CONFIGURATION OF EDUCATIONAL SYSTEMS TO SUPPORT AFRICAN SUSTAINABLE DEVELOPMENT

by

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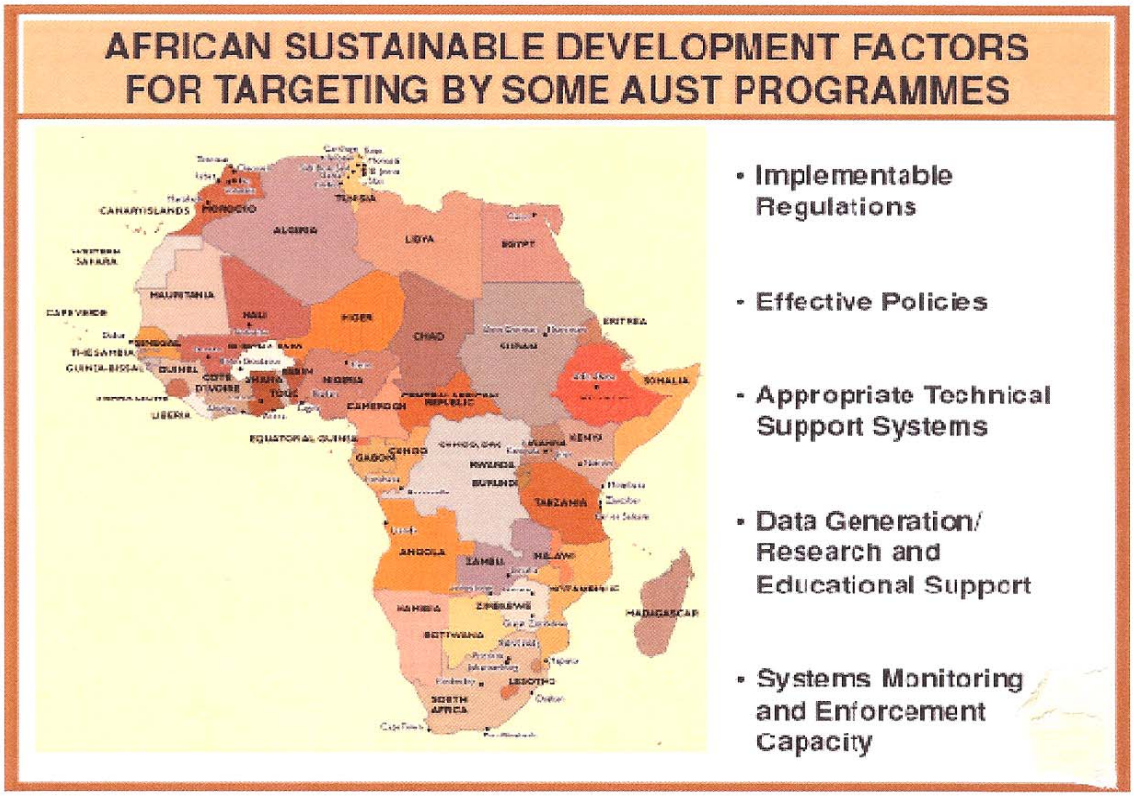
1. THE NECESSITY OF KNOWLEDGE-BASED SYSTEMS AS DRIVERS OF AFRICAN AND GLOBAL SUSTAINABLE DEVELOPMENT

Knowledge is the cornerstone of modern societies. Its creation, dissemination and ethical use in devising mechanisms to support social systems at global, national and local scales can improve human welfare by enabling the selection of optimal combination of options on various aspects of human and infrastructure development. Rational choices that are enabled by investment of knowledge in decision-making processes, coupled with implementation schemes for entrepreneurship and social support projects, can generate jobs, alleviate human suffering, safeguard environmental systems, promote inter-cultural and international understanding, enable peaceful co-existence, and reduce the ravages of natural and technological disasters worldwide. Many African and other developing countries, as well as organizations such as the World Bank, United Nations, and African Union are developing frameworks and investing resources to counter social stressors such as unemployment, diseases, poverty, hunger, land degradation, global climate change, regional and international conflicts, human migration, illiteracy, digital divide, environmental pollution, water scarcity, energy insecurity, and social inequity. These stressors usually have both local and global drivers and impacts.

