giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Higher Education & Science for Development

Towards the Agenda 2030 and the Sustainable Development Goals

A discussion paper

10 REDUCED INEQUALITIES — JORDAN: NEW PERSPECTIVES THROUGH ACADEMIC EDUCATION AND TRAINING FOR YOUNG SYRIANS AND JORDANIANS (JOSY)

5 GENDER EQUALITY — JORDAN: ECONOMIC INTEGRATION OF WOMEN IN THE MENA REGION

4 QUALITY EDUCATION — AFGHANISTAN: ACADEMIC MINING EDUCATION IN AFGHANISTAN (AMEA)

4 QUALITY EDUCATION — PALESTINE: MORE JOB OPPORTUNITIES FOR PALESTINIAN YOUTH

8 DECENT WORK AND ECONOMIC GROWTH — BANGLADESH: GERMAN BANGLADESH HIGHER EDUCATION NETWORK FOR SUSTAINABLE TEXTILE

4 QUALITY EDUCATION — EGYPT: INTERNATIONAL EDUCATION MANAGEMENT (INEMA)

4 QUALITY EDUCATION — MONGOLIA: GERMAN-MONGOLIAN INSTITUTE FOR RESOURCES AND TECHNOLOGY

2 ZERO HUNGER — WORLDWIDE: ADVISORY SERVICE ON AGRICULTURAL RESEARCH FOR DEVELOPMENT (BEAF)

13 CLIMATE ACTION — CARIBBEAN REGION: RENEWABLE ENERGY AND ENERGY EFFICIENCY TECHNICAL ASSISTANCE (REETA)

3 GOOD HEALTH AND WELL-BEING — SOUTH EAST ASIA: FIT FOR SCHOOL

7 AFFORDABLE AND CLEAN ENERGY — SENEGAL: HIGHER EDUCATION PROGRAMME IN RENEWABLE ENERGIES AND ENERGY EFFICIENCY (PESEREE)

4 QUALITY EDUCATION — LATIN AMERICA AND CARIBBEAN REGION: INDIGENOUS INTERCULTURAL UNIVERSITY

1 NO POVERTY — AFRICA: STRENGTHENING ADVISORY CAPACITIES FOR LAND GOVERNANCE IN AFRICA

4 QUALITY EDUCATION — ETHIOPIA: CAPACITY DEVELOPMENT IN HIGHER EDUCATION

17 PARTNERSHIPS FOR THE GOALS — BRAZIL: NEW PARTNERSHIPS. INNOVATION FOR SUSTAINABLE DEVELOPMENT (NOPA)

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — NAMIBIA: TRANSPORT, MOBILITY, AND LOGISTICS

16 PEACE, JUSTICE AND STRONG INSTITUTIONS — AFRICA: PEACE AND SECURITY, CAPACITY DEVELOPMENT THROUGH HIGHER EDUCATION AND APPLIED RESEARCH

15 LIFE ON LAND — CENTRAL AFRICA: CONSERVATION OF BIODIVERSITY AND FOREST MANAGEMENT IN AFRICA

6 CLEAN WATER AND SANITATION — AFRICA: PAN-AFRICAN UNIVERSITY (PAU)

Higher Education & Science for Development

Towards the Agenda 2030 and the Sustainable Development Goals

A discussion paper

Prepared by:
Dr. Karola Hahn, Competence Center for Education, Vocational Education and Training, Labour Markets
With support of Emily Andres, Sector Programme Education

Version: Zero Draft
March 2017

Content

1. Introduction

This paper has been drafted as a discussion paper. It is a work in progress (Zero Draft) which will be developed further by considering the feedbacks and results of expert meetings on the one hand and by aligning it to further ongoing Agenda 2030-related initiatives and processes in GIZ.

The paper provides a short introduction into the Agenda 2030 and the Sustainable Development Goals (SDG) and the role of higher education, science, technology and innovation (STI) in the Agenda. It gives a first reflection on the role of higher education and STI in development cooperation in general. In a third step, GIZ, its mission and its approaches to higher education and STI in the light of the Agenda 2030 are presented. The draft paper exemplarily illustrates approaches of GIZ programmes alongside the sustainable development goals and some core topics and principles of the agenda alongside.

The last part of the draft paper addresses challenges, conflicting rationales and issues to be discussed in the field of higher education and STI with regard to the achievement of the Sustainable Development Goals.

2. Agenda 2030 and SDGs

The new global Agenda 2030 represents a concerted endeavour of all UN member states – developing, emerging and developed countries – to embark on new paths of development and transformation. The Agenda 2030 with its Sustainable Development Goals (SDG), adopted in September 2015, sets 17 aspirational global goals in a systemic approach. Each goal has specific targets to be achieved over the next 15 years – altogether 169 targets.

The new agenda brings together the several strands of international development dialogue on poverty alleviation and sustainable development - the Millenium Development Goals (MDG), the Education for All (EFA) process and the post-MDG process on the one hand and the Rio Process on the other hand.

→ **Transforming our world:**
the 2030 Agenda for Sustainable Development
United Nations. Resolution adopted by the
General Assembly on 25 September 2015

The Agenda 2030 defines sustainability across three dimensions: economic, social and ecological sustainability. The points of reference of the agenda are the "5 P's", namely People, Planet, Peace, Partnership, and Prosperity. This holistic perspective is underpinned by shared values and principles such as poverty eradication, human rights and dignity, gender equality, girl and women empowerment, "Leave no one behind" inclusiveness, the protection of public goods and natural resources as well as good governance. The integrated approach of the agenda reflects the multidimensional interconnectivity and comprehensiveness of the different SDGs as well as the super-complexity of global key challenges such as poverty or climate change.

The Addis Ababa Action Agenda (AAAA), which was pinned by the Global Conference on Partnership of UN Member States on Financing for Sustainable Development, provides a foundation for implementing the global sustainable development agenda. Domestic resource mobilisation is central to the agenda as well as commitment to official development assistance, particularly for the least developed countries, and the strengthening of South-South cooperation.

