International Scholars Journals

Global Journal of Food and Agricultural Sciences ISSN 2756-3448 Vol. 12 (1), pp. 001-009, April, 2025. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Agricultural Perspective on Global Food Security

Christopher

Aristotle University of Thessaloniki, Serres, Macedonia, Greece.

Accepted 12 April, 2025

Throughout history, food security has been a critical concern for human societies. Concern over the effects of population increase and economic development/crisis on global food production and security has grown over the past few decades. This review's goal was to provide a comprehensive overview of the definitions of food security, the global food security concept, and, lastly, the importance of agriculture for sustainability and ecosystem services on a global scale in addition to feeding the globe. We examined three scientific databases—Pub Med, Scopus, and Science Direct—for English-language publications between January 2000 and April 2013 in order to find articles pertinent to our issue. A literature review found 1945 articles, but only 35 were chosen after being filtered by titles, abstracts, and complete papers. Numerous elements related to agriculture and food security were discovered in these publications. Feeding the world's nine billion inhabitants is a formidable task that calls for adjustments to both agricultural productivity and the global food security agenda for the ensuing decades.

Key words: Food security, Agriculture sustainability, Agriculture, Nutrition.

INTRODUCTION

The Throughout history, food security and its relationship to human and health security have been key concerns for human societies (Andersen 2009, Wahlqvist 2009). Concern over how population increase and economic development affect global food production and security has grown over the past few decades. There will be a greater need for food production when the world's population grows to nine billion people by the middle of the century. Additionally, increasing food production necessitates a change in how people use soil, water, and land resources (Godfray et al. 2010b; Schneider et al. 2011).

Feeding the world's nine billion people is a huge problem that calls for improvements in agricultural production, including higher yields, cropping systems that adapt to climate change, genetically improved plant types, insect control, and innovative farming techniques. According to Abumhadi et al. (2012), this dilemma not only reveals the importance of agriculture but also more specialized areas like food waste, biodiversity challenges, and landscape management, all of which have significant effects and are essential to new food security strategies. Furthermore, the demand for meat and dairy products has shifted in developing nations due to shifting diets and lifestyles (Godfray et al. 2010a). Since animals get nearly one-third of the world's cereal production (FAO 2006), the number of cattle, sheep, and goats has increased by around 1.5 times, while the numbers of pigs and chickens have increased by about 2.5 and 4.5 times, respectively (FAOSTAT 2009). Food security and access to sufficient and healthy food are among the top issues on the public agenda since it is clear that the demand for food will increase competition for land (Erkan 2012). In this study, we discuss current definitions of food security, the global food security concept, and, lastly, the importance of agriculture for sustainability and ecosystem services on a global scale in addition to feeding the globe.

Methods - Data collection, eligibility requirements, and literature strategy

We examined three scientific databases—Pub Med, Scopus, and Science Direct—for English-language publications between January 2000 and April 2013 in order to find articles pertinent to our issue. The search phrases "food security definition," "global food security," and "global food security and agriculture" were employed. Full-text articles, reviews, and editorials were the kinds of articles that were obtained. Articles that were unavailable to us or that dealt with climate change or case studies of certain nations or areas were not included since they covered a different perspective on global agriculture and food security, which was outside the purview of this assessment (Figure 1).

Results and Discussion

A bibliographic citation management program called EndNote Library v.3 (Thomson Reuters, 2009) was used to extract all publications. Duplicates were eliminated, and titles, abstracts, and complete papers were screened in order to apply exclusion criteria. The search identified 1945 articles but after screening by title *n=250,* abstract *n=100,* full text *n=35* (Figure 2).

Food security definition

For the purpose of defining food security, seven articles were reviewed. There were two reviews and five research articles. A consistent growth in the number of records that showed as search results for "food security definition" at each database is depicted by the lines in Figure 3, which shows the rising trend in the number of articles that used the word from 2000 to 2013 (till April). Over the past 40 years, there have been numerous definitions of food security that have evolved. Articles from 191 databases were obtained. 33 articles are included after screening by title, 20 by abstract, and seven by final selection. "Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" was the original definition provided by the World Food Summit in 1974. (UN, 1975). The issues with food production and supplies during the global food crisis in the middle of the 1970s are reflected in this definition, which emphasizes on food availability (Hadley and

Crooks 2012). Supply-side considerations caused this crisis, which prompted new laws aimed at ensuring a steady supply of food worldwide. The World Food Program (WFP), the Consultative Group on International Agricultural Research (CGIAR), the International Fund for Agricultural Development (IFAD), and the Global Information and Early Warning Systems (GIEWS) are among the organizations that were established to keep an eye on the global food situation, according to the same authors (Hadley and Crooks 2012).

