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Employment for rural Africa

COVID-19

How to cope with
the crisis

ZANZIBAR

Women algae farmers
facing ruin?

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Dear Reader,

On the 11th March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic, referring to the more than 118,000 cases confirmed at the time in over 110 countries. Today, a little more than three months later, the WHO states that world-wide, more than 8.5 million people in 216 countries and regions have tested positive for the virus, six million of them alone between mid-April and mid-June. Over 455,000 people have died as a result of the disease, more than half of them in the USA, Brazil, the UK, Italy, France and Spain, according to the official Johns Hopkins University statistics.

In reality, things are probably much grimmer. For in many countries, hardly anyone is even tested for the virus. For example, regarding Brazil, numerous scientists and representatives of various organisations assume that at least seven times as many people have become infected than is officially known – which would mean over seven million people alone in this South American country. And we are still far away from the all-clear. “The pandemic is accelerating,” said WHO Director-General Tedros Adhanom Ghebreyesus in Geneva, Switzerland, on the 19th June, reporting that on the day before, more than 150,000 new infections had been recorded, more than ever before on a single day. Almost half of the cases recorded came from the Americas, with large numbers also from South Asia and the Middle East. “The world is in a new and dangerous phase,” the WHO Director-General warned. Even though it was understandable that countries wished to end social isolation and open up their economies, he called for extreme vigilance as to the spread of the virus.

As is always the case in times of crises, it is the already most vulnerable who feel the brunt of the pandemic: the estimated 55 per cent of the global population who have no access to social protection; the just below 80 million forcibly displaced people, 80 per cent of whom are living in countries or territories affected by acute food insecurity and malnutrition anyway; the more than 365 million children who are often missing their only daily meal now that schools are closed world-wide; the millions of women and girls whose risk of being affected by gender-based violence, being forced into early marriage or dropping out from school has increased; and last but not least, the countless people living on the periphery of society because of their ethnicity – be it in the Global North or the Global South.

A small ray of hope comes from Ghebreyesus’ colleagues in Italy, where the UN Food and Agriculture Organization (FAO) has arrived at the conclusion in its recently published Food Outlook that “a COVID-19-induced global food crisis is not on the hori-

zon”. Today, the FAO argues, the world food economy is significantly better prepared for the shocks that characterised the global food (price) crisis in 2007/2008 – with positive global food production prospects, high stocks, low international food prices, a broader-based trade with more importing and exporting countries,

collapsed energy prices and stable fertiliser and input prices. With food being the most fundamental need, global and national food systems should be regarded as on a par with health systems, it demands. And this, it argues, means that farmers and agricultural workers are placed on the same footing as health workers engaged in fighting COVID-19 – a demand also underscored by our authors.

There is a further – at least temporary – glimmer of hope from Africa. So far, both numbers of infections with Sars-CoV-2 and fatalities have been low in comparison with other world regions. This could be due to restrictions being introduced at an early stage – based on experience in handling Ebola and other epidemics. The majority of the population being young could be a further explanation. In connection with the rapid economic transformation that the continent is undergoing, this was the reason for our giving it particular consideration in our “employment” focus.

As both our author Beatrice Gakuba and some of the farmers speaking out in our magazine note, for many people in the Global South, hunger is closer and more dangerous than COVID-19. And for them, social distancing tends to be more of a danger than protection. Let’s hope that a response to both threats can be found as soon as possible, and for as many people as possible.

On behalf of the editorial team,

Silvia Richter

You can find the latest information on COVID-19 at www.rural21.com

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Global cooperation is the only way to cope with the crisis

In a large number of countries, the impacts of the Corona pandemic are not only going to dramatically worsen the health and food supply situation but will also result in severe income and job losses. In particular, the huge amount of people working in informal or precarious employment relationships will be affected. In addition to swift support in containing and mitigating the crisis, it is all the more important to make the agriculture and food sector more resilient in the long run. And this requires a joint effort, our author maintains.



By Gunther Beger

Life has undergone fundamental changes since the first case of COVID-19 was confirmed in the Chinese city of Wuhan in December 2019. This applies to all of us, throughout the world, although the pandemic is going to have the most severe impact on those countries and people that are already faced with poverty, hunger and poor governance.

