Thünen Institute´s Engagement in Africa

Overview – 2018/2019

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Contents

Abbreviations

AGMEMOD	Agricultural Member State Modelling for the EU and Eastern European Countries
AK	Thünen-Institute of Climate-Smart Agriculture
ARS-AfricaE	Adaptive Resilience in Southern African Ecosystems
AT	Thünen-Institute of Agricultural Technology
AWA	Ecosystem Approach to the management of fisheries and the marine environment in West African waters
BMBF	Federal Ministry of Education and Research
BMEL	Federal Ministry of Food and Agriculture
BMZ	Federal Ministry for Economic Cooperation and Development
BW	Thünen-Institute of Farm Economics
CEM-CV	CoastalEcosystem Monitoring Cape Verde
COFISHMAP	Contaminated Fish Habitats in Morocco
ECOWAS	Economic Community of West African States
EFTEON	Expanded Freshwater and Terrestrial Environmental Observation Network
EMS-Africa	Ecosystem Management Support for Climate Change in Southern Africa
EU	European Union
FG	Thünen-Institute of ForestGenetics
FI	Thünen-Institute of Sea Fisheries
GEOMAR Kiel	GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel
GIZ	German Corporation for International Cooperation GmbH[I]
HF	Thünen-Institute of Wood Research
ICAWA	International Conference “Ecosystem Approach to the management of fisheries and the marine environment in West African waters”
ICOS	Integrated Carbon Observation System
IMMPEX	Impact of meat and milk product exports on developing countries

ITTO	International Tropical Timber Organization
LaForeT	Landscape Forestry in the Tropics
MA	Thünen-Institute of Market Analysis
OF	Thünen-Institute of Baltic Fisheries
OL	Thünen-Institute of Organic Agriculture
SEACRIFOG	Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations
SF	Thünen-Institute of Sea Fisheries
TRAFFIC	Trophic TRAnsfereFFICiency in the Benguela Current
TRIATLAS	South and Tropical Atlantic climate-based marine ecosystem prediction for sustainable management
WASCAL	West African Science Service Centre on Climate Change and Adapted Land Use
WF	Thünen-Institute of International Forestry and Forest Econoics
WO	Thünen-Institute of Forest Ecosystems

1 Introduction

The number of research infrastructures and networks in Africa is constantly growing. At this time, a considerable number of very different research institutions at the university, public, private and international level can be found on our neighbouring continent.

In addition, cooperation with Africa has increasingly become the focus of German and European policy in recent years; this also applies to cooperation in the field of research and innovation. More or less high financial budgets of various German ministries and the European Union are driving research cooperation with Africa with regard to the respective political goals. The African Union is also promoting increased intercontinental research cooperation, for example through the joint platform with the European Commission, the so-called "High Level Policy Dialogue on Science, Technology and Innovation"[1]. Further national funding mechanisms have been established or are currently being set up by various African countries.

As far as Germany is concerned, several Federal Ministries are funding projects and infrastructures in Africa. However, this is still happening without sufficient coordination and agreement; sometimes the involvement of different ministries gives the impression of competition rather than a coordinated approach. As a result, the goals and approaches of the various funding institutions often remain visible only as individual beacons; in some cases they are even contradictory.

This finding is not new; it is quite easy to criticize this state of lack of coordination at the level of, e.g., federal ministries. But are we actually better at the level we can influence, such as at the level of the Thünen Institute as a federal research institute? In the course of the growing research funding for projects in and with Africa, due to the general process of internationalisation of research and innovation, but also in accordance with our own research interests and topics, the number of research cooperation of the Thünen Institute with African partners has increased in the last years. A number of specialist institutes have maintained contacts, networks and projects in Africa for a long time (see project list in the appendix) and are expanding these cooperation. But also here it becomes apparent: So far these cooperation have been rather isolated. Different specialist institutes are sometimes active in similar regions, sometimes with the same local partner organisations, without knowledge of each other.

The first step is to create an internal Thünen transparency in order (a) to benefit from the existing knowledge of our colleagues at the Thünen-Institute and to support each other with information on contacts and experiences and (b) to use the economic, scientific and technological competence of the Thünen Institute in the future to work on questions in the context of Africa in a coordinated way and, if necessary, together.