3. Higher Education and STI in the Agenda 2030

The Education 2030 Incheon Declaration and Framework for Action - Towards Inclusive and Equitable Quality Education and Lifelong Learning For All sets out the new vision for education. After a long, participative process initiated by and under guidance of UNESCO, involving stakeholders globally, the Declaration was adopted at the World Forum in South Korea in 2015.

→ **Towards 2030: A new vision for education**
Our vision is to transform lives through education, recognizing the important role of education as a main driver for development and in achieving the other proposed goals.

SUSTAINALBLE GOALS

1 NO POVERTY — End poverty in all its forms everywhere

2 ZERO HUNGER — End hunger, achieve food security and improved nutrition and promote sustainable agriculture

3 GOOD HEALTH AND WELL-BEING — Ensure healthy lives and promote well-being for all at all ages

4 QUALITY EDUCATION — Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

5 GENDER EQUALITY — Achieve gender equality and empower all women and girls

6 CLEAN WATER AND SANITATION — Ensure availability and sustainable management of water and sanitation for all

7 AFFORDABLE AND CLEAN ENERGY — Ensure access to affordable, reliable, sustainable and modern energy for all

8 DECENT WORK AND ECONOMIC GROWTH — Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

10 REDUCED INEQUALITIES — Reduce inequality within and among countries

11 SUSTAINABLE CITIES AND COMMUNITIES — Make cities and human settlements inclusive, safe, resilient and sustainable

12 RESPONSIBLE CONSUMPTION AND PRODUCTION — Ensure sustainable consumption and production patterns

13 CLIMATE ACTION — Take urgent action to combat climate change and its impacts
Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

14 LIFE BELOW WATER — Conserve and sustainably use the oceans, seas and marine resources for sustainable development

15 LIFE ON LAND — Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

16 PEACE, JUSTICE AND STRONG INSTITUTIONS — Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels

17 PARTNERSHIPS FOR THE GOALS — Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

The Framework for Action (FfA) lays down the future priorities and strategies for the achievement of the Agenda 2030 and attempts to galvanize commitment of all key stakeholders of sustainable development.

While higher education was not the focus of the MDGs, it is now part of the systemic approach of capacity building for development as specified in SDG 4 and as implicitly incorporated as means to an end of the other goals.

Furthermore, research, technology transfer and innovation are explicitly highlighted in several goals.

The Agenda 2030 acknowledges that higher education and research are key in addressing the mounting global challenges as well as the fast shifting dynamic changes taking place in an increasingly complex environment. Therefore, they are recognised in all SDGs as vital instruments to achieving the multitude goals.

> → Quality education includes the development of those skills, values, attitudes and knowledge that enable citizens to lead healthy and fulfilled lives, make informed decisions and respond to local and global challenges. A focus on quality and innovation will also require strengthening science, technology, engineering and mathematics education (STEM). FfA. p. 9

3.1. Higher Education as Part of the Sustainable Development Goal 4

> **4 QUALITY EDUCATION**
>
> **Quality Goal 4**
> Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Higher education is crucial to achieving SDG 4. It is incorporated in target 4.3. The wording underlines the perception of education as a human right and higher education as a public good and a means for attaining gender equality. These principles are inspired by a humanistic vision of education and development based on human rights and dignity, justice and shared responsibility (Global Education Monitoring Report, 2016)

> → **Target 4.3**
> By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

Higher education is considered to be an integral part of the education sector tasked with conveying social norms and values such as human rights, culture of peace, inclusiveness, shared responsibility and diversity. This perception of higher education clearly goes beyond the predominantly utilitarian concept of higher education as enabler of economic growth and increased productivity.

Furthermore, target 4.3 points to the need for substantial increase in the enrolment rate in higher education in the global South to reduce South-North enrolment gaps while enhancing equity through access to the sub-sector.

> → Access to higher education in Africa has doubled in the last fifteen years in terms of its gross enrolment rate from 4 % to 8 %. However, compared to Europe and North America with a gross enrolment rate of 75 %, Africa still is lagging far behind, although its student population has tripled in numbers during this period.
>
> Global Education Monitoring Report, 2016

Access, inclusion, equity and gender equality are perceived as cornerstones for social and economic transformation. Scholarship schemes embedded in the SDGs are seen as an instrument in fostering equal opportunities, facilitating greater access to higher education, and equipping young people with relevant competences and skills, including entrepreneurship skills. Scholarships can also contribute to reducing disparities, disadvantages, exclusion and marginalization.

This statement underlines the holistic view of Goal 4, incorporating higher education in all targets concerning the learning cycle. [1]

---

1 While targets 4.3. and 4.4. are discussed separately, it should be noted that they are closely related. UNESCO et al. (2015). FfA. p. 13

SDG 4.4. stresses the need for competence-based and learning outcome-oriented education, enabling students to develop life skills to enhance employability and to stimulate a spirit for entrepreneurship. Qualified teaching staff is paramount in realizing these. Hence, growth both in quantity and quality of teacher education, which requires international cooperation, is imperative.

3.2. Higher Education as a Means to an End

As higher education is pronounced as engine for socio-economic development, it is recognised as key lever for transformation. Higher education bears a great potential for capacity development.

As a cross-cutting instrument for implementation, it contributes to the achievement of all SDGs and targets and thus resonates with the spirit of Agenda 2030. It generates the qualified and skilled work force as well as leaders and change agents to implement reforms, development agendas and to drive innovations. Hence, all sectors shall regard higher education as partner for long-term and sustainable change.

The Framework for Action highlights new formats of higher education at the intersection to vocational education and training. These have a potential to ensure a smooth transition from higher education to the labour market. In particular with regard to the academisation of professions, the permeability of educational pillars, the flexibility of professional or qualification pathways, and the intersection between higher education and TVET are becoming increasingly important in achieving the SDGs. The FfA therefore reflects a holistic view on higher education incorporating the International Standard Classification of Education (ISCED) ranging from ISCED level 5 (short cycle tertiary education) to ISCED 8 (doctorate or equivalent).

