that are degrading other resources. The Code of Conduct for Responsible Fisheries, the International Treaty on Plant Genetic Resources for Food and Agriculture and the Global Plan of Action for genetic resources in the different sectors, evidence the priority that FAO affords conservation and management of biodiversity in all sectors concerning natural resources use and food security. Above all, FAO stresses the need for more effective government leadership, improved resource stewardship, the application of an ecosystem approach in agriculture-related sectors, and greater investment in biodiversity.

■ Climate change

Manifested most notably in more frequent, extreme weather episodes and shifts in seasons, climate change is expected to affect food production in many areas of the world and to disrupt food distribution systems and infrastructure, particularly in the second half of the century. Less immediately apparent are the longer-term effects on ecosystems, including increased salinity and rising sea levels, and the shifts in the geographical distribution of plant, insect and animal species. Although climate change is a global threat, populations in developing countries, particularly in rural areas, are at greater risk because of the more limited means available for adaptation and mitigation. Furthermore, it is expected to increase the dependency of developing countries on imports and to accentuate the existing concentration of food insecurity in sub-Saharan Africa and possibly South Asia.

Effects on ecosystems

The functioning of most of the world's ecosystems and the services they provide will be altered and risk being compromised in the coming decades, including capture and inland fisheries, an important source of food and livelihood for poor populations in Asia and Africa. The livestock sector, supporting the livelihoods and food needs of nearly 1 billion people, is both a contributor to and a victim of climate change. All stages of the livestock production cycle contribute to produce greenhouse gas (GHG) emissions, as does clearing of forest for pasture and feed crops. Livestock can also play a major role in mitigation, however, through the adoption of improved technologies and management practices that reduce GHG emissions from animal production and enable pasture and cropland to become net carbon sinks.

Climate change will have far-reaching consequences for animal production, through its effects on forage and range productivity. Resulting overgrazing and land degradation, shorter growing seasons and extreme weather events are likely to exacerbate food insecurity and may cause conflicts over resources.

The livestock sector is both a victim of and a contributor to the process of climate change.



The incidence, distribution and intensity of pests and diseases resulting from climate change may cause additional crises in plant and animal health, as crop weeds, insects and diseases expand and vector-borne diseases find new transmission pathways.

Human demographics also contribute to and are affected by climate change. Population growth and urbanization are a driver of increased CO₂ emissions, while it is also expected to be the trigger for widespread migration within and beyond national borders as people abandon land and coastal and inland fisheries areas because production is no longer possible or viable.

Adaptation, mitigation and climate-smart agriculture

Disaster risk management and adaptive change management are recommended as a matter of urgency, especially in vulnerable food-insecure countries, and *FAO in the 21st century* describes the Organization's activities and country support in these areas. Reducing Emissions from Deforestation and Forest Degradation (REDD+) is cited as one of the most cost-effective approaches to mitigation. It seeks to provide incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. Through REDD+ and other programmes, FAO supports countries' efforts in climate change mitigation by providing data, knowledge and technologies as well as supporting necessary institutional structures.

FAO policies and activities promote climate-smart agricultural practices as a means of adapting to and mitigating climate change. Many practices exist already: integrated rice farming systems, conservation agriculture, urban horticulture, integrated food-energy systems, low energy use aquaculture systems, sustainable forest and land management systems and agroforestry. The point underlined is that considerable investment is needed to fill data and knowledge gaps and provide incentives to encourage adoption of appropriate practices. Coherent policymaking across the different sectors involved, and effective natural resource policy, including use and property rights and law enforcement are also essential.

Food-energy-climate change nexus

Addressing the food-energy-climate change nexus will be agriculture's greatest challenge this century. Significant increases in the current level of energy inputs into agriculture, particularly in developing countries, are necessary to satisfy the 70 percent growth in global food production required by 2050. To achieve these increases while reducing impacts on the environment, agriculture will need to become more energy efficient; food wastage must be minimized and the use of sustainable bioenergy and other renewable energy resources must increase.