[1] https://www.africa-eu-partnership.org/en/projects/eu-africa-high-level-policy-dialogue-hlpd-science-technology-and-innovation-sti

The present document is intended to help create this transparency by providing an overview of the existing diversity of cooperation and the experience gained with cooperation in Africa. This is intended to initiate and promote exchange, recognition and coherence within the Thünen Institute about cooperation and projects with and in Africa.

2 The science sector in Africa

Due to international funding and national policies, the science sector in Africa is constantly growing. Research that was conducted on Africa rather than with African partners has now been recognized by many donors and research institutions in Germany and Europe as an undesirable development and is therefore on the decline. Nevertheless, the science sector in many areas in Africa is still dominated by Europe. Research collaborations and research funding are often characterised by historical, colonial structures, even though a great deal of work is being invested in the development of intra-African research and research funding structures.

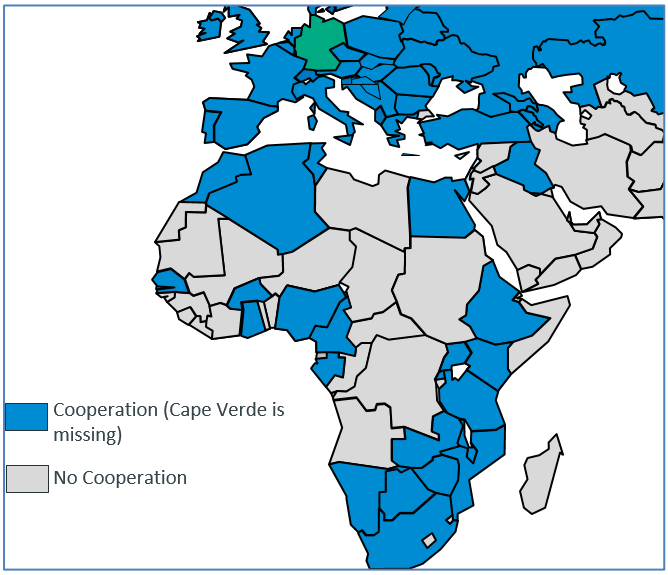
The science sector in Africa is very heterogeneous. This is understandable at first sight, because, among other things, the size, the specific discipline, the required scientific infrastructure and the financial resources vary greatly in the 54 African countries. For all 54 countries, and also for all disciplines, however, the following applies: In a global comparison, a below-average number of Africans write a doctoral thesis or work in the academic sector, although the number of those who attain a higher level of education is increasing overall on the continent. Another hurdle is that there are few well-paid jobs for highly educated academics in many African countries. As a result, many academics leave the continent for at least part of their careers. Many take advantage of opportunities to live and work in other parts of the world permanently. This “brain drain” continues to be a major obstacle to the establishment and expansion of independent, sustainable research structures in many African countries. It is important to consider these backgrounds in order to establish and maintain sustainable cooperation between the Thünen Institute and African partners.

Africa is confronted with two parallel developments, which together represent a special challenge: On the one hand, the population of the continent will grow at an above-average rate in the coming decades. On the other hand, the adverse consequences of climate change will primarily affect Africa. This is the basis for the corresponding priority topics, especially for agricultural research in Africa: Food security, climate resilience of agricultural production systems while at the same time increasing efficiency and production (further development of low input-low output systems to low input-medium output systems). Also combating pre-harvest and post-harvest losses through better crop protection, optimised crop storage and transport chains that are as loss-free as possible, use of digital possibilities for better market transparency and improved market access, etc. In general, digitisation offers enormous opportunities for networking among actors, information transfer and targeted advice. The existing research and transfer structures in many African countries are not yet sufficiently well positioned to meet the resulting requirements. However, the necessary framework conditions are also decisive for an independent, efficient science and transfer structure: Appropriate governance structures on site, a clear focus on transdisciplinary research and extension - also with regard to women as those on whose shoulders

practical agricultural work lies in many African countries. In addition, however, the focus should also be on building sustainable structures on the ground (capacity building).

Current agricultural research on the continent currently concentrates mainly on issues that have a direct impact on the local population, i.e., applied research. This is appropriate and correct. However, the existing incentive systems in the scientific sector do not give enough recognition to applied research: The performance and excellence of a researcher is still measured primarily by the scientific impact (peer-reviewed publications, third-party funding, number of doctoral students). Applied research or even knowledge-based practical implementation with local actors on-site cannot usually be published in high-ranking specialist journals and is therefore not sufficiently rewarded in the current "canon of excellence". For some years now, however, there have been initiatives in Germany and Europe to integrate the practical or societal impact of research work into the evaluation systems of scientific performance; this will be particularly important for the commitment of all researchers for and in Africa in the future.