Target 4 c addresses another core aspect of higher education, teacher education, as a means to an end. Quality gaps in teacher education translate into negative long-term impacts on the overall performance of educational systems and therefore need to be addressed. Good and sound teacher education is the pre-requisite for generating qualified school leavers entering higher education.

3.3. Science, Technology and Innovation

Science, technology and innovation (STI) as key functions of Higher Education belong to the core topics of the Agenda 2030. STI features strongly both in SDG 17 as Means of Implementation (MoI) as well as a cross-cutting topic to achieve several sectoral goals and targets.

Scientific research is explicitly mentioned with regard to sustainable agriculture and food security (MoI 2.a), health (MoI 3.b), renewable energies (MoI 7.a), innovation and infrastructure (Target 9.5), climate change mitigation (Target 13.3) and oceans and marine resources, "Increase scientific knowledge, develop research capacity and transfer marine technology" (MoI 14.a).

Science, technology and innovation feature strongly in SDG 17	17 PARTNERSHIPS FOR THE GOALS
MoI 2.a	2 ZERO HUNGER
MoI 3.b	3 GOOD HEALTH AND WELL-BEING
MoI 7.a	7 AFFORDABLE AND CLEAN ENERGY
Target 9.5	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
Target 13.3	13 CLIMATE ACTION
MoI 14.a	14 LIFE BELOW WATER

Capacity building in and through higher education institutions is vital to the achievement of SDG 17.

Global partnerships and international cooperation, which are necessary for capacity building and thus achievement of the SDGs, shall strengthen access to STI and knowledge sharing through North–South, South–South and triangular regional and international cooperation on mutually agreed terms (Target 17.6; 17.9). ICT play a central role in these processes (Target 17.8).

4. The Role of Higher Education, Research and Innovation in Development Cooperation

Higher education, research and innovation are key drivers of social, economic and ecological development. Hence, they are urgently required to respond to the needs of societies

> → Tertiary Education and universities are critical for the education of future scientists, experts and leaders. Through their research functions, they play a fundamental role in creating knowledge and underpin the development of analytical and creative capacities that enable solutions to be found for local and global problems in all fields of sustainable development.
>
> FfA. p. 13

Applied research is crucial in addressing existing problems and challenges and can be readily conducted in a reasonably shorter period of ti than basic research. Basic research is also vital in building the capacity for applied research.

The linkage of research and capacity development should be based on the co-design, co-development and co-delivery of solutions, through partnerships between relevant stakeholders including governments, private sector, civil society, research community and the relevant international partners. Higher education institutions play a key role in this. Hence, development cooperation

has to re-think, re-calibrate and diversity its partnerships in this aspect.

A "Multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals" (STI Forum) as Technological Facilitation Mechanism (TFM) to promote multi-stakeholder partnerships for research, innovation and technology transfer has already been launched. A further component of the TFM is an online platform as a gateway for information on existing STI initiatives, mechanisms and programs.
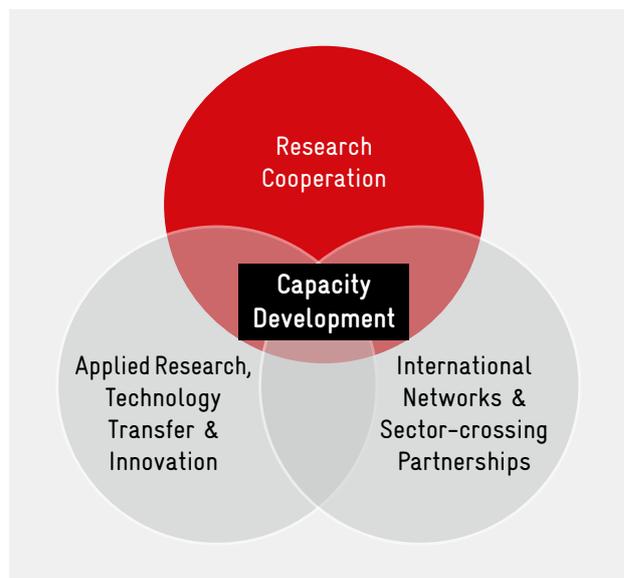
Leveraging at the nexus

Development cooperation should leverage at the nexus of specific key sectoral reforms, higher education and private sector with a multi-level approach. With this approach, development cooperation contributes to capacity development of the academic sector but also at all other sectors.

The concept of capacity building through higher education in development cooperation should be designed in a way that it enables universities to develop an inclu-

sive approach striving for both, access and quality Linkages of sectoral reforms to academic capacity development measures and private sector cooperation allow not only for technology transfer, but also contributes to relevance, employability of graduates and entrepreneurship.

Applied research alongside development cooperation programmes contribute to the generation of cutting-edge knowledge with immediate practical (and po-

tential) effects. It also makes knowledge generated in development programmes accessible to students, the academic community and decision makers.

The embedding of research into development cooperation is often directly linked to capacity development of young academic staff at universities or research institutes and doctoral programmes. International collaborative arrangements and university partnerships are common models to enhance quality through among others, coaching and mentoring of young academic staff,

joint supervision of doctoral students or joint doctoral programmes.

A number of programmes at the nexus also explicitly seek the cross-sectoral dialogue with stakeholders including political leaders, private sector and civil society. Leveraging at the nexus of different arenas is mutually beneficial to all stakeholders involved as it enhances relevance, state-of-the art knowledge and fosters cross-sector linkages.

Migration, crisis and emergencies

The demand for robust and inclusive education has gained a new dimension as war and conflicts create humanitarian crisis that triggers massive migration as well as internal displacement. The Framework for Action sets a specific focus on the role of education in general and higher education in particular for situations of flight, migration, crisis and emergencies.