A very important role can be played by the agriculture sector itself through the supply of bioenergy. The global potential of sustainable bioenergy production as a percentage of global energy is projected to reach about 30 percent by 2050. Liquid biofuels, especially, are among the most controversial of energy types, but *FAO in the 21st century* points out that, as with many agricultural products, the detrimental effects and benefits they may have are dependent on investment and management practices. Sound and participatory land-use planning and combined cultivation of food and energy crops, use of agricultural

The past decade has witnessed a more than threefold increase in demand for bioethanol and elevenfold for biodiesel.



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and forestry residues and contract farming to benefit smallholders are among the measures to be adopted to ensure sustainable biofuel production.

■ Managing globalization in the agriculture sector

A key driver of change in agro-food systems worldwide is globalization, the growing integration of economies and societies around the world as a result of increased flows of information, capital, labour, technology, goods and services. It is spurred by four main factors: market liberalization, growth of international trade; increased international financial transactions and capital flows; and advances in information and communication technologies and logistics systems.

Agricultural trade

In addressing the challenge of globalization, *FAO in the 21st century* underlines the importance of agricultural trade for poverty reduction and food security in developing countries and the need to establish a fairer system of trading rules for the sector. The complexity of globalization in the agriculture sector is illustrated by the failure of the several rounds of world trade negotiations over the past decades to reach a satisfactory agreement on agricultural products and markets. One of the main reasons why agreement has been so difficult to reach on many issues in the latest Doha Rounds is that many of the policy instruments that could help vulnerable countries improve their food security run counter to the prevailing spirit of liberalizing trade although at times not the actual practice – input subsidies are a prime example. Also considered is the trend towards use of private “standards” or measures applied by private firms, which remain outside the domain of the negotiations. Concern is expressed as the trend may continue to expand and to cover more food commodities, thereby posing risks for small producers in particular in developing countries and hindering their efforts to increase food production.



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The impacts of large-scale land acquisitions on food security are likely to differ depending on the context and business model.

Land acquisitions

The implications of the large-scale farmland acquisitions made over the past three years in Africa, Latin America, Central Asia and Southeast Asia are discussed from the perspective of world agriculture and food security in the future, including their potential effects on the relations between agribusinesses and smallholder farming. The land acquired is often state or public land (except in Eastern Europe and Latin America), and buyers are from both the private sector and governments and government sovereign funds. Most current deals have been concluded by European biofuel investors and Gulf State and Asian investors.

FAO is engaged in major global initiatives to address the situation, with a view to ensuring that such acquisitions are beneficial for the food security and development of the populations in the investing as well as the land-supplying countries. The development of *Voluntary Guidelines on Responsible Governance of Tenure of Land and other Natural Resources*, recognizing the need to engage with indigenous and other community investors, recipient governments, private sector and civil society to ensure sustainable and transparent practices is a prime example. A second partnership initiative is the *Principles for Responsible Agricultural Investment that Respects Rights, Livelihoods and Resources*, which include elements directly related to the linkages between large land acquisitions and food security.

Investing in and mobilizing resources for agriculture

Both domestic expenditure and official development assistance (ODA) for agriculture have declined over the past 20 years, with ODA falling by 43 percent. While recent commitments by the international community to reverse the downward trend have improved the situation slightly, a massive capital input into the agriculture sector of agriculture-based and transforming countries is vital if the world is to reduce hunger and assure food security in the future. According to *FAO in the 21st century*, national public investment must be the primary source, strategically backed by ODA.

Perhaps more significant, however, is the need to support private enterprise, which is measured by agricultural capital stock (ACS). Agricultural production and marketing is

very much reliant on ACS, which has been growing steadily over the past 30 years, although for most of this period at declining rates. It is noted that ACS growth is lowest in countries with the highest prevalence and depth of hunger.

Foreign direct investment (FDI) is also expected to play an increasingly important role. However, while FDI has increased in the last decade, inflows into agriculture represent a very small proportion of total FDI and of domestic private sector investment in agriculture. For FDI to be effective in achieving hunger reduction and poverty alleviation, countries need appropriate policy frameworks in place so as to attract more and better targeted investments in agriculture. The *Voluntary Guidelines on Responsible Governance of Tenure of Land and other Natural Resources*, and the *Principles for Responsible Agricultural Investment*, cited in the previous section, as well as the *OECD Policy Framework for Investment in Agriculture* provide important conceptual frameworks aimed at enhancing the positive potential of FDI, while helping to avoid negative effects in recipient countries.

