

Foreword and Acknowledgements

This Volume 21 of the *African Development Perspectives Yearbook* with the title “*Science, Technology and Innovation Policies for Inclusive Growth in Africa – Human Skills Development and Country Cases*” has again benefitted from many contributions, from various inputs and from important institutional support. The great number of contributions to this volume (essays, analytical surveys, country case studies, review articles and book reviews) was made possible because of the continuing support from African and international organisations, from numerous research and development institutions, and from many individual experts cooperating continuously with us on Africa. A great number of international and regional organisations, universities and research institutes have supported this project which led to the publication of volumes 20 and 21 with the overall theme “*Science, Technology and Innovation Policies for Inclusive Growth in Africa*”.

It is worth to mention the great number of supporters to these two volumes, such as a number of international and regional organisations: UNESCO (United Nations Educational, Scientific and Cultural Organisation); ACBF (African Capacity Building Foundation); UNECA (United Nations Economic Commission for Africa); UNCTAD (United Nations Conference on Trade and Development), the African Development Bank (AfDB), the African Union (AU), the New Partnership for Africa’s Development (NEPAD). On the side of the universities, scientific academies, scientific governance institutions, and research institutes the following partners should be mentioned: the Department of Economics, University of Khartoum, Sudan; the Department of Agricultural Economics, Faculty of Agriculture, Usmanu Danfodiyo University, Sokoto, Nigeria; the Department of Agricultural Economics and Rural Sociology, the Institute for Agricultural Research, Ahmadu Bello University, Zaria, Nigeria; the

National Institute for Animal Production, Shika, Ahmadu Bello University, Zaria, Nigeria; the Research and Innovation Management Department at the Egyptian Academy of Scientific Research & Technology (ASRT); the Academy of Scientific Research and Technology (ASRT), Cairo, Egypt; the Cairo University, Egypt; the Heliopolis University, Egypt; the Agricultural Extension and Management Department, Lagos State Polytechnic, Lagos, Nigeria; the Economics Department, University of Lagos, Akoka, Yaba, Lagos, Nigeria; the Centre for Business and Technology in Africa, Flensburg University of Applied Sciences (FUAS); the University Institute of Technology at the Faculty of Sciences of the University of Douala in Cameroon; the Faculty of Law and Political Sciences, University of Ngaoundere, Cameroon; the Department of Economics, University of Kassala, Sudan; the Royal Docks School of Business and Law, University of East London, UK; the Higher Education Academy, York, UK; the African Technology Policy Studies Network Nairobi, Kenya; the National Research Center (NRC), Khartoum, Sudan; the Department of Agricultural Economics, Ambrose Alli University, Ekpoma, Edo State, Nigeria; the Federal Ministry of Agriculture and Rural Development, Abuja, Nigeria; the General Directorate of Scientific Research, Ministry of Higher Education, Mauritania; and many others.

All these partners have directly supported this Yearbook project, comprising this volume 21 and the prior volume 20 on *“Science, Technology and Innovation Policies for Inclusive Growth in Africa – General Issues and Country Cases”*, with contributions, expertise and suggestions. Special thanks go to Professor Dr. Samia Satti Mohamed Nour, Department of Economics, University of Khartoum, and to Dr. Nazar Mohamed Hassan, Regional Adviser, UNESCO Regional Office for Science and Technology for the Arab States, Cairo, Egypt. Both experts have given advice from the first phase of planning this publication project. Dr. Nazar Mohamed Hassan from UNESCO

has co-edited a Unit in volume 20 and now a Unit of volume 21 and has contributed various essays (analytical and introductory ones) to both volumes. Also, Professor Dr. Samia Satti Mohamed Nour cooperated with expertise for both volumes. The volume editor, Professor Karl Wohlmuth (from IWIM/Institute for World Economics and International Management and the Research Group on African Development Perspectives Bremen), is indebted to these two experts for encouragement, ideas, concepts, and valuable contributions to these two volumes of the *African Development Perspectives Yearbook*. Great was also the contribution of two other Unit co-editors and contributors: Professor Reuben A. Alabi, from the Department of Agricultural Economics, Ambrose Alli University, Ekpoma, Edo State, Nigeria (currently guest professor at IWIM), has contributed to volume 20, while Dr. Chantal Marie Ngo Tong, Senior Lecturer, Faculty of Law and Political Sciences, University of Ngaoundere, Cameroon, has contributed to this volume 21. They brought in their valuable competences in the fields of agricultural transformation processes and digital transformation processes in Africa.