A shift in priority setting in development cooperation towards education has already embarked on involving

partner universities and networks from the "North" to address these emerging issues. Now, modalities have to be found to provide access to quality higher education to refugees and migrants as well as to build up resilient higher education systems in post-conflict contexts.

The use of modern ICT to provide access to higher education via e-learning, the development of eSkills and the improvement of ICT infrastructure are widely acknowledged as preferred and feasible methods of choice.

Knowledge and mind-sets

The broad concept of STI includes not only the development, transfer and scaling of appropriate technologies, but also social innovations and changes of mind-set and behaviours.

Therefore, one of the most challenging issues in the field of higher education, research and innovation refers to the modes of knowledge production, knowledge sharing, and knowledge networks which require an in-depth change of mind-set and attitude – hence a social innovation.

This applies to all those contributing to STI towards achieving the sustainable development goals. The SDGs require more collective, comprehensive and creative approaches to effectively design policies and shape

institutions according to shared visions and common objectives. This entails more cross-compliance and interface between with multiple sectors, policy fields and arenas with a diversity of stakeholders from different domains involved in the knowledge domain.

Thematic, problem-based and solution-oriented approaches will have to complement disciplinary approaches; disciplinary approaches have to be complemented by transdisciplinary, multidisciplinary and interdisciplinary perspectives. This requires a specific set of skills and competence as well as an openness for radical reforms and new modalities guided by the spirit of accountability for all public goods. Universities will play a crucial role in shaping competences and promoting the mind-set necessary for drivers of global transformation.

5. Sustainable Development: The Core Business of GIZ

GIZ is promoting sustainable development worldwide. Operating at a global level, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH provides

demand-driven, tailor-made and effective services in the field of sustainable development. GIZ works in a wide range of fields, including economic development

and employment; governance and democracy; security, reconstruction, peace building and civil conflict transformation; food security, health, environmental protection, resource conservation and climate change mitigation as well as education at all levels of the system. The main commissioning party is the German Federal Ministry for Economic Cooperation and Development (BMZ). GIZ also works on behalf of other German ministries as well as German federal states and municipalities and public and private sector clients, both in Germany and abroad. It operates in more than 130 countries, employing more than 16,000 staff members across the globe.

GIZ has a long tradition of supporting various platforms and initiatives in sustainable development.

5.1. GIZ Services in Higher Education and STI

GIZ provides technical cooperation in higher education and research for development in all sectors relevant in development cooperation. Higher education, science, technology transfer and innovation belong to its core fields of expertise which complements its expertise in key sectors for development. GIZ supports the implementation of programmes mainly focussing on higher education or STI – most of them tailored to enhance employability and socio-economic development. However, there is also a large number of sectorial or thematic programmes incorporating higher education and STI as supporting instruments to reach sectorial goals. The programmes in higher education, science, technology and innovation or with a component or activity in these fields cover all partner regions and all key sectors.

- Policy advice in higher education reform, governance and strategies, integrated cross-sectoral reforms

- Technical advice in institutional development, higher education management, quality assurance

- Capacity development support at all system levels of the academic sector

- Support of development and review of labour market-oriented curriculum

- Capacity development for applied research

- Support of networking with academic and non-academic actors (e.g. industry)

5.2. GIZ Approaches in Higher Education and STI

Higher education and science programmes as well as programmes with components in this field share three main features in their approaches:

- Multi-level interventions
- Sector-crossing perspectives
- Multi-stakeholder cooperation and partnerships

Many programmes in Technical Cooperation are complemented by Financial Cooperation providing for infrastructure and equipment and to a minor extent also to scholarships. The Financial Cooperation is executed by the German KfW Development Bank. A Code of Conduct is underlining the joint endeavours of BMZ and its two main implementation partners GIZ and KfW in cooperatively contributing to the achievement of the Sustainable Development Goals.

One of the main implementation partners is the German Academic Exchange Service (DAAD). Main activities are the support of university partnerships and curriculum development, mobility of staff and students as well as the management of scholarships.

GIZ APPROACHES IN HIGHER EDUCATION AND SCIENCE PROGRAMMES	
1	Support to system and sector reforms
2	Building of study programmes and academic institutions in key sectors for development
3	Application-oriented research, technology transfer and innovation
4	Digital formats of higher education and research
5	Higher education networks
6	Cooperation with the private sector and entrepreneurship education
7	Higher education in emergencies

5.3. Higher Education Programmes Contributing to the Achievement of the SDGs

All GIZ higher education programmes contribute not only to Goal 4 but to several SDGs as they are designed for structural and institutional reforms and human capacity development. All programmes serve national or regional development plans. Hence, all higher education programmes are embedded into broader sectoral reforms and national development plans. With their sector-crossing approach, they go beyond the usual discipline-based and traditional 'ivory tower' approach. GIZ programmes support the transformation of the former 'silo' concept of universities and institutes into institutions serving the SDG conform comprehensive, integrative model of concerted action of all development stakeholders from public and private sector as well as from civil society.

The social, economic and ecological dimensions are the three cornerstones. Within this triangle, relevance, employability, employment and entrepreneurship are main points of reference. Hence, one of the basic features of higher education programmes in GIZ is the close cooperation with the private sector.