However, not everyone has access to food just because it is available. The FAO broadened the definition in 1983 with the phrase "Ensuring that all people at all times have both physical and economic access to the basic food that they need" (FAO 1983), when the issues of supply and access surfaced throughout the following 10 years. There were over 194 definitions of food security between 1983 and 1996 (Renzaho and Mellor 2010). However, the World Food Summit in 1996 added two new elements to the definition of food security: access to the desired food and food safety (FAO 1996). Word Food Summit brought attention to the issue of composition and access to enough food by using the terms "safe and nutrition" and "food preference," both of which are included in the latter definition. It also identified other factors that emerged, such as utilization and stability, which began to be incorporated into definitions of food security in the 1990s and exposed the opposite of that, food insecurity (Hadley and Crooks 2012, Andersen 2009). Additionally, the World Food Summit's definition of food security, which states that "food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996), made it clearer that the time had come to link food security and public health, particularly since the global agenda of food security would be reestablished in the upcoming ten years (Dowler et al. 2011, p. 405, 406, Wahlqvist 2009). Food security encompasses political, economic, and social aspects between 2000 and 2013 (till April) (Touzard and Templez 2012). Different socioeconomic and political factors affect the availability, stability, usage, and access to food, even while food security affects individuals in both rich and developing nations (Hadley and Crooks 2012, pp. 73-74; FAO 2006). Furthermore, the idea of food security remained multifaceted and complex, and it was disputed whether or not new components like financial crises, energy crops, and spikes in food prices reflected shifts in our understanding and assessment of food security (Renzaho and Mellor 2010, p.1). Lastly, the most widely used definitions of food security are: "access by all people at all times to enough food for an active, healthy life and includes at least: a) the ready availability of nutritionally adequate and safe foods, and b) the assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, and other coping strategies)" and "food security exists when 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" (Vink 2012, p. 158; Renzaho and Mellor 2010, p. 3).

Global food security

Ten publications were chosen to examine the idea of food security from a global perspective. There were two editorials, two reviews, and six research pieces. The increased trend in the number of articles containing the phrase is once again shown in Figure 4, and the lines indicate the abrupt rise in the number of records pertaining to global food security over the previous 13 years. It is evident that more articles using that term were published in 2013 than in 2008, despite the fact that 2013 only consists of four months.
Global food security is the starting point for all of the writers. Nearly one billion people are underfed even if the world's food output exceeds its demand (Charles et al.

2010). Additionally, the state of global food security may alter in a number of ways due to factors like population increase, environmental change, new regulations aimed at reducing food waste in both rich and developing nations, and other socioeconomic concerns. According to Charles et al. (2010), our capacity to produce food will be impacted by the overuse of Earth's natural resources as well as the increasing competition for land, water, and energy.

Food security is a complicated topic with many economic, political, and environmental factors. Ingram (2011) points out that increasing food production won't meet society's needs, even though he examines several instances of how food systems approaches connect with food security and global environmental change. Important concerns also include food accessibility, food affordability, and other food system operations such as production, storage, processing, and packaging (Ingram 2011, p. 428). Two researchers explore how globalization has affected food production and availability. McMichel (2001, pp. 216–217) condemns the rise in meat and animal protein consumption as well as the shift in social diets in the northern hemisphere. He highlights the "global epidemic of malnutrition," where one billion people are undernourished and one billion are overfed. Lastly, he notes that the globalization of food markets might not provide answers to the problem of malnutrition (McMichel 2001, p. 217). The other author attempted to present a comprehensive strategy for future global food security. Important elements are evaluated, including population growth trends, global food demands, urbanization and globalization, food costs, and upcoming agricultural research investments (Godfray et al. 2010b). According to Godfray et al. (2010b, p. 2776), reducing the dangers of rising hunger necessitates a multidisciplinary strategy including the social sciences and economics.