Institutional support is welcomed by the *Research Group on African Development Perspectives Bremen*. Many organisations in Africa, like the African Development Bank (AfDB) Group, the United Nations Economic Commission for Africa (UNECA), the African Union (AU), and the NEPAD (New Partnership for Africa's Development) Secretariat have contributed with information and encouragement. Also, the OECD (Organization for Economic Cooperation and Development) and its Development Centre, the IMF (International Monetary Fund), and the World Bank (with various offices at headquarters and in Africa) have given advice and information. We, as the Editors of the Yearbook, are always interested in their advice and guidance to structure the future work on the *African Development Perspectives Yearbook*.

For the volumes 20 and 21 of the *African Development Perspectives Yearbook* the Editors of the Yearbook took up the issues of Science, Technology and Innovation (STI) Policies for Inclusive Growth in Africa. These issues are so important for the much-needed redirection of economic policies in Africa. While volume 18 of the *African Development Perspectives Yearbook* has focussed on “Transformative Regional Integration in Africa”, volume 19 had the theme of “New Trade and Investment Policies for Africa”. Both volumes consider the fact that structural reforms and structural transformation processes in Africa request policies which directly support structural change.

STI policies which are covered in volumes 20 and 21 can support structural change in many ways, via acceleration of productivity growth, development of agriculture and agribusiness, diversification of industrial production and exports towards higher value-added products, and via making the services sector more productive, building human capacities for growth, and implementing inclusive growth strategies. While volume 20 presented a general strategy on “STI policies for inclusive growth in Africa”, this volume 21 continues the debate from volume 20 by focussing on “human capacity building and STI policies in Africa”. Unit I of volume 21 elaborates on specific strategies to speed up human skills development as a base for STI infrastructure. Country case studies highlight the importance of tertiary sector education reforms, the role of digital development plans for human capacity development, the role of E-learning experiments for broadening and deepening skills development strategies, and the role of returnee entrepreneurship for technology transfer and knowledge creation. Also, volume 21 focusses in Unit 2 on two North African countries which are already diversified in their economic structure (Egypt and Tunisia). Both countries need an excellent STI infrastructure and sophisticated STI policies. For Egypt, the ongoing reforms of the national innovation system (NIS) and the respective roles of the private and

public sectors for the creation of an efficient STI infrastructure are discussed. For Tunisia, focus is on the role of STI in the private sector and the barriers to innovation in local firms, on the roles of techno parks and clusters as instruments of a modern STI policy and of a more effective regional development policy, and on the role of a national policy to speed up the spread of innovations in the health care sectors. Volume 21 has in Unit 3 also a Book Reviews and Book Notes section; this section (Unit) is rich in presenting numerous review articles, book reviews and book notes on the core themes of volumes 20 and 21.

Unit 1 of the prior volume 20 of the *African Development Perspectives Yearbook* with the title “Science, Technology and Innovation (STI) Policies for Inclusive Growth in Africa – General Issues” has covered general issues of the STI infrastructure and strategies regarding more coherent STI policies. In various essays key issues were discussed, such as the role of innovations for diversification and inclusive growth, the development of STI policies in Africa and the support by UNESCO, and the efforts at building capacity for Africa’s STI systems. Unit 2 of Volume 20 presented essays on “Science, Technology and Innovation (STI) Policies for Sudan’s Economic Revitalization”. These essays covered important aspects of Sudan’s STI system, such as the overdue reforms of the national innovation system (NIS) and of the subsystems (tertiary education, science & technology, ICT), the emergence of innovative firms in Sudan and the instruments to support them by adapted STI policies, the strengthening of agricultural research systems for the field-testing of research results and for generating yield increases in various agricultural subsectors and for various local crops, and the role of foreign investors in stimulating knowledge spillovers to domestic firms. Unit 3 of Volume 20 was discussing the theme of “Science, Technology and Innovation (STI) Policies for Agricultural Transformation in Nigeria”. In various essays specific issues of Nigeria’s overdue agricultural transformation process

were presented: the role of indigenous agricultural technologies and their development and production in local Nigerian research institutes; the role of GM (Genetically Modified) crops, such as cowpea as a local staple food crop, to increase pest-resistance and yields while preserving acceptability among farmers and consumers; and the importance of developing the overall value chain of local crops, such as cassava, to increase production and yield and to fortify the crop by bio-technology and breeding so that consumers receive all the important minerals they need for a healthy life.

In the volumes 20 and 21 of the *African Development Perspectives Yearbook* with the common theme of STI policies for inclusive growth in Africa major strategic and policy issues are analysed. The guiding issue is how to make the STI policies becoming a vital part of the structural transformation process in Africa. So far, these policies are not applied in a comprehensive, integrative and coherent approach, and they lack a focus on structural transformation. The disappointing results in mobilizing resources for development, in promoting production and export diversification, in integrating local firms into global and regional value chains, in establishing partnerships in production, R&D, training and trade, in strengthening regional integration, and in attracting foreign direct investment for high-value added manufacturing and high-technology services sectors request a new approach towards STI systems development. Also, the limits in African intra-regional trade, investment, technology diffusion, skilled labour migration, enterprise-to-enterprise cooperation, etc., within and between the regional economic communities (RECs) in Africa, request a completely new approach towards STI development.