GIZ programmes in higher education and their components are designed to support the national, regional, continental and global development agendas. The overall objective is to support the establishment of structures, robust institutions, effective policies, enabling frameworks and sector-crossing and international networks and dialogues. Furthermore, it envisages producing a critical mass of highly skilled experts and leaders needed to drive and implement transformation in meeting the SDG.
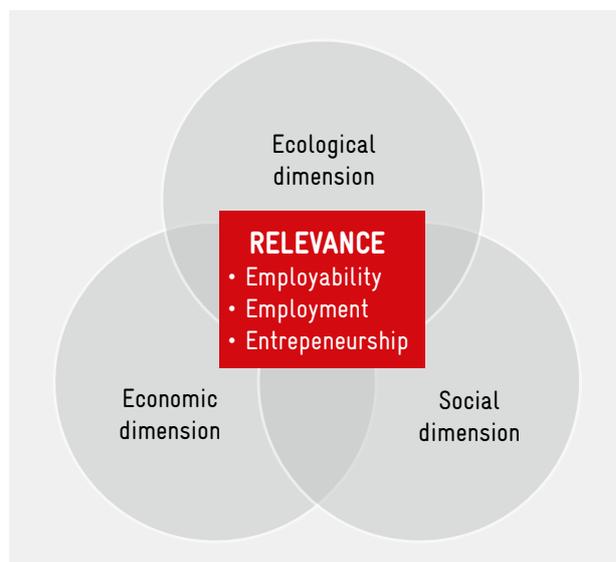
5.4. Best Practices

5.4.1. Integrated Approaches: A Successful Model

Integrated approaches in higher education combining sector reform(s), capacity development and cross-sectorial cooperation prove to be successful model.

The former Engineering Capacity Building Programme (ECBP) in Ethiopia could be described as a sound model for a coordinated multi-level and multi-sector approach. It integrated several pillars of the education sector with emphasis on labour-market-oriented higher and vocational education and training in engineering, technology and sciences as core of the National Growth and Transformation Plans. This was undertaken in concert with the private sector enhanced by investment promotion policies and development of national quality standards. Interventions focussed on leverage effects on system level as well as institution and individual level taking into consideration the demand and the supply side.

The programme "Transport, Mobility and Logistics" in Namibia supports the development of the transport sector as key to its sustainable economic development.

This sector creates employment opportunities, expands markets and social services, facilitates connectivity, and ensures mobility of the population as well as the transportation of goods. In order to address the severe shortages of capacities, the programme backs the sector through capacity building in Civil Engineering at the University of Namibia and the Namibian University of Science and Technology. Bachelors, Masters and PhD programmes in Civil Engineering are developed to generate the capacities needed to implement the reforms in the public and the private sectors in cooperation with German partner universities. Research and technology transfer, for example in Materials Testing and Applied Research, are components of the programme.

In Uganda, DeveloPPP, a programme to foster public-private partnerships, has contributed to strengthening the capacity building for the modernisation of the banking and finance sector. The Bachelors Programme in "Banking and Development Finance" at the Mountains of the Moon University is an example.

5.4.2 Employability, Entrepreneurship, Decent Work and Economic Growth
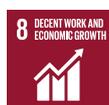
 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Employability and entrepreneurship elements are increasingly becoming capacity development objectives in most higher education programmes.

The programmes incorporate study approaches and experiences from the German dual model which combines elements of vocational education and training and higher education in an institutionalised format. Dual study programmes generally are part of the higher education sector. Their distinguishing feature is strong practical orientation and close collaboration with non-university actors of the private and public sector – frequently leading to dual degree, a professional and an academic degree.

The programme in Palestine "More Job Opportunities for Palestinian Youth Promoting" is intended to enhance employability through the dual studies approach. At Al Quds University dual study programmes are offered in Electrical Engineering, Information Technology, and Business Administration. The programmes run in close collaboration with industry equipping students with relevant practical skills and entrepreneurial mind-sets. The "Higher Education Programme in Renewable Energies and Energy Efficiency" (PESEREE) in Senegal provides collaborative graduate education to improve employability, relevance and entrepreneurship in the field of renewable energy and energy efficiency. Tailor-made short-trainings for professionals, international summer schools and integrated entrepreneurship modules and close collaboration with industry foster innovation, technology transfer and entrepreneurship.

The bi-cultural German-Arab Master Programmes (GAMP) enhances the employability of their graduates by incorporating practicum periods in the study programmes and exposing them to intercultural contexts through international student mobility between the Arab and German partner universities.

The German-Mongolian Institute for Resources and Technology – a labour market-oriented model university - was established to strengthen institutional management and industry linkages. It has developed tailor-made practice-oriented bachelor programmes in engineering (Raw Materials/Process Engineering, Environmental Engineering, Industrial Engineering, and Mechanical Engineering). These programmes generate highly qualified engineers and technology experts needed for Mongolia's mineral resources sector and downstream industries.

The Qualified Internship System developed within the "Engineering Capacity Building Programme" in Ethiopia was mandatory to all students in engineering programmes. It provides a set of quality standards and procedures for an integrated internship in the private or public sector mentored by academics and the hosting enterprises or institutions.

 8 DECENT WORK AND ECONOMIC GROWTH — Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

A programme specifically focussing on decent work is the German Bangladesh Higher Education Network for Sustainable Textile is strengthening graduate education and research capacities of universities in Bangladesh in fields relevant to the garment sector in close cooperation with industry and German universities. The higher education programmes incorporate topics like Ethical Management, Quality Management and Social Dialogue aiming at sustainability and transparency in the textile and garment sector to ensure decent work.

5.4.3 Safeguards and Gender

Derived from its sustainability guidelines, GIZ has developed standards of safeguards and gender for all its programmes. These encompass the following range of topics: Environment and climate, human rights, conflict sensitiveness and context sensitivity, and gender equality.

Human Rights

 1 NO POVERTY — End poverty in all its forms everywhere

 4 QUALITY EDUCATION — Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

 10 REDUCED INEQUALITIES — Reduce inequality within and among countries

 16 PEACE, JUSTICE AND STRONG INSTITUTIONS — Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels

The acknowledgement of Human Rights is an underlying principle and value in all GIZ development cooperation programmes, hence also in its higher education and science initiatives.

Some higher education programmes explicitly address the topic at curriculum level. For example, the Master programmes of the Pan African University all entail a module on human rights and gender as a foundation for African citizenship.

Gender

5 GENDER EQUALITY — Achieve gender equality and empower all women and girls

The equality of genders is a mainstreamed concept in all GIZ programmes and monitored with a gender indicator. The Center for Women's Studies of the University of Jordan, in cooperation with the Economic Integration of Women in the MENA Region (EconoWin) facilitates the ANA HUNNA female mentoring project. Young female students (mentees) are paired up with experienced female professionals (mentors) to jointly work on their transition from university into the labour market.

