



**PROCEEDINGS OF THE 6TH GLOBAL
CONSORTIUM OF HIGHER EDUCATION AND
RESEARCH FOR AGRICULTURE CONFERENCE**

*‘Food, Health and Energy: Challenges for Sustainable
Agriculture’*

23rd - 27th November, 2009

Nairobi-Kenya

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INTRODUCTION

Agricultural universities worldwide face numerous challenges including increasingly limited resource allocations, declining enrollment, keeping up with advances in information and other technologies, remaining aware of and responsive to stakeholders, and the need to aggressively globalize their teaching, research and outreach programs. Although the scale of the problems and the local conditions vary across and among regions, there are remarkable similarities in the fundamental nature of these challenges.

The realization that these are shared challenges, combined with a political and economic climate that lends itself to the lowering of national barriers, presents an environment conducive to global networking and cooperation among universities.

GCHERA grew out of an international conference held in 1998 in Kiev, which marked the 100th anniversary of the National Agricultural University of Ukraine and the completion of a four-year university linkage project involving many institutions around the world and financed by the United States Information Service. The consortium was formed as a result of shared concern for the future of the planet and a conviction that higher education in agriculture should play a key role in solving problems associated with food security and environmental sustainability. The consortium aims to include and serve institutions with programs in agriculture, veterinary medicine, and natural resources management, including the biological, physical and social sciences dimensions of these fields. The founders designed the organization to be helpful to institutions worldwide that are working to make significant reforms in their systems of higher agricultural education. Currently, the consortium has approximately 400 members from more than 100 countries.

The consortium is governed by a regionally balanced Executive Committee and led by a President. Global meetings of the consortium are held every two years, the first having been held in Amsterdam (Netherlands) in 1999. Subsequent conferences were held in San Francisco (USA), Kiev (Ukraine), Hangzhou (China) and San Jose (Costa Rica). This book of proceedings reports on the 6th GCHERA conference held in Nairobi, Kenya.

FOREWORD

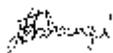


It is with profound pleasure that we unveil the proceedings of the 6th GCHERA Conference that was held in Nairobi, Kenya.

The five-day conference featured eleven technical paper presentations, group discussions, exhibitions and field excursion under the theme “Food, Health and Energy: Challenges for Sustainable Agriculture”.

The Organising Committee of the Conference spent long hours to ensure the conference was a success. The challenges faced in organising the conference served as a learning experience for many in the committee. We mainly derived our resilient working spirit from awareness of the fact that it would indeed be a great honour to play host to some of the world’s most celebrated agricultural trainers, researchers, policy makers and technology disseminators as they reflect on how to make the discipline more responsive to the needs of our ever changing world.

Let me thank the University management, conference organisers, sponsors, participants, the Government of Kenya and all other stakeholders for their valuable contributions towards the success of the forum. Finally, I thank His Excellency Hon. Mwai Kibaki, CGH, MP, President and Commander-in-Chief of the Armed Forces of the Republic of Kenya for officially opening the conference.



Prof. Esther Murugi Kahangi
CHAIRPERSON, 6TH GCHERA CONFERENCE ORGANISING COMMITTEE

MESSAGE FROM THE VICE CHANCELLOR



It gives me much pleasure to witness a major milestone for us all - the publication of the Proceedings Book for the 6th Global Consortium of Higher Education and Research for Agriculture Conference, which was hosted by Jomo Kenyatta University of Agriculture and Technology (JKUAT) on 23rd to 27th November 2009. The success realised in organising and hosting the conference went a long way to not only showcase JKUAT as a major centre of agricultural research and technology, but also the continent of Africa as a rich reservoir for agricultural activity.

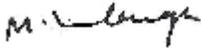
I wish, on behalf of the entire JKUAT Community, to take this opportunity to thank all those who contributed in one way or another towards the success of the conference. I particularly note the role of the various paper presenters who tabled well-researched and highly relevant presentations, and the GCHERA Executive Committee together with the Conference Local Organising Committee for the long hours spent to ensure the success of the conference. My sincere thanks also go to the conference sponsors, namely the Bill and Melinda Gates Foundation, Alliance for Green Revolution (AGRA), the German Academic Exchange (DAAD) and the Kenya Institute of Management, for the very generous assistance towards the organisation of the forum. Our institution is also grateful to the Government of Kenya, through the Ministries of Higher Education Science and Technology, and Ministry of Agriculture for much logistical support that saw the conference proceed without hitches. I in this regard particularly thank His Excellency the President of the Republic of Kenya, Hon. Mwai Kibaki for finding time to open the conference.

Continued consultations and cooperation of all parties mentioned above ensured that at the close of the day, the first GCHERA conference in the continent of Africa was indeed a remarkable success. Thank you once again and maintain this working spirit.

For all participants, I wish to reiterate the oft-repeated reminder that this and other similar conferences should rise above being mere talk-shops. It is now time for us to consolidate the various findings with a view to making the ordinary farmer – and indeed the entire agricultural sector – more useful to humanity through ensuring food security and therefore reduction of poverty. It is we researchers and professors in institutions of higher learning that will provide the ultimate solution to the myriad of problems that continue afflicting the agricultural sector day after day.