Engaging with agricultural companies and industry organizations

FAO is extending its partnering strategy with the private sector, which has traditionally focused on collaboration with industry associations, to engage agricultural companies and business leaders in dialogue and the development of integrated, long-term strategic approaches that could not be attained by FAO and its members alone. There has also been a trend towards involvement of non-governmental stakeholders, including agricultural companies or their associations, in governance and standard-setting activities. The Committee on Commodity Problems and the Codex Alimentarius Commission are cited, among others, as examples.

In its field programmes, FAO regularly collaborates with companies, commercial service providers and private sector associations on value chain and subsectoral development projects. One of FAO's strengths highlighted by *FAO in the 21st century* is its support for innovation in pro-poor business models with particular attention to the producer-buyer relationship.

Technology development and transfer

Organizational and institutional changes have been occurring in the agriculture sector of most developing countries: agribusiness enterprises are becoming larger and food is increasingly being retailed through formal outlets, including supermarkets, instead of local markets. While these developments clearly bring opportunities, they pose a challenge for small-scale farmers, traders and processors, who require access to productive technologies and support in skills upgrading to be able to participate competitively and cost-effectively in markets today and in the future.

In providing the required technologies, capacity building and logistical support, FAO is promoting value chain approaches. These entail systematic interventions that improve the efficiency of the chain as a whole, recognize the central role of the private sector and provide economic incentives to all actors in the chain.

Towards the eradication of world hunger – FAO in action

■ Policy assistance

Together with capacity building, policy assistance today is the area of greatest priority for member countries and requests are steadily increasing. Policy advice has been a core activity since FAO's inception, with methods of delivery and areas of focus evolving over time in response to emerging development issues, and major meetings and statutory committee sessions providing key fora for international dialogue and decision-making. Not surprisingly, current priorities reflect the very challenges highlighted by *FAO in the 21st century* as the major determinants of food security efforts in the coming decades.

Through high-level learning events, institutional capacity development has aimed at strengthening developing countries' capacity to participate in multilateral trade negotiations and to adjust their agricultural and trade policies effectively. An even more recent initiative has entailed a series of regional seminars on policy responses to food price volatility suffered since the onset of the triple F crisis.

The link between migration, remittances and opportunities for investment in agriculture is the basis of activities aimed at assisting countries in the formulation of policies that channel remittances from citizens abroad into agriculture and rural development in home countries.

Other thematic issues for which policy options and support are being formulated include: rapid transformations in agriculture and the strong growth in demand; global threats to natural resources and ecosystems, particularly in relation to climate change; energy scarcity; and building resilience to the changing nature of disasters and food emergencies.

An important strategic change in FAO's policy assistance over the past 15 years has been the decentralization of this function – with national and regional advisory support primarily offered through decentralized offices, thereby capitalizing on local experience and expertise.

Addressing the gender gap

Achieving gender equality plays a central role in improving food security and nutrition levels as well as in increasing productivity in all agricultural and rural sectors, and thus harnessing a nation's full potential: FAO has constantly aimed to provide gender-sensitive policy advice. Whereas "women" were initially the primary target in the policy process, more recently FAO has adopted a more effective gender-sensitive approach, preceding policy development with a thorough gender analysis and ensuring that advice is relevant to both men and women.

FAO in the 21st century underlines the key constraints and areas requiring action in order for the gender gap to be closed. Among these are the unpaid activities and "invisible" work carried out by women as well as their lack of access to education, training and information, mainstream employment, land, credit and markets.