In the densely populated neighbourhoods of our partner countries, it is hardly possible to enforce social distancing regulations, and especially in rural regions, even in normal times, millions of people have no access to clean drinking water, not to mention disinfectants. Health systems are fragile, while protective clothing, respiratory equipment and skilled staff are lacking.

However, focusing solely on the health sector means ignoring other crucial aspects. In most African countries, COVID-19 is not merely going to trigger a health crisis, which would be dramatic enough, but it will lead to a combined health and food crisis that will be significantly aggravated by losses of income and employment. In some African countries, fruit and vegetable prices have already risen sharply.

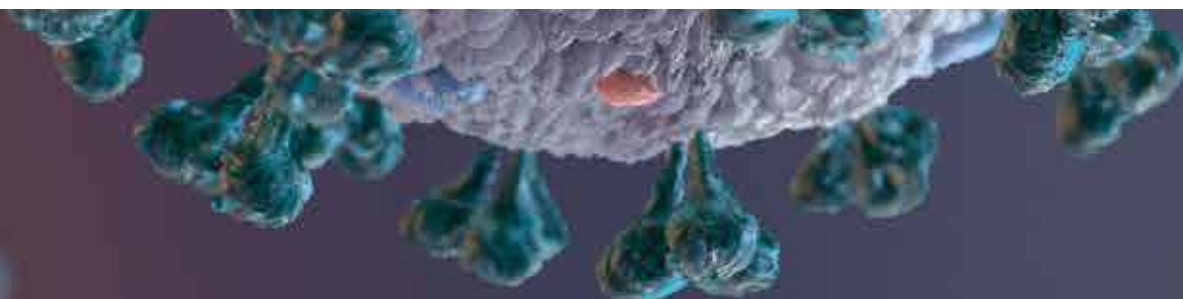
Such price hikes hit the poor groups of the population especially hard. Already before the pandemic, they had to spend most of their income on food. The large numbers of people working in the informal sector in Africa, Asia and Latin America are particularly severely affected. Alone in the first month after the crisis had started, more than 80 per cent of income was often lost. There are fears that owing to the limited availability of healthy and nutritious food such as fruit and vegetables on the one hand and a lack of purchasing power on the other, under-nutrition and malnutrition will increase markedly, especially among children.

From our partners across the world, we get reports giving accounts of the negative impacts that the pandemic is having on agricultural production and food security as well as of huge income and job losses. In many countries, the considerable restrictions on freedom of movement are leading to labour shortages and problems with logistics and transportation. The lack of rural workers is going to result in severe harvest losses, especially where labour-intensive products such as fruit and vegetables are concerned. Normally, in many

areas, the planting season started in May. Now it is acutely threatened – and without sowing, there will be no harvest. At the same time, curfews are causing severe income losses, with whole families struggling for their livelihoods. The economic crisis has also raised the threat of casual and unprotected employment becoming established on a long-term basis. A major share of people in Africa are still working in informal and precarious employment relationships, without contracts and social security.

The pandemic has caused disruptions in supply chains of inputs such as seed, fertiliser and animal feed because of borders being closed and travel restrictions within individual countries. Further processing, transportation to local markets and access to export markets are severely restricted, too. Smallholder farms depending on functioning supply and value chains to secure their livelihood threaten to slide into the subsistence economy, with drastic income losses.

In Kenya, for example, owing to the lockdown prescribed by the government, only the most important markets continue to operate. Supply



chains to and from remote regions are disrupted. Milk now seldom arrives at the collecting points. Most micro-farms are starting to consume their own milk again or are selling it in small quantities, e.g. to neighbours. However, without storage, transportation or cooling facilities, this is only possible to a very limited extent. Most of the milk goes bad, meaning that the prime source of income is lost. At the same time, supplies for the urban population are also lacking.

Like in past times of crisis, one can see countries beginning to resort to protectionist measures. For example, in late March, the government of Kazakhstan imposed an export ban on a selection of food products, including wheat flour, sunflower oil, sugar, potatoes and various types of vegetables. The government of Vietnam, which is normally an important rice exporter to Africa, initially entered no new contracts for rice exports, concentrating on first building up local rice stocks in order to secure supplies for its own population.