The German Mongolian Institute of Technology incorporates gender in its Module "Engineer in Society". The Pan African University dedicates a Gender module in all its Master programmes. Other engineering programmes have developed specific marketing and mentoring activities as well as career guidance programmes to attract female students and to coach them during their studies.

Leave no one behind

10 REDUCED INEQUALITIES — Reduce inequality within and among countries

Higher education and research programmes show a variety of ways on how to address the principle of leaving no one behind (LNOB).

The Indigenous Intercultural University represents a structural approach capacity building for marginalised population. It is a network university designed to widen access for marginalised groups, to be inclusive and to safeguard indigenous knowledge. It provides access to postgraduate education for the indigenous people in Latin America and the Caribbean Region and promotes intercultural dialogue, regional networking and regional integration.

The programme "Transport, Mobility and Logistics" in Namibia chose a content-wise approach to address LNOB. The topic of HIV/AIDS prevention is part of the module of "The Society and the Engineer" in the Civil Engineering Bachelor programmes. Those have been developed with the support of the programme at the University of Namibia. The module addresses a core public health aspect of the transport and road sector. Hence, all employees of the sectors, including truck drivers and labourers in road construction and maintenance as well as the related vulnerable communities alongside the roads and railways indirectly benefit from this endeavour through disruption of the spiral of poverty and HIV/AIDS.

A common element of various higher education programme to also reach the disadvantaged and marginalised are scholarships.

5.4.4. Flight, migration and crisis

10 REDUCED INEQUALITIES — Reduce inequality within and among countries

In Germany, a Special Initiative "Tackling the Root Causes of Displacement, Reintegrating Refugees" has been launched by the Federal Ministry of Economic Cooperation and Development (BMZ). Programmes funded focus on employability, digitalisation and dual mode delivery approaches linked to labour market needs, university partnerships as well as scholarships for refugees and migrants and support to their hosting communities.

The programme "New Perspectives through Academic Education and Training for Young Syrians and Jordanians" (JOSY) is supporting young Syrian refugees and disadvantaged Jordanians with stipends and practice-oriented projects gain qualifications in higher education programmes. The ultimate aim is to enhance their employability and secure livelihood in the long run. The programme is part of this Special Initiative.

5.4.5 Poverty alleviation

1 NO POVERTY End poverty in all its forms everywhere

Higher education, research and innovation can contribute in many ways to reduce and alleviate poverty. From a broad range of programmes, two are presented as show case: The programme "Strengthening Advisory Capacities for Land Governance in Africa" supports postgraduate education and applied research in Land Management and Land Governance as well as the establishment of an African Networks of Excellence on Land Governance in support of the AU Agenda on Land. The AU Agenda directly addresses access to land for women and marginalised groups to ensure a livelihood and food security for the poorest.

The programme "Advisory Service on Agricultural Research for Development" (BEAF) supports the CGIAR Network, a Global Agricultural Research Partnership of 15 centres worldwide in international agricultural research for food security, poverty reduction and sustainable management of natural resources.

5.4.6 Water, Renewable Energies, Environment and Climate

6 CLEAN WATER AND SANITATION Ensure availability and sustainable management of water and sanitation for all

7 AFFORDABLE AND CLEAN ENERGY Ensure access to affordable, reliable, sustainable and modern energy for all

13 CLIMATE ACTION Take urgent action to combat climate change and its impacts

15 LIFE ON LAND Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Besides the general standards of safeguards for all GIZ programmes mentioned above, a variety of programmes tackling the reform or development of key sectors explicitly consolidate their efforts with a component of higher education for capacity building in these core areas of sustainable development.

The Pan African University Institute of Water and Energy, including Climate Change (PAUWES) is directly involved in translating the African Union long-term development agenda – the Agenda 2063 - into a Pan African programme. Postgraduate and doctoral education linked to thematic areas key for development, educate and capacitate future leaders of the continent.

The programme "Renewable Energy and Energy Efficiency Technical Assistance" (REETA) in the Caribbean Region consolidates its technical cooperation with the Secretariat of the Caribbean Community (CARICOM) in Renewable Energy and Energy Efficiency with interdisciplinary graduate education. At UTech, Kingston in Jamaica, a regional Master programme in "Sustainable Energy and Climate Change" has specifically been designed for professionals to foster entrepreneurship, innovation, regional integration and a sustainable economic growth.

The regional programme in Central Africa "Conservation of Biodiversity and Forest Management in Africa" targets the modernisation of forestry and environmental programmes and capacity building to strengthen the Central African Forest Commission (COMIFAC). The technical cooperation is backed by evidence-based research conducted in international and regional collaboration.

The German-Arab Masters Programme (GAMP) explicitly addresses the development of qualified experts in key sectors of German development cooperation with the MENA Region including the water, energy, education and economic sector.

The higher education programme in Senegal (PESEREE) supports a practice-oriented reform and curriculum development in the fields of renewable energy and energy efficiency at several institutions in Senegal.

5.4.7 Multi-Stakeholder Partnerships

17 PARTNERSHIPS FOR THE GOALS Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

Multi-Stakeholder Partnerships are prevalent in GIZ programmes as they generally leverage at the nexus of sector reform, higher education and private sector. This involves a diversity of actors and partners at a multi-level approach.

The Pan African University (PAU) programme is based on trilateral cooperation between the African Union Commission (AUC), Algeria and Germany. GIZ supports the AUC in international development partners' coordination and stakeholder management at the political level. Industry partners support the Pan African University Institute of Water and Energy Sciences, including Climate Change (PAUWES) to strengthen the practical orientation in teaching and learning and to foster applied research relevant to development. University partnerships contribute to attain and sustain international quality standards and facilitate academic and student mobility as well as scientific networking.