3 Thünen Institute's Engagement in and with African Institutions



In 2019 alone, the Thünen Institute cooperated with 57 different partners in 23 different African countries (see Figure 1). These cooperation range from simple data exchange to the processing of concrete research questions to the joint training of doctoral students. Some of the collaborations have grown over long periods of time; others are temporary projects based on third-party funding. In the following, the different activities of the Thünen Institute in and with Africa are presented.

Fig. 1 Thünen-cooperation based in African countries (2018-2019)

3.1 Global food Security – a Cross-Sectoral Topic

The issue of world food security is of particular relevance to the African continent. The agricultural, food-producing sector provides more than half of all formal and informal jobs in Africa. Food production has increased in Africa in recent years, but the population is also growing steadily. The noticeable changes in rainfall, droughts and temperatures caused by climate change on the continent have a negative impact on the conditions for food production. In addition to agricultural production, fisheries, aquaculture and new production methods for aquatic organisms are playing

an increasingly important role in the future supply of proteins and micronutrients to the population.
The Thünen Institute for Market Analysis acts as the BMEL's "first point of contact" on the subject of world food supply, but other specialist institutes are also working on the subject across sectors. With the thematic field "World Food and Global Resources" the Thünen Institute has started to make the information on the activities of the individual specialist institutes in this field transparent and thus accessible for coordinated and, if necessary, joint processing in the future. The majority of the relevant Thünen projects in Africa address the issue of food security.


Fig 2 Poultry farming in Ghana © ThünenInstitut MA, D. Weible

International trade, but also regional agricultural market policies have an influence on the agricultural market and local user behaviour. One example: Poultry meat exports from the EU to West Africa have come in for widespread public criticism. But how strongly do these exports actually influence the local market, and what conclusions can or should West African agriculture draw from this? Therefore, e.g., in the project "Consumer preferences for poultry meat in Ghana" the motives of consumers in Ghana for the preference of poultry meat of different origins are investigated. The investigations will evaluate the effects of the trade agreement between the EU and Ghana or ECOWAS. Based on this, the IMMPEX project will investigate the economic impact of meat and dairy product exports on Ghana and Senegal.

The Thünen Institutes of Organic Agriculture and Agricultural Technology have been working together on the LandLessFood project since 2019. Questions that the project wants to answer are: How can the world be fed in the Year 2100 when the world population is estimated to have grown to over 11 billion people? By then, arable land suitable for conventional land production is likely to have shrunk enormously, especially in Africa. At the same time, even conservative estimates predict that Africa's population will have tripled by then. For this reason, the project is evaluating innovative approaches to use innovative fermentative processes to produce as much food raw material in a square metre bioreactor as is normally produced on one hectare of arable land.

3.2 Long-Term Networks and Research Infrastructures

A special feature - and at the same time a particular strength of the Thünen Institute - is the performance of long-term monitoring tasks in order to carry out research on the basis of time-series-capable data sets and to advise policy makers. Examples are the Federal Forest Inventory, which is carried out every ten years; the Greenhouse Gas Reporting from agriculture; the Soil Condition Survey for Agricultural and Forestry land, or the monitoring of fish stocks in the North and Baltic Seas. Accordingly, the expertise of the Thünen Institute in the development of long-term networks and scientific infrastructures is high. Several working groups at different Thünen Institutes aim to extend such long-term structures to Africa or to intensify such already existing cooperation with African partners. This is both an opportunity and a responsibility for the federal research institutes, because their higher share of institutional funding compared to universities and other research institutions, combined with a lower dependence on temporary projects based on third-party funding, enables them to link research with capacity building and policy advice for and in Africa in the long term. The Thünen Institute is making increasing use of these opportunities, and various cooperation projects with a focus on Africa have already been established, some of which are successful in the long term.

The Thünen Centre of Competence on the Origin of Timber is an association of three forestry institutes (Forest Genetics, Wood Research, International Forest Management and Forest Economics). The aim of the centre is to clearly identify timber origins in order to prevent the import and trade of illegally logged timber and wood products and to strengthen the markets for legally traded timber. If, during inspections, doubts arise about the correct declaration of the timber, or if there is suspicion that protected timber species are being traded, the Thünen Centre of Competence on the Origin of Timber makes its expertise available. It is able to determine wood samples without doubt at the level of genus or species and can verify information on the geographical origin of the wood for an increasing number of tree species. The Competence Centre is the central contact point for authorities, the timber trade, consumers and associations for questions regarding the species and origin of wood and wood products.