Stressors may originate from one African country but their effects often precipitate on all countries, communities and businesses, no matter how physically distant they may be from Africa. Lack of adequate human capital in Africa can stall operational efficiencies of multi-national firms, break international supply chains, generate unemployment in both African and more developed countries, and cause social inequities that threaten global peace. Thus economic development of Africa should be promoted by all countries and organizations. Low to mid-income countries in Africa are particularly vulnerable to stressors because of the inadequacy of risk management systems such as regulations, policies, technical support systems, data generation/research/educational support systems and enforcement capacity. Often, poor governance and economic disadvantages in some African countries combine with these inadequacies to make development efforts ineffective or unsustainable. The predictable results are that unemployment and lack of other socio-economic support systems constrain millions of people to favelas, slums, shanty towns and ghettos that are characterized by hazards in many African countries. These factors lower the tolerance threshold for the initiation of intra and inter-regional conflicts. Recent and/or continuing problems in the Congo, Kenya, Sierra Leone, the Horn of Africa, Darfur, and Nigeria's Niger Delta are multi-dimensional and generate human dislocations that induce social system adjustments internally in Africa, and elsewhere in North America, Europe, and Australia.

As recent events involving floods, social unrests, and terrorism indicate, the greater effectiveness of strategic planning and management systems of some of the more



technologically advantaged African countries (e.g. South Africa) is partly negated by the high rate of generation of new problems that can be partly addressed by science and technology and appropriately implemented management systems. All African countries need to re-tool systems continually to address evolving problems. This calls for collaboration among African countries and between African and non-African countries on educational initiatives that can improve socio-economic circumstances in Africa. The complex web of interactions among factors that determine the quality of life and peaceful co-existence of communities in Africa requires advanced analyses and presentation of data and facts to decision-making organizations such as governments, corporations, investment groups and international agencies. The global community, acting through the United Nations, has expressed sustainable development targets in terms of the Millennium Development Goals (MDGs). Attainment of MDGs and global peace in Africa requires infusion of knowledge into projects and diplomatic initiatives, capacity building, and collaboration across all jurisdictional lines and cultural frontiers in Africa.

Industrialized countries that have good governance and economic strength to deliver goods and services to their citizens usually put strong emphasis on tertiary education, technology diffusion, and the appropriate policy mix that encourages innovation. Ironically, the year 2007 was designated as the "Year of Science and Technology in Africa" by African leaders who met in Addis Adaba, Ethiopia and proposed the allocation of at least 1.0% of GDP by each African country to research and development by 2020. Mr. Gumisai Mutume, a columnist in the October 2007 edition of Africa Renewal Newsletter, observes that, unfortunately, sub-Saharan Africa contributes about 2.3% of the global GDP but records only 0.4% of global research and development expenditure. Furthermore, Africa holds 13.4% of the global population but hosts only 1.1% of the world's scientific researchers. This translates to one scientist/engineer per 10,000 people. For industrial countries, it is 20-50 scientists/engineers per 10,000 people.

Appropriately, many African countries have developed comprehensive national frameworks for reform, socio-economic growth, and poverty reduction. Harvesting of research potential; deployment of knowledge from many disciplinary sectors into industrialization projects and public policies; and effective training of students to create a potent labor force can enhance the capacity to attain the Millennium Development Goals (MDGs), as well as other social-economic development targets. Studies generally show that despite the abundance of talent as evident in African emigrants who perform very well outside Africa, the continent is falling behind in science and technology capacity internationally. Much of this failure is attributable to lack of deep indulgence in research and intellectual activities, poor capacity to gather, process, and share research data, inadequate deployment of research products in systems that promote entrepreneurship and good governance, and inadequate training of students to meet the needs of the labor force.