The relationship between global environmental change and food security is the subject of four research articles, one editorial, and three research articles. One facet of global environmental change and food security is the effect of climate change on land usage or agricultural productivity (Ericksen 2009, pp. 373–374). The complex and multifaceted nature of global food security is highlighted by factors such as the drought in Australia, the rising demand for meat in Asia, the policies surrounding biofuels in the United States, Latin America, and Europe, and speculation on global food commodities (Ericksen 2009, pp. 373-374). At every stage of food production, distribution, retailing, and processing, there are significant environmental implications, including biodiversity loss, water extraction, and greenhouse gas emissions (Garnett 2013). Furthermore, all four aspects of food security—access, availability, stability of the food supply, and utilization—will be impacted by climate change; however, the severity of these effects will vary by region and rely on a nation's overall socioeconomic standing as the effects of climate change take hold and unavoidably impact global food security (Schmidhuber and Tubiello 2007, p. 19708).

Numerous environmental stressors have both direct and indirect effects on food production systems, and they may lead to conflicts between sustainable environmental management and the goals of global food security (Ericksen et al. 2009). "Global environmental change, in the context of social, political, and economic changes, may bring unprecedented stresses to bear on food systems and food security," as noted by Polly J. Ericksen (2008, p. 234) in his article. Lastly, Misselhorn et al. (2012) and Cassman (2012) defend the necessity of taking immediate action to guarantee food security for everyone. The global food security agenda for the coming decades is shaped by a number of important factors, including the use of frontier technologies in all sectors of food systems, urbanization,

competition between crops for food and energy, the decline in crop yields in major cereal production areas, high economic growth rates in developed countries, and restrictions on food access (Cassman 2012). Misselhorn et al. (2012); Cassman (2012).

Global food security and agriculture

The upward trend in the number of articles containing the term "global food security and agriculture" is once again shown in Figure 5, and the lines indicate the steady rise in electronic records for these topics over the past 13 years in each database, particularly after the midpoint of the previous decade.

Agriculture has a vital and complex role in ensuring the world's food security. In order to ensure global food security, we will concentrate on two key issues that agriculture must address in the coming decades. The first is how agricultural productivity, biotechnology, and research can guarantee food security; the second is how agriculture can use natural resources sustainably to achieve food security on a global scale.

Research, biotechnology and innovation

New research methods in agricultural productivity are required to boost crop yields in order to guarantee global food security. Public investments are essential for boosting agricultural productivity through environmentally friendly and yield-increasing production technologies, but they must also prioritize small farmers and the impoverished in developing nations (Andersen and Cohen 2000). Significantly, the agricultural sector's economic plans and investments must be logical and a part of the broader national plans that are outlined in the budget for poverty alleviation, food security, and economic development in any nation (Adenle 2011, p. 92). According to Parry and Hawkesford (2010), advancements in plant growth science that emphasize photosynthesis and higher water productivity can have a significant impact. Ruanne and Sorino (2011, p. 359) emphasize the value of agricultural biotechnology and the application of instruments for the diagnosis of plant illnesses caused by bacteria or viruses, as well as immunodiagnostic and DNA-based approaches. Boggess et al. also discuss the use of "omics" to attain global food security (2013). Agriculture productivity will be produced in a variety of ways via genomics, proteomics, and metabolomics. The identification of novel proteins and enzymes can, among other things, improve resistance to disease and pests, lessen the need for chemical weed and pest management, and ultimately, lessen the demand for fertilizers and other nutrients (Boggess et al. 2013, p. 16).

Two more publications highlight how agricultural biotechnology might increase crop yields. Transgenic crops, insect-resistance crops, herbicide-resistant crops, and viral-resistance crops are examples of innovative plant genetics that are essential to increasing global yields while managing biotechnology responsibly for sustainable agricultural production (Abah et al. 2010; Ronald 2011).

Furthermore, according to three other authors, we may boost food production and availability by monitoring and measuring crop losses before and after harvest (Flood 2010, pp. 218-220) and by moving crop production away from non-food uses such bioenergy crops (Foley et al. 2011, p. 340). Last but not least, reducing food insecurity requires a more sophisticated approach to pesticide use that combines integrated pest management (biological pest control) with the best scientific uses of biotechnology to develop pest resistance in crops (Andersen 2002, p. 1208).