Fig. 3 Workshop on taking wood-samples in Kenia © Thünen Institute FG, C.Blanc-Jolivet

The Thünen Institute for Wood Research maintains one of the world's largest scientific wood collections with samples of 12,000 tree species and 50,000 microscopic preparations. Many of these samples and specimens come from Africa. They serve as reference material for the macroscopic or microscopic determination of samples of raw or processed wood. Charcoal can now also be examined in this way. Furthermore, the wood samples serve

as a reference for the establishment of a genetic database.

The Institute of Forest Genetics develops genetic barcodes to control the tree species and prepares genetic reference maps to verify the geographical origin of the wood. In addition to these two tools for genetic species and origin control, genetic fingerprints can be used to offer procedures that allow valuable trees to be traced individually along the processing and transport chain in a forgery-proof manner. In Kenya, Cameroon, Congo, DRC, Gabon, Ghana, Nigeria and Ivory Coast, for example, samples were collected in the respective distribution areas of certain tree species to serve as a genetic and chemical reference for the species and origin of the wood. The data are provided by the Global Timber Tracking Network (GTTN). In parallel to sampling and analysis, researchers from Africa are trained and investments are made in local reference laboratories so that proof of origin can later be provided in the countries of origin. The anatomical comparisons, chemical and genetic references can be used to narrow down the national origin of wood and even the area where the wood was felled. Illegal logging can thus be traced in Africa.

The Thünen Institute of International Forestry and Forest Economics examines and further develops forest certification systems in the context of the Competence Centre. In doing so, it checks the equivalence of certification systems with the established systems PEFC and FSC in the context of public procurement of timber products. It offers the verification of legality documents and advises market participants who are placing timber products on the EU market for the first time. The institute examines the implementation of the legal situation in Germany and the resulting costs for German companies. Changes in procurement procedures and shifts in procurement markets are identified. By analysing international trade flows, it is examined whether and to what extent trade flows are diverted to countries with lower environmental standards, thus undermining the goal of preventing illegal logging.

Third-party funded project activities, e.g., the project "LargeScale" of the Thünen Institute of Forest Genetics or the project "LaForeT" of the Thünen Institute of International Forestry and Forest Economics on the influence of political instruments on deforestation and reforestation processes in Zambia and elsewhere, support and complement the work of the Centre of Competence. Problems arising in such projects should not be concealed: The Institute of Forest Genetics, for example, has purchased equipment for the genetic analysis of wood samples and trained local staff in the use of the equipment. An extended use of the equipment for genetic analysis of wood and other plants would also be possible. However, this is not certain, as project funding is coming to an end and it is unclear how the laboratory structures created will be maintained and operated by the local partners.

Fig. 2 Harvested sugarcane at Cape Verde © Thünen Institute, V. Jorch

The globally active network *agri benchmark,* currently a partner with over 40 countries – to further the understanding agriculture worldwide was founded in 2006 by the Thünen Institute of Farm Economics and the DLG. In the meantime the network acts independently, even though many of the scientists involved are employed at the Thünen Institute. The network is divided into different subnetworks: "Beef and Sheep", "Cash Crop", "Dairy", "Pig", "Horticulture", "Fish" and "Organic". For all these sub-networks, economically relevant data on the respective production systems are collected and analysed and then information is prepared for the network partners. The information provides insight into future economic trends on the global agricultural market and helps the network partners to align their production systems and market structures accordingly. The number of African institutions that can feed their data into the network and at the same time use the data of all other participating countries is growing year by year. *agri benchmark* is one of the Thünen activities with the most partners in Africa; in 2018 a total of 18 African institutions were active in the network.

Within the framework of the project "AGMEMOD goes Africa" by the Thünen Institute for Market Analysis, the effects of new agricultural policy and market-related framework conditions are analysed in detail in their economic dimension for selected African countries. Together with colleagues in Ethiopia, Kenya, Uganda, Tanzania and Rwanda, market models are being developed with AGMEMOD to project the future supply situation with domestic and imported food.