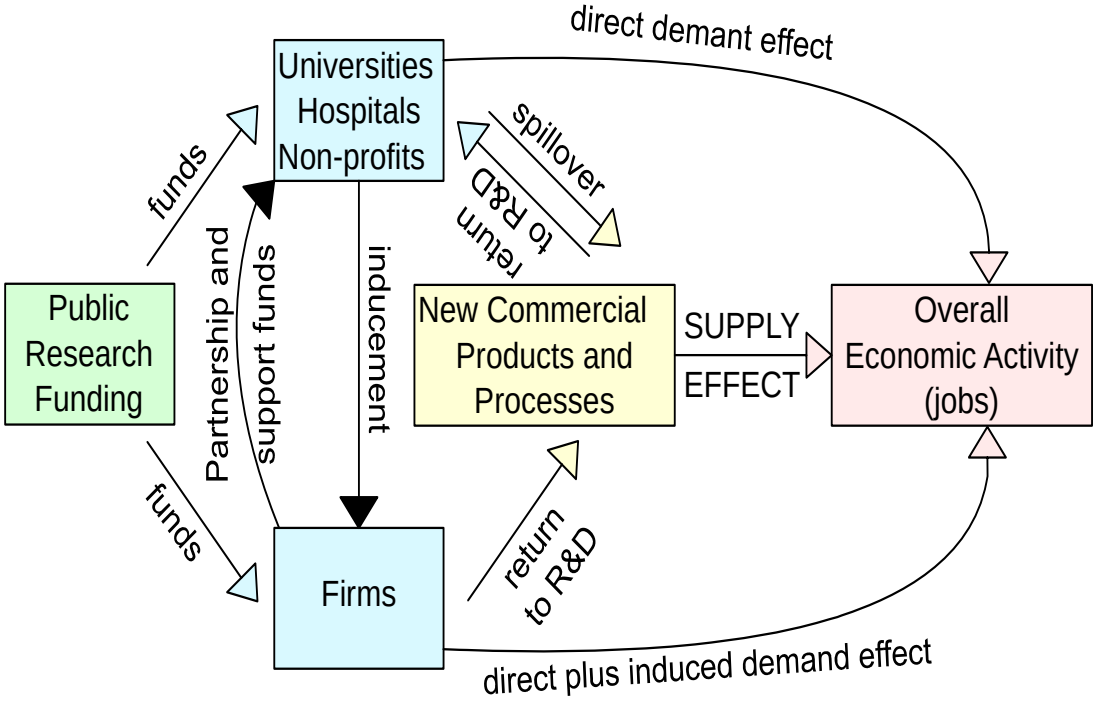
AUST'S MISSION AND TASK REQUIREMENTS

AUST'S MISSION

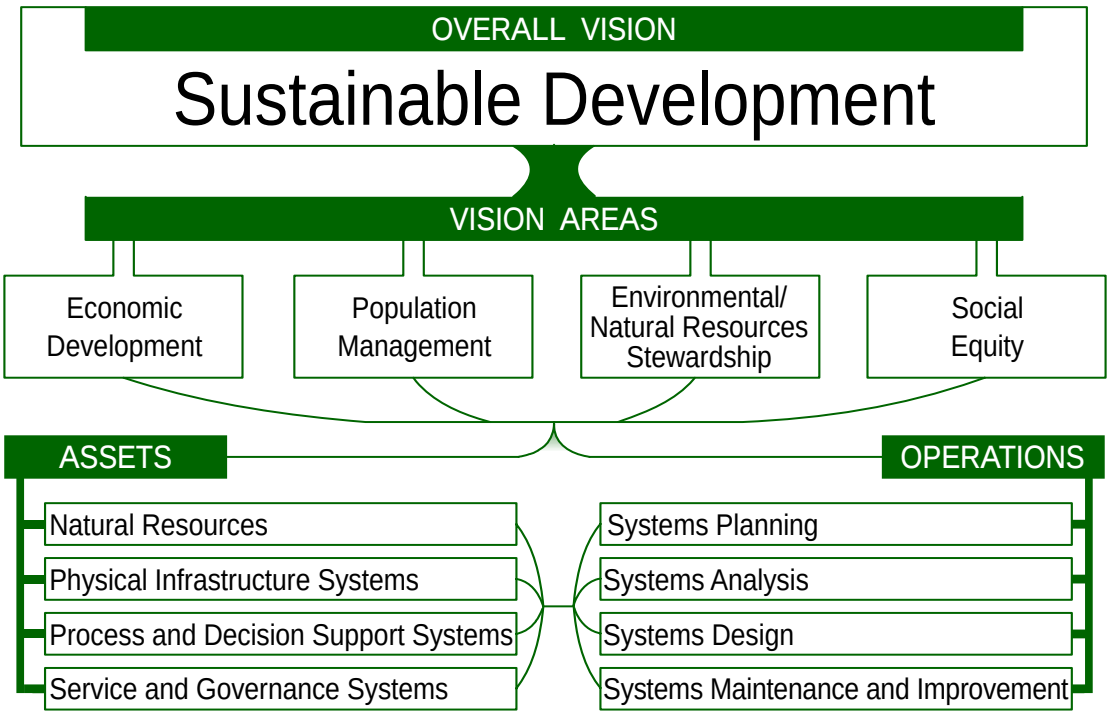
- **Human Capital Development**
- **Improvement of Africa's Educational Systems**
- **Knowledge Development, Incubation and Dissemination**