Sustainable and ecological agriculture

To address natural resource management, food security, and sustainable agriculture, eight articles were chosen. The application of ecological ideas and principles to the planning, development, and administration of sustainable food systems is known as ecological agriculture or agroecology. According to Borsari (2011), this definition exemplifies a modernized approach to agriculture that relies on contemporary ecological knowledge and theories to achieve sustainability in agriculture while attempting to balance resource use and food production in support of regional, small-scale farming. The "ecoagriculture approach" is emphasized in four more of the preceding eight papers. Given their emphasis on enhancing landscape performance in relation to three objectives—agricultural productivity, biodiversity protection, and livelihoods—eco-agriculture approaches may have some relevance in all agricultural settings (Scherr and McNeely 2008, p. 482). This

method is predicated on the idea that landscape-level biodiversity is essential to maintaining agricultural output and ecological service provision (Brussaard et al. 2010, p. 35). Additionally, this strategy must guide the selection of crop species and cultivars to be cultivated in specific conditions and regions and aim to cost-effectively provide food security, sustainability, and ecosystem services at the regional and global scale (Spiertz 2012, p. 1, p. 7). In order to supply the quantity and caliber of ecosystem services required to sustain agriculture in the future, the relationship between biodiversity, natural resources, and hunger reduction need well-informed policies and solutions (Hazell and Wood 2008, p. 513; Tscharntke et al. 2012, pp. 53-56).
Lastly, two writers look at two distinct viewpoints and connections between sustainability, agricultural productivity, and food security. According to Acevendo (2011, pp. 159–163), in order to boost food and water productivity, new farming techniques, agricultural management techniques, and research methodologies must be used. When properly integrated with interdisciplinary models, new monitoring tools like GIS and remote sensing, biotechnological, and precision agriculture technologies may lead to higher productivity and, eventually, sustainable increases in food production that preserve environmental quality and conservation (Acevendo 2011, p. 165). Toledo A. and Burlingam B. (2006, p. 478) emphasize the relationship between nutrition and biodiversity and food composition and analysis. National information systems for food and agriculture can be strengthened and used as the foundation for international policy-making and priority-setting if nutrient analysis and data dissemination of the various food species and intra-species diversity are conducted systematically, they contend, adding that biodiversity management is important for the development of sustainable agricultural development practices and strategies against malnutrition (Toledo and Burlingam 2006, p. 478, p. 481).

Conclusions and Recommendations

To sum up, this study includes definitions of food security, the idea of global food security, and the part that agriculture will play in ensuring global food security in the coming decades. In order to guarantee food production in a sustainable manner, ecosystem services, and biodiversity, plant biotechnology and innovative systems in agricultural practices, sustainable agriculture productivity, social sustainability, and lastly, the ecological use of natural resources are required (Beddington 2010). The agricultural industry now has the issue of ensuring food access, distribution, and social justice for all people, in addition to maximizing productivity and feeding nine billion people until 2050 without seeing a large increase in food prices (Schneider et al. 2011, Pretty et al. 2012).

Acknowledgments

The Greek State Scholarships Foundation (IKY), which is co-funded by the European Union (European Social Fund—ESF) and Greek National Funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework 2007-2013 (NSRF), is acknowledged by the author for its research funding.‟

The author declares that he has no conflict of interest.

References

[1] Boggess, M.V., Lippolis, J.D, Hurkman, W.J., Fagerquist, C.K., Briggs, S.P., Gomes, A.V., Righetti, P.J. Bala, K. (2013) The need for agriculture phenotyping: —Moving from genotype

to phenotypell. *Journal of Food Protection,* dx.doi.org/10.1016/j.jprot.2013.03.021.

[2] Garnett, T. (2013). Food sustainability: problems, perspectives and solutions. *Proceedings of the Nutrition Society*, 72, 29–39.

[3] Abumhadi, N., Todorovska, E., Assenov, B., Tsonev, S., Vulcheva, D., Vulchev, D., Atanasova, L., Sanova, S., Atanassov, A. (2012). Agricultural Research in 21st century: Challenges facing the food security under the impacts of climate change. *Bulgarian Journal of Agricultural Science,* 18 (6), 801-818.

[4] Erkan, R. (2012). Food for thought: "four Ss with one F": Security, safety, sovereignty and shareability of food". *British Food Journal,* 114(3), 353-371.