3.3 Project examples using monitoring based Thünen databases

Only few of the activities of the Thünen Institute with Africa described under point 3.2 could be realised as long-term cooperation from the very beginning. As a rule, such alliances start as temporary projects financed by third parties, and only under favourable conditions can they be subsequently consolidated in such a way that a permanent partnership is created. This can be criticised; but on the other hand, this genesis of long-term networks and joint infrastructures can be described as normal in the scientific world. On the one hand, the partners on both sides have to build up trust during the course of a project and gain the conviction that long-term cooperation is worthwhile and fruitful; on the other hand, donors must also gain the insight that long-term investment in research cooperation or capacity building makes sense.

This is why the Thünen specialist institutes use the opportunity to raise third-party funds for temporary projects with and in Africa with the aim of creating long-term cooperation in one case or another. The conditions for this are favourable in so far as the Thünen Institute, due to its experience in setting up and operating time series-capable monitoring systems (see first paragraph under Point 3.2), can contribute above-average methodological competence in the analysis and evaluation of natural resources and protected assets to such projects. This is particularly attractive for the relevant gain in knowledge and the measures derived from it for sustainable land use, fisheries management, etc., in African countries.

Fig. 3 Maintanace of a greenhouse gas measurement tower in The Karoo, South Africa © Thünen Institute AK, J.Ch. Jüdt

The ARS AfricaE project coordinated by the Thünen Institute of Climate-Smart Agriculture was a joint project with a total of four German and seven South African partner institutions. The project results are to serve the improved management of savannah ecosystems. In the ARS-AfricaE project, greenhouse gas measuring towers were established at two agricultural sites in South Africa. During the duration of the follow-up project EMS-Africa, these will be integrated into the South African monitoring network for terrestrial and freshwater ecosystems "EFTEON". At the same time, doctoral students will be trained. They will evaluate the data collected by the monitoring towers and draw conclusions about the surrounding ecosystem. In the long term, the measurement infrastructure is to be handed over to the South African partner structure and a long-term cooperation based on data exchange shall be established.

The EU-funded SEACRIFOG project also focuses on greenhouse gas monitoring in Africa. In cooperation with sixteen institutions in Europe and Africa (six in Africa, ten in Europe), a plan is being drawn up to establish an efficient Africa-wide infrastructure for greenhouse gas monitoring. The project will combine considerations of technical, economic and political feasibility. The experience gained from ARS-AfricaE and from the ICOS consortium (ICOS = Integrated Carbon Observation System) will be incorporated. ICOS is a Europe-wide scientific infrastructure that serves the comprehensive detection of greenhouse gases.

With the project "Restoration of Forest Utilisation Potentials and Ecosystem Services in Africa" the Thünen Institute of International Forestry and Forest Economics pursues the research goal to comprehensively analyse the potentials and limits of the restoration of forest landscapes and to develop best practice concepts. To this end, field work is being conducted in Ethiopia as an example, but the results are also to be transferred to other African countries with comparable site conditions. The project will identify, analyse and classify different silvicultural options for the

restoration of forest landscapes as well as ecosystem services for different land user groups under cost-benefit aspects. The five-year project was launched in 2019. The work is being carried out in cooperation with the Thünen Institute of Forest Ecosystems.

Within the framework of the COFISHMAP project of the Thünen Institute of Fishery Ecology, images and genetic barcodes of various fish and crustacean species have been and are being created with cooperation partners from Europe, Morocco (University of Rabat), Cape Verde and Gambia. These were stored in the specially developed database "aquagene"[2]. As with the Thünen Centre of Competence for Timber Origins with regard to timber identification, a comparison of fish samples with the database can detect false declarations of fish catches and processed fish products. The export of fish products from West Africa to Europe is an important economic factor for both regions. Proof of species or quality by means of barcodes is of mutual interest for this trade.

3.4 Education and Knowledge Exchange

Long-term bilateral networks, scientific infrastructures, databases and policy advice can only be successfully implemented and operated if a sufficient number of well-trained researchers, laboratory staff, technicians and consultants are available and employed in the target regions. Furthermore, research in rural areas is only efficient if it serves the local population. The effectiveness of research cooperation between the Thünen Institute and African partner institutions is greater if there is sufficient understanding and sound knowledge of the target region on the Thünen side. Therefore education and knowledge exchange is a central topic of many Thünen activities with and in Africa. The approach to the topic varies depending on the target group and the approach of the respective cooperation.