TASK REQUIREMENTS AND DEVELOPING AUST INSTRUMENTS

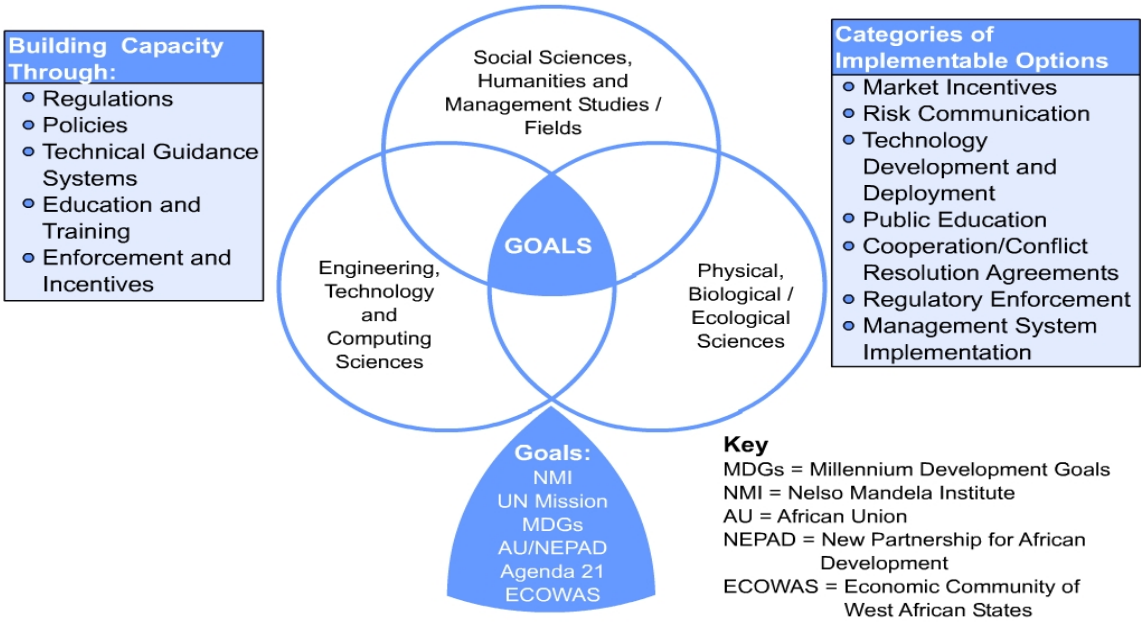
TASK REQUIREMENTS	AUST SUPPORT INSTRUMENTS
● Implementation of systems for growth and propagation of intellectual thought	• Encouragement of debate • Good library services • Well structured degree programmes
● Catalysis for conversion of knowledge to African economic sustainability	• Engagement of industry in centers and projects • Instruction in entrepreneurship • Policy support to agencies and commercial groups
● Recruitment and training of students of great potential in adequately equipped facilities	• Setting of appropriate admission processes • Fundraising for facilities development • Widely cast advertizement of academic programmes • Early engagement of industry on curricula
● Recruitment and support of the best researchers, educators and administrators into an effectively managed organization	• Use excellence as base-level criterion • Target diasporans, locals and others • Provide incentives in addition to salary • Delegate responsibility and empower leaders
● Engagement of policymakers, agencies, corporate organizations and foundations within and outside Africa	• Avoid ivory tower mode of operation • Create on-campus events for their participation • Develop projects of common interest • Develop contacts list of relevant players
● Intensification of research alliances internally and externally, and elevation of the quality and quantity of research output	• Target major issues with centers • Create leadership role through early involvement • Publish in high-quality journals and lead major conferences • Develop high utility models, products and technology