[5] Cassman, K.G. (2012). What do we need to know about global food security? *Global Food Security,* 1, 81–82.

[6] Thomson Reuters. EndNote v.3 ''. Thomson Reuters, Carlsbad, CA, USA, 2009.

[7] Hadley, C. And Crooks, D.L. (2012). Coping and the Biosocial Consequences of Food insecurity in the 21st century. *American Journal of Physical Anthropology*, 149 (55), 72–94.

[8] Misselhorn, A., Aggarwal, P., Ericksen, P., Gregory, P., Phathanothai, L.H, Ingram, J. And Wiebe, K. (2012). A vision for attaining food security. *Current Opinion in Environmental Sustainability*, 4, 7–17.

[9] Pretty, J., Sutherland, W.J., Ashby, J., Auburn, J., Baulcombe, D., Bell, M., Bentley, J., Bickersteth, S., Brown, K., Burke, J., Campbell, H., Chen, K., et al. 2012). The top 100 questions of importance to the future of global agriculture. *International Journal of Agricultural Sustainability,* 8(4), 219-236.

[10] Tscharntke, T., Clough, Y., Wanger, T.C., Jackson, L., Motzke, I., Perfecto, I., Vandermeer, J. And Whitbread, A. (2012). Global food security, biodiversity conservation and the future of agricultural intensification. *Biological Conservation,* 151, 53–59.

[11] Touzard, J-M. And Templez, L. (2012) Sécurisation alimentaire et innovations dans l'agriculture et l'agroalimentaire : vers un nouvel agenda de recherche ? Une revue de la littérature. *Cahiers Agricultures*, doi : 10.1684/agr.2012.0577

[12] Vink, N. (2012). Food security and African agriculture. *South African Journal of International Affairs*, 19 (2), 157-177.

[13] Spiertz, H. (2012). Avenues to meet food security. The role of agronomy on solving complexity in food production and resource use. *European Journal of Agronomy*, 43, 1–8.

[14] Adenle, A.A. (2011). Global capture of crop biotechnology in developing world over a decade. *Journal of Genetic Engineering and Biotechnology* 9, 83–95.

[15] Borsari, B. (2011). Agroecology to the rescue of food security and germplasm conservation in a global market economy. *International Journal of Agricultural Resources, Governance and Ecology*, 9(1/2),1–14.

[16] Dowler, E.A., Kneafsey, M., Lambie, H., Inman, A., Collier, R. (2011). Thinking about food security': engaging with UK consumers. *Critical Public Health,* 21(4), 403–416.

[17] Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., Gerber, J.S., Johnston, M., Mueller, N.D., O'Connell, C., Ray, D.K., West, P.C., Balzer, C., Bennett, E.M., Carpenter, S.R., Hill, J., Monfreda, C.,

Polasky, S., Rockstrom, J., Sheehan, J., Siebert, S., Tilman, D. And Zaks, D.P.M. (2011). Solutions for a cultivated planet. *Nature*, 478, 337-342.

[18] Ingram, J. (2011). A food systems approach to researching food security and its interactions with global environmental change. *Food Security*, 3, 417–431.

[19] Ronald, P. (2011). Plant Genetics, Sustainable Agriculture and Global Food Security. *Genetics*, 188, 11–20.

[20] Ruane, J. and Sonnino, A. (2011). Agricultural bio technologies in developing countries and their possible contribution to food security. *Journal of Biotechnology* 156, 356–363.

[21] Schneider, U.A., Havlik, P., Schmid, E., Valin, H., Mosnier, A., Obersteiner, M., Bottcher, H., Skalsky, R., Balkovic, J., Sauer, T. And Fritz, S. (2011). Impacts of population growth, economic development, and technical change on global food production and consumption. *Agricultural Systems*, 104, 204–215.

[22] Acevendo, M.F. (2011). Interdisciplinary progress in food production, food security and environment research. *Environmental Conservation,* 38(2), 151-171.

[23] Abah, J., Ishaq, M.N. And Wada, A.C. (2010). The role of biotechnology in ensuring food security and sustainable agriculture. *African Journal of Biotechnology*, 9(52), 8896-8900.

[24] Beddington, J. (2010). Food security: contributions from science to a new and greener revolution. *Physiological Transactions of The Royal Society B*, 365, 61–71.