In many projects, the training of postgraduates runs alongside the scientific tasks. The training of postgraduates is a cornerstone of the BIOHOME project of the Institute of Wood Research . BIOHOME is run in cooperation with the universities of Hamburg (Germany), Stellenbosch (South Africa) and Addis Ababa (Ethiopia). This project is part of the BMBF partnership for sustainable solutions with Sub-Saharan Africa. The programme aims at measures for research-driven, integrated further- and continuing-training. Students work in cross-border working groups on the assessment and use of secondary resources (ash, plastic waste, wood residues). These are used to develop composite materials for social housing in the target countries. The project trains a total of 12 doctoral and master students, develops e-learning components and builds the basis for corresponding curricula.

[2] www.aquagene.org

Fig. 6 Walter Herwig III at Senegal's shores© Thünen Institute SF, H. Fock

In the project "Ecosystem Approach to the Management of Fisheries and the Marine Environment in West African waters (AWA)" of the Thünen Institute of Sea Fisheries, the decision was made to train PhD students in various African countries. Eight PhD students from Senegal, Ivory Coast, Mauritania, Gambia, Ghana and Nigeria completed their research for an ecosystem approach to fisheries management in West Africa. An accompanying summer school, for which the research vessel Walter Herwig III of the Thünen Institute sailed to Senegal, was integrated into the training plan. As there are only a few research vessels in Africa, some of the participating African marine biologists had the opportunity to work at sea for the first time. In the TRAFFIC project, in which the efficiency of material and energy flows through the food webs in the Benguela Current is being researched by scientists from the neighbouring countries Namibia, South Africa and Germany, the students remain at the partner institutions in Africa, but in some cases spend several months researching in Germany. Conversely, German doctoral students and scientists travel to Namibia and South Africa as guest researchers. The joint field research will be implemented via two expeditions with German research vessels in the Benguela Current off Namibia and South Africa. These research trips are planned and implemented together with partners from southern Africa.

Cape Verde was included in the BMBF-funded WASCAL programme in 2017. Within this framework, a Master's programme in marine research was established at the University of Cape Verde in Mindelo, which started in June 2019. Students from the WASCAL countries (Benin, Burkina Faso, Cape Verde, Ivory Coast, Gambia, Ghana, Mali, Niger, Nigeria, Senegal and Togo) can apply. In the first phase of the Master's programme, the Thünen Institutes for Sea Fisheries and Fishing Ecology will be involved in addition to the University of Kiel and GEOMAR Kiel in order to teach courses locally. The CEM-CV project under the umbrella of the BMZ's Sea Knowledge Initiative also started in 2019 and involves cooperation with German and Cape Verdean institutions. The aim is to develop a sustainable concept for coastal zone use with broad participation of the local and regional population and interest groups. Participation takes place through local working groups, working sessions at regional conferences and a website. The Thünen Institute for Sea Fisheries cooperates with the University of Cabo Verde to collect data on small-scale fisheries. In the EU-funded project TRIATLAS, which is co-ordinated by the Thünen Institute of Sea Fisheries, an overall assessment of the marine ecosystems of the tropical and southern Atlantic is being carried out. The synthesis of the regional results is carried out with the participation of partner institutions from Cape Verde, Senegal, Ivory Coast, Benin, Angola, Namibia, and South Africa. Annual

conferences provide an opportunity for internal project exchange as well as for setting special regional priorities and involving other scientists. Capacity building is supported by summer schools and a new network for the exchange of postgraduates and students, the 'Cross-Atlantic Network for Excellence in Marine Science' (CANEMS).

Since July 2019, the Thünen Institute of Climate-Smart Agriculture coordinates the integrated capacity building initiative within the BMBF programme "SPACES - Science Partnerships for the Adaptation to Complex Earth System Processes in Southern Africa". The SPACES programme funds projects for research into complex ecological processes in Southern Africa, which are implemented by partners from Germany and Southern Africa. The Thünen Institute of Climate-Smart Agriculture and the Thünen Institute of Sea Fisheries are each involved in a SPACES-funded project (EMS-Africa and TRAFFIC). The project homepage https://spaces-training.org serves as a platform for information on all summer schools, trainings and workshops that have been or will be conducted in the SPACES project. Registration for these events is also done via the above mentioned website hosted and maintained by the Thünen Institute.