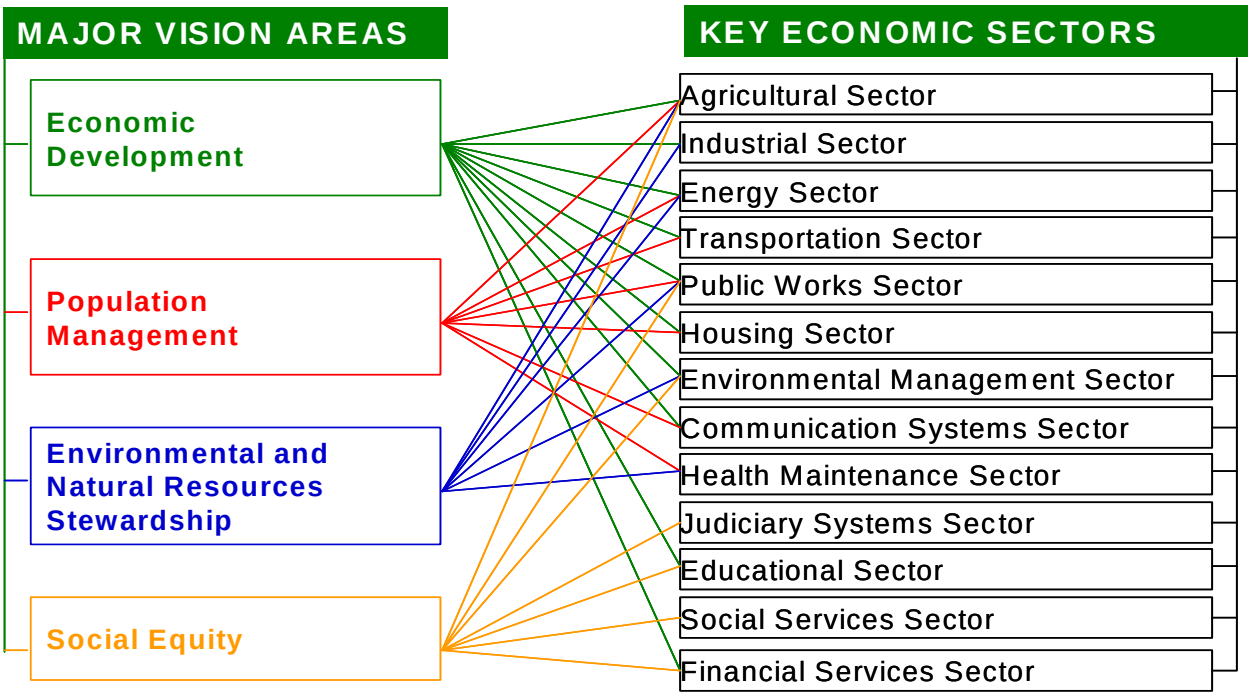
AFRICAN SUSTAINABLE DEVELOPMENT FACTORS FOR TARGETING IN EDUCATIONAL PROGRAMS



ACADEMIC AND PROGRAMME COVERAGE REQUIREMENTS FOR EFFECTIVE CONTRIBUTION OF AUST WITHIN ITS MANDATE, TO EFFORTS TO ADDRESS AFRICAN GLOBAL ISSUES



INTER-RELATIONSHIPS BETWEEN AFRICAN ECONOMIC DEVELOPMENT SECTORS THAT WILL BE TARGETED BY AUST'S SCIENCE AND TECHNOLOGY PROGRAMMES AND OTHER SECTORS WITHIN THE OVERALL AFRICAN SUSTAINABLE DEVELOPMENT VISIONS