Addressing land rights and tenure

Weak governance of land and other natural resources hinders economic growth, sustainable use of the environment and food security. Elaborating on points discussed in relation

to the challenges of natural resource management, climate change and globalization, *FAO in the 21st century* devotes a specific policy section to the central and potentially controversial issue of access and rights to land and other resources. It highlights the need to improve access to land – thereby heightening users’ responsibility for land use – through: improved governance; redistribution; leasing; consideration of land issues in emergencies; attention to pastoral rights of access; and improved security of private tenure. Geospatial technologies are cited as important means used by FAO in its work to achieve improved governance in national and transnational contexts.

Civil society partnerships

Picking up on FAO’s extended partnering strategy discussed in relation to globalization in the agriculture sector, *FAO in the 21st century* discusses the importance of FAO’s collaboration with civil society in policy development. While civil society organizations (CSOs) and non-governmental organizations (NGOs) have long been important partners for FAO, the relationship has become more institutionalized and effective over the past two decades, especially since the major summits of the 1990s. CSO/NGO participation and support was vital during that period, and has grown to become an indispensable component in global policymaking processes. This is perhaps exemplified by the new format of the Committee on World Food Security, which has broadened its reach to become the foremost inclusive international and intergovernmental platform dealing with food security and nutrition.

■ FAO as a results-based knowledge organization

Central to FAO’s mandate is its role in generating and disseminating information on the extremely wide range of issues that relate to food security. Seen as a trusted source of both technical and public information, FAO is in an authoritative position to frame international debate on key global challenges affecting food security in this century.

The rapid and continued development of information technologies over the past two decades has enabled the Organization not only to increase the outreach and impact of information provided to members and key audiences, but also to improve access to and exchange of knowledge by members and partners engaged in development and food security efforts. Likewise, new technologies and knowledge management tools have facilitated FAO’s capacity development activities, a long-standing organizational priority that has been given even greater focus since the 2005 Paris Declaration on Aid Effectiveness – a key principle of which is for developing countries to set their own strategies for poverty reduction and institutional development.

Strategic organizational reform

Since 1994, FAO has undertaken a series of internal reforms, the first of which reappraised priorities and clearly focused the Organization’s work on food security so that it could address relevant issues more effectively. *FAO in the 21st century* considers key developments resulting from this reform, including establishment of the Special Programme for Food Security to boost smallholder production in low-income, food-deficit countries, and the Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases

(EMPRES). Project and policy services were boosted with the establishment of a new Technical Cooperation Department, while the creation of multidisciplinary teams in regional offices evidence FAO's move to a multidisciplinary and decentralized approach to its work.

In 2005 another set of reforms provided for further enhancement of multidisciplinary work in key areas such as knowledge management and capacity building, and climate change and bioenergy. A "farm to table" food chain approach was supported through programme and structural reforms, while a specific department was set up to enable a holistic approach to the Organization's work on natural resources management.

Following an independent external evaluation, implementation of the most recent set of reforms was initiated in 2009 and a new headquarters structure put in place in 2010. While the evaluation concluded that FAO provided a necessary global forum, combining the full range of disciplines required for the provision of technical and policy responses to the major challenges facing food and agriculture in the 21st century, it recommended even further reforms and administrative streamlining aimed at achieving a leaner, more responsive and results-based organization. These include measures to ensure that all FAO's resources work in synergy across geographic and sectoral boundaries and with improved balance between headquarters and decentralized offices. Improved collaboration between FAO and partner organizations is also underlined as an important development objective as part of a reform area referred to as "Functioning as One".

FAO in action

In focusing broadly on the challenges that FAO and its Members are facing this century, *FAO in the 21st century* illustrates a number of current activities, most of which build upon past achievements and lessons learned in earlier development contexts. It also identifies future directions to be taken and recommends action by FAO, together with its member countries and partners. In line with the Organization's strategic reform, all such priority-setting, resource management and programme design will be in the context of a results-based system and guided by the Strategic Framework for 2010-19, which articulates global goals sought by members as follows:

- Reduction of the absolute number of people suffering from hunger, progressively ensuring a world in which all people at all times have sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life;
- Elimination of poverty and the driving forward of economic and social progress for all, with increased food production, enhanced rural development and sustainable livelihoods;
- Sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources, for the benefit of present and future generations.



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