Many institutions have contributed to the various volumes of the *African Development Perspectives Yearbook*, with news and information about African countries and regions, with information about new research projects in and on Africa, with publi-

cations about policies and strategies, with documents about declarations and agreements, and with research papers, also at their early stage. So, the editors of the *African Development Perspectives Yearbook* can grasp new development in Africa very early, what helps in inviting contributors who are then key persons of expertise for specific units (chapters). Many regional and international organisations, like the African Development Bank (AfDB), the African Union (AU) and its affiliated institutions, the UNECA (United Nations Economic Commission for Africa), the World Bank, the UNCTAD (United Nations Conference on Trade and Development), the UNDP (United Nations Development Programme), the IMF (International Monetary Fund), the UNIDO (United Nations Industrial Development Organization), and the ILO (International Labour Organization), continue to support our scientific effort by sending us materials and by making available - always timely - new strategy documents and drafts of their research papers for our publication series, especially the Book Review and Book Notes Unit of the *African Development Perspectives Yearbook*. For volumes 20 and 21, UNESCO (United Nations Educational, Scientific and Cultural Organisation) and ACBF (African Capacity Building Foundation) stepped in as partners with huge support. But it is also true that individual persons in these important organizations matter; they open the doors, they invite us to cooperate, and they share their knowledge with us.

Also, UNU-WIDER (United Nations University - World Institute for Development Economics Research) as an institution of global importance for development research has continuously supported our work with most recent research papers, with access to their conferences and networks of researchers and affiliated institutes, and with publications and information about important scientific events in their domain of development studies. Furthermore, we would like to thank all those institutions which make us part of their global research networks; so they are in-

forming so many others in the development field about our work for Africa, in our endeavour of continuously publishing the *African Development Perspectives Yearbook*. This is the case now since 1989 when the first volume appeared under the theme of “Human Dimensions of Adjustment”.

We would also like to express our gratitude to two researchers who accepted the position as members of the Editorial Committee for Volume 21, to act as Co-Editors of a Unit and as a Volume Editor. We are indebted to Dr. Chantal Marie Ngo Tong, Senior Lecturer, Faculty of Law and Political Sciences, University of Ngaoundere, Cameroon. She stepped in with her knowledge of digital development in Africa and implications for the STI infrastructure. She worked with us on Unit 1 of volume 21. We are thankful to Dr. Nazar Mohamed Hassan, Regional Adviser, UNESCO Regional Office for Science and Technology for the Arab States, Cairo, Egypt, for his work as author and co-editor of the Unit 2 on STI Policies for Economic Transformation in North Africa. It was a pleasure to introduce the Units 1 and 2 together with these two personalities for the readers. The two co-editors of the Units 1 and 2 of volume 21 have done an excellent job, and we are sure that we will cooperate with them towards publishing future volumes of the African Development Perspectives Yearbook. We are also thankful to Professor Dr. Samia Satti Mohamed Nour, Department of Economics, University of Khartoum, for reviewing various books for Unit 3 of volume 21.

We are also indebted to Senior Expert Officer Andrew Mold from UNECA for his continuous encouragement; beside of being an author in several of our volumes he always has pushed us to present the new Yearbook Volumes at the UNECA offices in Addis Ababa and Kigali, and/or elsewhere in Africa. In October 2016 this idea was realised. Andrew Mold, at that time Acting Director of the Kigali Office of UNECA, organized a launch event with a fine programme for the volumes 18 and 19 of the

African Development Perspectives Yearbook. A major launch event with a high-level audience took place in Kigali, Rwanda. Our Managing Director, Professor Tobias Knedlik from the Fulda University of Applied Sciences, and our Project Adviser for the volumes 20 and 21 at that time, Dr. Nazar Mohamed Hassan, Regional Adviser, UNESCO Regional Office, were present in Kigali. They informed the attending experts, policymakers, ambassadors, the UN staff, and representatives of donor organizations and the media about the *African Development Perspectives Yearbook* Project. It was a great event, and African TV and Radio Stations reported in 48 African countries about the launch event for volumes 18 and 19 of the *African Development Perspectives Yearbook*. We are planning to hold such events in the future more regularly. Dr. Nazar Mohamed Hassan has already mentioned the idea to present the two volumes 20 and 21 of the Yearbook at UNESCO offices. This could give additional weight to the theme of “STI Policies for Inclusive Growth in Africa”. We hope that we can realise this project with the publication of these new volumes of the *African Development Perspectives Yearbook*.