5.4.8 Technology Transfer and Innovation

17 PARTNERSHIPS FOR THE GOALS Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

The programme "New Partnerships for Innovation in Sustainable Development" (NOPA) is designed to enhance technology transfer in key sectors through bilateral applied research of Brazilian and German research institutes in collaboration with industry. The research is guided by the spirit of technology transfer to foster innovation; hence the innovation needs of the practice partners play a key role. The research addresses thematic fields such as climate change, renewable energies, biodiversity, the protection of the tropical forest, and environment. A dialogue with the public and private sector as well as civil society supports the dissemination of good practices and ensures an effective linkage of S&T cooperation with development cooperation.

The global programme "Green Innovations Centres in Agricultural Systems" (GIAE) aims at innovations in the agricultural and food sectors to boost the incomes of smallholders, create more employment opportunities (particularly in food processing), and increase regional food supplies. Selected partner countries are Benin, Burkina Faso, Cameroon, Ethiopia, Ghana, India, Kenya, Malawi, Mali, Nigeria, Togo, Tunisia and Zambia. GIAE works with innovation partners locally to promote green innovation networks and to jointly develop innovative approaches to growing, processing and selling staple foods, and establishing and implementing programs for strengthening the domestic processing sector. While innovation can be technical in nature, for example regarding mechanization, improved seed, fertilizer or refrigeration chains, the project in many cases looks at new forms of cooperation such as setting-up producer groups, specialized companies and interest groups (social innovations). The programme promotes support services such as knowledge development and dissemination by providing advice and training, as well as access to loans in collaboration with existing knowledge centres such as research institutions and agricultural colleges. The programme is part of the BMZ's Special Initiative "One World, No Hunger".

5.4.9 Knowledge Production & Knowledge Sharing

17 PARTNERSHIPS FOR THE GOALS Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

Joint knowledge production and knowledge sharing are underlying principles of the Agenda 2030 spirit.

The programme "Advisory Service on Agricultural Research for Development" (BEAF) supports seventeen centres worldwide in international agricultural research on food security, poverty reduction and sustainable management of natural resources, water, energy, environment, and climate change (CGIAR). The research approach is interdisciplinary and application-oriented. As a contribution to capacity building in agricultural

research for development, the programme provides scholarships for students in jointly supervised Master thesis research. This multi-stakeholder partnership stands for an institutionalised knowledge generating, knowledge sharing and knowledge transferring global network.

The Tana High-Level Forum on Security in Africa brings together African heads of states and governments, representatives of academia, civil society and the youth to discuss the nexus of fragility and diversity, organised crime and illicit finance flows, secularism, politi-

cised faith and natural resource governance in Africa. The Forum is scientifically informed by the graduate programmes and the research conducted at Institute of Peace and Security Studies (IPSS) in Ethiopia. This platform for knowledge exchange enjoys high political visibility and reputation. IPSS is supported by the Africa Peace and Security Programme (APSP) to jointly investigate with diverse stakeholder "African Solutions" in the area of peace and security. IPSS is mandated by the African Union to support this continental dialogue and knowledge sharing.

5.4.10 Monitoring the SDGs

17 PARTNERSHIPS FOR THE GOALS — Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

The Sustainable Training and Education Programme (STEP) in Ethiopia is supporting the establishment of a higher education management information system as well as a quality assurance system at national and institutional levels.

Some development programmes have complemented their strategies with the development of Master Programmes in Monitoring and Evaluation in a blended learning format delivery (e.g. in Costa Rica and Uganda). These are expected to contribute to the enhancement of monitoring the SDGs.

5.4.11 Diminishing the digital divide

4 QUALITY EDUCATION — Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

17 PARTNERSHIPS FOR THE GOALS — Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

The approaches of digitalisation in higher education related development programmes are manifold and diverse. Various higher education and science programmes use information and communication technologies to widen access, enhance equity, and enhance quality by delivering learning contents online and supporting learning processes. ICT are widely used to communicate, network and disseminate knowledge via e-platforms. These are expected to contribute to diminishing the digital divide.

The Alumni Portal (Global Partners of Germany), a joint initiative of GIZ, the German Academic Exchange Service (DAAD), the Alexander von Humboldt-Foundation (AvH) and the Goethe-Institute is one of the largest projects in the area of digitalisation. More than 132.000 alumni world-wide are registered on the platform. A

current focus of the platform is a global dialogue on the Sustainable Development Goals.

Blended learning is a common approach in many programmes supported through development cooperation.

The "International Education Management (INEMA)", a bicultural German-Arab Masters Programme combines on campus, face-to-face learning with e-learning modules.

A component of the Executive Masters Programme of the Institute of Peace and Security Studies, "Managing Peace and Security in Africa", uses blended learning to cater for the lifelong learning needs of adult professionals in regional and national key positions in the domain of peace, security and conflict management.

The Masters in "Sustainable Energies and Climate Change" at UTech in Jamaica incorporates e-learning into the collaboration with universities at small island states in the Caribbean Region and hence contributes to capacity building and regional integration. E-Learning is also used to support teaching through German partner universities.

The "4E Academy" in Central America also provides blended learning and different learning platforms to build capacities in Renewable Energy and Energy Efficiency with a regional and cross-sectoral outreach. The "Sustainable Training and Education Programme" (STEP) in Ethiopia has built an online platform to link universities and institutes of technology with the private sector to foster networking and technology transfer.

The "Indigenous Intercultural University" in Latin America has been designed as virtual network university linking 25 universities in 11 countries to capacitate the indigenous population and to contribute to pluralistic democracies in the region.

An upcoming regional programme, "Higher Education Center in ICT", is intended to foster economic integration between East African countries. It will focus on ICT capacity development in higher education to meet the requirements of digitalisation in the region, training and entrepreneurship, cross-sectoral dialogues as well as regional and international partnerships. Commissioned by the East African Community it will be implemented by Inter University Council for East Africa (IUCEA).