[25] Brussaard, L., Caron, P., Campbell, B., Lipper, L., Mainka, S., Rabbinge R., Babin, D. And Pulleman, M. (2010). Reconciling biodiversity conservation and food security: scientific challenges for a new agriculture. *Current Opinion in Environmental Sustainability*, 2, 34–42.

[26] Charles, H., Godfray,J., Beddington,J.R., Crute,I.R., Haddad,L., Lawrence,D., Muir,J.F., Pretty, J., Robinson, S., Thomas, S.M., Toulmin, C. (2010). *Science,* 327(812), 811-817.

[27] Godfray, C.H.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M. And Toulmin, C. (2010a). Food Security: The Challenge of Feeding 9 Billion People. *Science*, 327, 812-818.

[28] Godfray, C.H.J., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Nisbett, N., Pretty, J., Robinson, S., Toulmin, C. and Whiteley, R. (2010b). The future of the global food system. *Philosophical Transactions of The Royal Society B*, 365, 2769–2777.

[29] Parry, M.A.J. and Hawkesford, M.J. (2010). Food security: increasing yield and improving resource use efficiency. *Proceedings of The Nutrition Society*, 69, 592–600.

[30] Renzaho, A.M.N. and Mellor, D. (2010). Food security measurement in cultural pluralism: Missing the point or conceptual misunderstanding. *Nutrition*, 26, 1–9.

[31] Flood, J. (2010). The importance of plant health to food security. *Food Security*, 2, 215–231.

[32] Andersen, P.P. (2009). Food security: definition and measurement. *Food Security*, 1, 5–7.

[33] Ericksen, P.J., Ingram, J.S.I. and Liverman, D.M. (2009). Food security and global environmental change: emerging challenges. *Environmental Science & Policy,* 2, 373 –377.

[34] FAOSTAT. (2009). http://faostat.fao.org/default.aspx, Food and Agriculture Organization of the United Nations.

[35] Wahlqvist M.L. (2009). Why food in health security (FIHS)? *Asian Pacific Journal of Clinical Nutrition,* 18(4), 480-485.

[36] Ericksen, P.J. (2008). Conceptualizing food systems for global environmental change research.
Global Environmental Change, 18, 234–245.

[37] Hazell, P. And Wood, S. (2008). Drivers of change in global agriculture. *Philosophical Transactions of The Royal Society B,* 363, 495–515.

[38] Scherr, S.J. And McNeely, J.A. (2008). Biodiversity conservation and agricultural sustainability: towards a new paradigm of ‗ecoagriculture' landscapes. *Philosophical Transactions of The Royal Society B,* 363, 477–494.

[39] Schmidhuber, J. and Tubiello, F.N. (2007). Global food security under climate change. *Proceedings of The National Academy of Science*, 11, 104 (50), 19703–19708.

[40] FAO. (2006). World Agriculture Towards 2030/2050, Food and Agriculture Organization of the United Nations, Rome, Italy.

[41] FAO (2006). Food Security. Policy Brief June 2006 no. 2. Available at: ftp://ftp.fao.org/es/esa/policybriefs/pb_02.pdf.

[42] Toledo, A. and Burlingam, B. (2006). Biodiversity and nutrition: A common path toward global food security and sustainable development. *Journal of Food Composition and Analysis*, 19, 477– 483.

[43] Andersen, P.P. (2002). Food and agricultural policy for a globalizing world: preparing for the future. *American Journal of Agricultural Economics*, 84(5), 1201–1214.

[44] McMichel, P. (2001). The impact of globalisation, free trade and technology on food and nutrition in the new millennium. *Proceedings of the Nutrition Society*, 60, 215–220.

[45] Andersen, P.P. and Cohen M.J. (2000). Modern Biotechnology for Food and Agriculture: risks and opportunities for the poor. In G.J. Presley and M.M. Landin (Ed.), *Agricultural Biotechnology and the Poor* (pp. 159-169), Washington DC: The World Bank

FAO (1996). Declaration on world food security. World Food Summit, Food and Agriculture Organization of the United Nations, Rome.

[46] FAO (1983). Committee on World Food Security (CFS 83/4): Director-General's Report on World Food Security: A Reappraisal of the Concepts and Approaches. Food and Agriculture Organization of the United Nations, Rome.

[47] United Nations (1975). Report of the World Food Conference, Rome 5-16 November 1974. New York.