A BRIEF INTRODUCTION OF HILARY I. INYANG

Prof. Inyang is the President of the African University of Science and Technology (AUST), Abuja, Nigeria. AUST is a continental university that was set up with the help of international agencies to foster the use of knowledge systems in Africa sustainable development. He is also the Duke Energy Distinguished Professor of Environmental Engineering and Science, Professor of Earth Science and Director of the Global Institute for Energy and Environmental Systems at the University of North Carolina-Charlotte. He is currently the President of the International Society for Environmental Geotechnology (ISEG) and the Global Alliance for Disaster Reduction (GADR). Prior to his current position, he was University (titled) Professor, DuPont Young Professor and Director of the Center for Environmental Engineering, Science and Technology (CEEST) at the University of Massachusetts, Lowell. Previously he taught at George Washington University, Washington, DC; Purdue University, West Lafayette, Indiana; and University of Wisconsin, Platteville. Professor Inyang also served at the U.S. Environmental Protection Agency (1991-1993) as a Senior Geoenvironmental Engineer and subsequently as the President of Geoenvironmental Design and Research (GDR) Inc., a small research firm that he founded in 1993. From 1997 to 2001, he was the Chair of the Environmental Engineering Committee of the USEPA Science Advisory Board, and also served on the Effluent Guidelines Committee of the National Council for Environmental Policy and Technology. He has authored/co-authored more than 210 research articles, book chapters, federal design manuals and the textbook, *Geoenvironmental Engineering: principles and applications*, published by Marcel Dekker (ISBN: 0-8247-0045-7). His research and professional focus are on contaminant leaching and dusting from materials, containment systems and materials for barriers, energy systems and geohazards. Professor Inyang has contributed on a continual basis and in a leadership role, to several scholarly publications. He has been an associate editor/editorial board member of 27 refereed international journals and contributing editor of three books, including the United Nations Encyclopedia of Life Support Systems (Environmental Monitoring Section). Professor Inyang served on more than 100 technical and policy panels of governments and professional societies, and has given more than 110 invited speeches and presentations on a variety of technical and policy issues at many institutions and agencies in several countries. Among these presentations are the 10th Anniversary Lecture of the Korean Society of Soil and Groundwater Environment in Seoul, Korea (2005); the Annual University Lecture of the University of Calabar, Nigeria (2005); the Dean Rusk Public Lecture of Davidson College, NC, USA (2005); the Charles Jones Lecture at Dartmouth College, Hanover, NH, USA (2004); ALCOA Endowed Lecture at Carnegie-Mellon University (2002); the Earth Day Celebrations Lecture at Spellman College, Atlanta; the AMOCO Foundation Lecture at Iowa State University (1996); and the Goldberg and Zoino Lecture at Massachusetts Institute of Technology (1994). Professor Inyang has chaired/co-chaired international conferences in the United States, Brazil, Finland, China and Nigeria. Professor Inyang holds a Ph.D. with a double major in Geotechnical Engineering and Materials and a minor in Mineral Resources from Iowa State University, Ames, Iowa; an M.S. and B.S. in Civil Engineering from North Dakota State University, Fargo, North Dakota; and a B.Sc. (Honors) in Geology from the University of Calabar, Nigeria. His research has been sponsored by NOAA, FHWA, USDOE, USDOD, USNRC, DuPont Corporation, Sandia National Laboratory, Duke Energy Corporation and the National Science Foundation. For his research contributions to advances in geoenvironmental science and engineering, professional practice in many countries, and public policies on energy and environmental issues, he has received several professional honors, including selection as a Fellow of the Geological Society of London, the 1999 Chancellor's Medal for Distinguished Public Service of the University of Massachusetts, Lowell; 2001 Swiss Forum Fellow selection by the American Association for the Advancement of Science ; the 1996 National Research Council Young Investigator Selection; 1992 Eisenhower-Jennings Randolph Award of the International Public Works Federation/World Affairs Institute that was instituted to honor the international achievements of former U.S. President Dwight D. Eisenhower; and the 1991 American Association for the Advancement of Science/USEPA Environmental Science and Engineering Fellowship; and election (by eminence) as a Board-Certified Member (BCM) of the American Academy of Environmental Engineers (2006).