6 Conflicting Rationales and Issues to be Addressed

The SDGs entail some potentially conflicting rationales and diverging objectives, in particular with regard to existing global frameworks and ongoing trends.

One central issue is the request for the expansion of higher education as a public good – or at least an affordable good - by increasing access, equity in access and flexibility in access in concert with the need for high quality.

While the Agenda 2030 promotes affordability of education as a public good, the General Agreement on Trade in Services (GATS) treats higher education as a commodity and hence a tradable good. The rapid mushrooming of private higher education and its commercialization bear potential tensions for achieving the SDGs with regard to the quest for access, equity and quality.

The other competing reality is between knowledge sharing and knowledge networks versus the primacy of Intellectual Property Rights (IPR). This is particularly significant in science, technology and innovation and needs to be addressed on a political level as well as by the global academic community.

Debates rage on whether higher education is an instrument for self-promotion of elites or promotion of excellence (and hence potentially exclusive) and the need for widening the perspective of social cohesion by increased access and equal opportunities. New modalities are imperative to expand access to higher education and build a critical mass of well-educated workforce and leaders.

SDG 4 proposes scholarship schemes for the least developed countries to study abroad but it does not address the potential risk of brain drain. Existing brain gain policies of some emerging and developed countries have to be seriously considered as a risk. Alternative modalities have to be discussed, also in development cooperation, for example as in-third country scholarships, in-country or in-region scholarships, as implemented by DAAD.

It also needs to be discussed, in how far digitalisation in higher education can contribute to the SDGs. There is a certain risk, that the digital divide might even be deepened where gaps in ICT infrastructure are prevalent and access to internet is precarious. Technical cooperation in higher education accompanied

Pedagogy dependent solely on e-learning lacks the social dimension of learning and the conveying of values and principles as advocated by the Agenda 2030. Capacity building in digital competences of academic staff, researchers, students and administrators needs to be addressed in respective development programmes.

7 Challenges for Development Cooperation

Development cooperation in higher education and STI programmes and their components face multiple challenges regarding.

• Disparity in prioritisation of sectors between the organization and partner countries

• Enhancing coordination (within the organization, within ministries and with partners)

• Ensuring policy coherence and programmes concerned

• Synergising complementarity and synchronisation of technical and financial cooperation

• Enhancing donor harmonisation

• Policy advice on harmonization of frameworks and policies

- Translating the goals and targets into action jointly with diverse actors from different sectors (public, private, civil society) in asymmetries regarding power, resources and capacities

- Synergistic collaboration of development cooperation with higher education and research and innovation actors in building capacities for sustainable development in general and for STI in particular. This will imply integrated concepts and results models of sectoral development programmes.

- Lobbying for long-term investment in long-term HE-Programmes in comparison to quick-win/impact measures.

A great challenge will be the capacitating of partners to monitor the SDGs as there is a lack of viable statistical data and harmonized data systems. The empowerment of partners in this aspect is hence an absolute must.

It could be discussed whether the monitoring and evaluation should be linked to ex-post results-based financing taking also into account good governance aspects.

Another structural problem is the logic of the development cooperation programmes which often have a short- or medium term duration while higher education and STI require an integrated long-term perspective to achieve viable outcomes and impacts.

A further structural problem refers to the general mandate of development cooperation agencies focusing on transformation in partner countries. The spirit of the Agenda 2030 is a more systemic one, encompassing all countries thus with implications for the industrialised countries as well. Governmental actors have to find a mechanism to mandate development cooperation agencies to re-link their activities to other actors, policy fields and sectors, in particular to the higher education and science sector but also to the economic sector in their own country to create a comprehensive impact cycle. Governmental development agencies are inherently prepared and suitable to play a key role as brokers for sustainable development.

A challenge for institutional and human capacity development will be on the imparting of values and principles as advocated in the Agenda 2030 into higher education and STI policies and strategies and translate them into teaching, research, governance and management.

Financing higher education as a public good globally, lobbying and advice on mobilisation of resources require commitment and engagement of all stakeholders, including private sector and civil society.

> → **Development cooperation has to establish sound partnerships between the private sector, higher education and STI backed by civil society**

8 Conclusions

The Agenda 2030 and the sustainable development goals provide an ambitious frame of reference for development cooperation. Higher Education and STI play a central role in achieving the goals and targets.

The holistic perspective on education, knowledge, skills and STI for a sustainable development reflects a paradigm shift in approaches to sustainable development.

The paradigm shift of a sustainable development approach based on a holistic perspective on education, knowledge and skills and its connection to STI have a great potential to foster employability, employment and entrepreneurship. This comprehensive approach is tackling core challenges of developing and emerging countries. The quality dimension can be strengthened by regional and international networking and partnerships.

As higher education and science, technology and innovation policies for sustainable development are key transformational forces in changing existing pathways globally, they should become a vital ingredient of development cooperation. A great potential lies in a concerted endeavour of human and institutional capacity building through higher education, science, technology and innovation for system transformation. Hence, development cooperation should recognise higher education and STI as a core partner. Harmonised policies, enabling frameworks, shared values and responsibilities will be the prerogatives to achieve a relevant transformative impact.

The strategic leverage for development lies in integrated approaches to key sector development in cooperation

with the public and private sector as well as with civil society supported by functional and dynamic higher education and STI systems. GIZ has a long tradition and broad experiences in technical cooperation with these approaches – always tailored to the specific contexts.

GIZ is hence well prepared to meet the new challenges arising from the Agenda 2030 with regard to structures, standards, processes, competences, networks and part-ners. Its internal Agenda 2030 Strategy and standards tailored to the SDGs as well as its "Capacity Works" management concept with its multi-level approach and multi-stakeholder involvement provide a sound basis to facilitate global transformation. Its vision of working to shape a future worth living around the world reflects the spirit of the Agenda 2030 and its Sustainable Deve-lopment Goals. It has embarked on an encompassing di-alogue and has implemented various working groups to further align its strategies and refine its activities towards the Agenda 2030 as frame of reference.