Finally, I wish GCHERA continued success in the arduous attempt to change the face of agricultural training for the better, all over the world. With this, it is also my prayer that the new President, Prof. Phillippe Choquet, gathers enough strength to steer the consortium to greater heights.

Thank you.



Prof. Mabel O. Imbuga

**VICE CHANCELLOR, JOMO KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY, NAIROBI, KENYA**

ACKNOWLEDGEMENT

The Organising Committee wishes to recognise with utmost appreciation the sponsors of this conference, key among them being the Bill and Melinda Gates Foundation, Alliance for Green Revolution in Africa, Kenya Institute of Management, German Academic Exchange (DAAD) and Jomo Kenyatta University of Agriculture and Technology. The advisory role and active participation of the GCHERA Executive Committee is highly appreciated, alongside the paper presenters, chairpersons of sessions, rapporteurs and exhibitors. We are also indebted to the management of Jomo Kenyatta University of Agriculture and Technology, particularly the Vice Chancellor, Prof. Mabel Imbuga, for moral and financial support during the organisation and hosting of the conference.

TABLE OF CONTENTS

<i>Introduction</i>	<i>iii</i>
<i>Foreword</i>	<i>iv</i>
<i>Acknowledgement</i>	<i>vii</i>
<i>Table of Contents</i>	<i>ix</i>
Welcoming Remarks	
<i>Prof. Esther M. Kahangi, Chairperson, 6th GCHERA Conference Local Organising Committee</i>	<i>3</i>
Opening Remarks	
<i>Prof. Mabel Imbuga, Vice Chancellor, JKUAT</i>	<i>4</i>
GCHERA Background	
<i>Dr. Ernst Lindemann and Dr. Dymtro Melnychuk, GCHERA Founder members</i>	<i>6</i>
GCHERA President’s Speech	
<i>Prof. Nick G. Wanjohi, President, Global Consortium on Higher Education and Research for Agriculture (GCHERA)</i>	<i>9</i>
Opening Remarks	
<i>Hon. Dr. Sally Kosgei, Minister for Higher Education Science and Technology, Kenya</i>	<i>11</i>
Opening Speech	
<i>Hon. Mwai Kibaki, CGH, MP, President and Commander-in-Chief of the Armed Forces of the Republic of Kenya</i>	<i>12</i>
Sub-theme 1: Agriculture and Food Security	
New Dynamics of Agriculture and Food Security in the World	
<i>Prof. Mandivamba Rukuni</i>	<i>17</i>
The Exciting Role of Public Agricultural Research in Africa’s Green Revolution	
<i>Joe DeVries</i>	<i>56</i>
Sub-theme 2: Agriculture and Sustainability	
Sustainability in Agriculture: Emergent Challenges and Recent Progress	
<i>Dennis Garitty</i>	<i>71</i>
Capacity Development for Agricultural Transformation: Making Postgraduate Level Training Relevant to Africa’s Agricultural and Rural Sector Development	
<i>Adipala Ekwamu, Washington O. Ochola, Wellington Ekaya, Moses Osiru and Nodumo Dhlamini</i>	<i>72</i>

Agricultural Innovation and Prosperity in Africa: Challenges and Opportunities for Higher Education and Research <i>Calestous Juma</i>	92
Sub-theme 3: Agriculture and Health	
The Role of Agro-practices Such as Breeding, Production, Processing and Marketing of Neutraceuticals <i>Atsuyuki Hishida</i>	113
Impact of Globalisation on Infectious Pathology: New Challenges <i>Vitaliy V. Nedosekov</i>	119
Sub-theme 4: Agricultural Challenges and Graduate Profile	
Tertiary Agricultural Training in the 21 st Century: Challenges, Needs and Opportunities <i>Aissetou Drame Yaye and Rufaro Madakadze</i>	127
Think Again - Reinventing Perceptions of Agriculture <i>Bruce A. McPheron, J. Marcos Fernandez, Marianne Fivek, Mary Wirth, Jillian Stevenson, Thomas B. Gill and Deanna Behring</i>	139
Sub-theme 5: Climate Change	
Climate Change and Forests of Eastern Europe <i>Petro I. Lakyda, Roman D. Vasylyshyn</i>	149
Linking Sustainability and Agroforestry Science to Multifunctional Policy Action <i>Meine van Noordwijk</i>	150
Sub-theme 6: Agriculture and Energy	
Integral Valorisation of Bio-production <i>Roland Verhé</i>	161
Group Discussions	173
Resolutions	191
Closing Remarks <i>Prof. Mabel Imbuga, Vice Chancellor, JKUAT</i>	199
Closing Speech <i>Hon. William Ruto, Minister for Agriculture, Kenya</i>	201
Appendices	
<i>Appendix I: List of Participants</i>	205

<i>Appendix II: Working Committees</i>	220
<i>Appendix III: Exhibitions</i>	225
<i>Appendix IV: List of Sponsors</i>	230
<i>Appendix V: 6th GCHERA Conference in Pictures</i>	233