Professor Dr. Tobias Knedlik, the Managing Editor of the *African Development Perspectives Yearbook*, and Professor Karl Wohlmuth, the Director of the *Research Group on African Development Perspectives Bremen* and Volume Editor, are also thankful to Professor Dr. Achim Gutowski for his continuous work as the Book Review/Book Notes Editor of the *African Development Perspectives Yearbook*; he has prepared, in cooperation with Professor Karl Wohlmuth, the Unit 3 of volume 21 with numerous Book Reviews and Book Notes. This Unit 3 will provide detailed assessments of a great number of books, journals, series, research papers and documents being related to STI systems, policies and infrastructures in Africa; but also general studies on Africa’s development perspectives are reviewed in this Unit 3 of volume 21. The impressive list of sub-

jects/classifications for the Book Reviews/Book Notes Unit is of value for all those readers who want to go deeper in their understanding of African STI systems, policies, and infrastructures. The material was classified into 14 categories.

We are thankful to all the contributors and supporters of the *African Development Perspectives Yearbook* for their hard work, their steady encouragement and their continuous assistance. The valuable inputs from leading African research institutions and their experts have contributed over the years to the success of the *African Development Perspectives Yearbook* as an outstanding publication on and for Africa. In 2019 the *African Development Perspectives Yearbook* project will celebrate its 30th birthday, as the first volume has appeared in 1989. The readers of the various *African Development Perspectives Yearbook* volumes have continuously contributed with their critical comments and with supportive encouragement, so that over time a valuable partnership has emerged between readers, contributors and editors.

Various institutions have made over the years donations and have funded specific allocations to the *African Development Perspectives Yearbook* project, but the support of the University of Bremen, Bremen, Germany is of invaluable importance. The University of Bremen was awarded by the German scientific research community in June 2012 the title “Excellence University”, and the *Research Group on African Development Perspectives Bremen* is very proud about this distinction. The great honour for the University of Bremen is helping in the further work of the *Research Group on African Development Perspectives Bremen*. These donations, direct supports and research grants to the *African Development Perspectives Yearbook* Project have helped us to intensify researches on African development issues, to distribute the various volumes of the Yearbook to African partner universities and to major African research institutions, and to invite research scholars from leading African research

institutions to work with us in Bremen. Institutions like the Volkswagen Foundation and the Alexander von Humboldt Foundation have generously financed the stay of senior researchers at IWIM (Institute for World Economics and International Management) in Bremen. Currently, the African Economic Research Consortium (AERC) and the International Monetary Fund (IMF), African Department, are financing research of our staff/guest researchers, like Professor Reuben A. Alabi who is a long-term partner of the project. We are thankful for all these contributions and donations to the researches on African development issues which are taking place in Bremen; these are important supports for the *African Development Perspective Yearbook* project.

African Development Research Workshops were regularly held in Bremen at the University to discuss the draft papers which were intended for publication in the *African Development Perspectives Yearbook*. These African Development Research Workshops served as forums for the intensive discussion of the draft papers and of related research topics. Still there is contact to many of these research visitors. Partly these workshops are now replaced by online discussion forums about Units and Drafts. The Editors also want to express the thanks to the many referees of the draft contributions for their committed work they are doing for the Yearbook. By this input the *African Development Perspectives Yearbook* has become over the years a fully refereed publication. Also, the reviewers of the many books, journals, research papers and documents for the Book Reviews/Book Notes Unit are doing an excellent job. Past volumes, like volume 19, and now volume 21 give evidence of this important part of the work of the *Research Group on African Development Perspectives Bremen*.

Many persons have given support, advice, and encouragement; others have helped with frank and critical assessments. However, the responsibility for the final product remains with

the editorial team of the *Research Group on African Development Perspectives Bremen*. Both volumes, the Volume 20 for the year 2018 and Volume 21 for the year 2019 are released during the year 2018. The *Research Group on African Development Perspectives* has already started its work on Volume 22 for the year 2020 with the title “*The Sustainable Development Goal Nine (Infrastructure, Industrialization, Innovation) and African Development*”. The theme is related to important research and cooperation programmes of the *Research Group on African Development Perspectives Bremen* at IWIM (Institute for World Economics and International Management), University of Bremen.

In the name of the Editorial Team:

Professor Dr. Tobias Knedlik, Fulda University of Applied Sciences and IWH Halle, Managing Editor, and

Professor Emeritus Dr. Karl Wohlmuth, University of Bremen, Director of the Research Group on African Development Perspectives Bremen at IWIM, Volume Editor.