Fig. 4 PhD Summer-School 2019 © Thünen Institute, H. Haavisto-Maier

The analysis of economic potentials, risks and opportunities of agriculture cannot be monocausal for any region of the world or limited to individual factors; rather, the multitude of complex interactions and feedback effects must be taken into account. In Germany and other European countries there are different simulation models for this, including AGMEMOD. With their help, it can be assumed what level prices, supply, demand and trade could have in ten years. Within the framework of the project "AGMEMOD goes Africa" the Thünen Institute for Market Analysis analyses the effects of new agricultural policy and market-related framework conditions in their economic dimension in detail also for Africa. Together with colleagues in Ethiopia, Kenya, Uganda, Tanzania and Rwanda, the AGMEMOD model is currently being further developed to project the future supply situation with domestic and imported food. Regular training activities (three-day workshops, webinars, summer schools and guest scientists in Germany) enable the transfer of knowledge. Since 2013, scientists, policy advisors and decision-makers in Kenya, Uganda, Rwanda and Ethiopia have been trained in the use of the model and the development of resulting policies.

The LaForeT (Landscape Forestry in the Tropics) project is not only engaged in scientific work but also in the expansion and strengthening of transnational knowledge exchange. 33 scientists from 12 different countries and more than seven scientific disciplines are involved in the development

and analysis of drivers of deforestation and forestation in the tropics. The strong multicultural as well as multidisciplinary orientation results in a colourful portfolio of perspectives and approaches that enriches scientific analysis and the general exchange of knowledge. In Germany as well as in the project countries, numerous students benefit from the multi-year project through employment as doctoral candidates, student assistants or by realizing their final theses (MSc & BSc). In all project countries, cooperation with local research institutes, e.g., universities, has been established and local offices, traditional authorities and numerous residents have been integrated into the project. In this way, not only an exchange of knowledge between the scientists but also with the population and local experts could be realised and trust could be built up. The project will end with a final visit and event where the results will be shared and discussed with stakeholders. This will strengthen the link between science and practice and further develop close cooperation between scientific institutions and governmental and non-governmental organisations. In this way, the project attempts to distinguish itself from other science projects in which data is collected abroad but analysed and published in Germany.

A further, so far still small component in the knowledge exchange with Africa are stays of guest scientists who travel to Germany with short-term scholarships or within the scope of longer-term cooperation to do research and learn in the laboratories and research infrastructures of the different Thünen specialist institutes. Due to a cooperation between the Thünen Institute of Agricultural Technology and the Makerere University in Uganda, a PhD student comes to Braunschweig for a few months every year to use the laboratory infrastructure and to exchange professional experiences. This cooperation leads to a close exchange on a professional level, the deepening of which is now going into the second round through a further research grant application.

Due to their professional expertise, actors at the Thünen Institute are often asked to act as short-term experts for various development cooperation agencies in African countries. Teaching activities at local universities and research institutions are generally perceived by the Thünen actors as enriching for both sides, whereas a long-term teaching cooperation is preferable. Short-term assignments as consultants are seen more critically: On the one hand an added value for the target country is usually only achieved as long as the Thünen experts are familiar with the cultural background of the country (and in the best case also speak a national language). This is hardly possible, especially when working for the first time in a target country, within the short assignments which often last only two months. Before one has familiarised oneself with the local structures, got to know the acting and deciding persons and has built up a relationship of trust with them, time is already up. On the other hand, the outgoing experts also benefit from the fact that they can expand their own horizons through intercultural experience and by looking at their own area of expertise in a foreign environment. Even for this, an assignment that lasts only a few weeks is hardly sufficient.

3.5 Policy Advice

As one of the federal research institutes in the Federal Ministry of Agriculture and Food (BMEL) division, the Thünen Institute is requested for scientific policy advice by the BMEL itself, by other national ministries and bodies, by the EU and international bodies, by non-governmental organisations, parties or associations. The Thünen Institute develops scientific reports or decision support on the basis of its own research and conducts policy impact assessments, e.g., on the limitation of greenhouse gas emissions, on the economic and ecological effects of the next reform of the EU agricultural policy or on the further development of fishing quotas. This experience is an essential part of what the Thünen Institute also brings to its work with African countries, whether in temporary projects or longer-term networks and cooperation. In addition, this expertise is increasingly in demand from the African side in the run-up to possible cooperation. Regular visits of groups of African scientists, parliamentarians and representatives of African ministries of agriculture, for example, are part of this. They inform themselves about the structure and working methods of the Thünen Institute in research and policy advice, the communication between science and politics, the development and financing of the German research landscape, etc.

List of associated colleagues

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