Past experience has shown us that such trade restriction measures have a negative impact on all sides involved. Overnight, they threaten supply chains which it has taken a long time and a considerable effort to establish, and whose actors depend on one another, and thus they upset the market's balance. So it is all the more important to maintain global trade in food and get rid of the recently introduced export restrictions. This can prevent food shortages in various places and help achieve price stability on the world market.

So also, and particularly, for the trade sector, it is true that we will only be able to cope with this crisis through global cooperation, and not through isolation. The pandemic has shown us how closely everything is linked. No country is going to win the battle against the virus on its own. This is now the time of international solidarity with developing countries!

Germany's Federal Ministry for Economic Cooperation and Development (BMZ) is therefore financing a global corona emergency programme with seven focal areas:

1. Strengthening health and combating pandemics.
2. Food security, ensuring staple food supplies to avoid famine.
3. Stabilising refugee and crisis regions.
4. Social security, safeguarding jobs in global supply chains.
5. Safeguarding enterprises in key sectors such as textiles and tourism.
6. Securing the liquidity of governments.
7. Strengthening international cooperation.

Furthermore, in order to contain and mitigate the effects of the pandemic in the developing countries, we will provide immediate support, precisely because we are also partners in the long run. This applies in particular to the food and agriculture sector. The networks created by the initiative "One World – no hunger" launched by the BMZ are of particular value in this context. We are making use of the Green Innovation Centres operating in 14 African countries and in India and now reaching deep into rural areas with a network of tens of thousands of smallholders, small enterprises, farmers' organisations and federations as a basis for support tailored to each country and its current needs.

In Ethiopia and Benin, we are providing our partners with seed and small-scale machinery to ward off threats to planting, and we are also covering higher delivery costs. In Burkina Faso, we are helping to sensitise people towards COVID-19 via a radio programme. There, as well as in Malawi and Ghana, we are financing hygiene protection articles for our partners in production. In India, we are providing animal feed. In Tunisia, we are seeing to hygiene measures in the milk marketing sector and have supplied protective clothing to 1,500 harvest hands.

All these examples are a response to the highly individual needs of our partners in the respective countries. Direct support goes without saying when you have been working together closely with people and institutions for years. At the same time, it helps to make European solidarity with Africa more than just empty words, for a friend in need is a friend indeed.

However, to me, consistently orienting our policy on the Sustainable Development Goals (SDGs) and coherent, cross-sector intermeshing is also important. These global objectives are reflected in many instances, from the Paris Climate Agreement through the European Green Deal to our efforts to achieve more social and ecological sustainability in global supply chains. We must not question these political goals, as is already happening among those pursuing certain interests, but instead have to work towards them with even more determination.

Then there is the aspect that, despite its dramatic proportions, the crisis is also offering opportunities to change the world in a positive way. Not only is digitisation being accelerated in an unprecedented way. This also includes a timely discussing of how we can make agriculture more resilient towards future crises. How can we reshape value adding at local level, e.g. through more local processing of goods? How can we create broad access to training and further training measures by developing information and communications technologies in rural areas, in particular for young entrepreneurs? How can we counter the economic impact of the crisis and generate employment? What role can agroecology play? How can we improve the focusing of agricultural research e.g. in order to gain a better understanding of zoonoses?

This may be difficult to imagine today, for we are still at the very beginning of coping with this epochal crisis. Nevertheless, the clouds could have a silver lining in that we will be stronger and more united when we emerge from the crisis in a globalised world. That has to stay our goal.

Gunther Beger is Director-General of the Department "Policy issues of development cooperation; civil society, churches and private sector; rural development" at the Federal Ministry for Economic Cooperation and Development (BMZ) in Berlin, Germany.

What African farmers and processors have to say

The Economic Community of West African States (ECOWAS) estimates that COVID-19 pandemic risks food insecurity and nutrition of 50 million people between June and August 2020. The pandemic adds to other threats including climate change and recurrent drought as well as Fall armyworm (FAW) and locust infestations in West Africa. Agathe Diama, Head of Regional Information at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in West and Central Africa, spoke to farmers and other agricultural stakeholders in Ghana, Niger, Nigeria, Mali and Senegal about the impact that the outbreak of the COVID-19 pandemic has had and their concerns regarding the 2020-2021 cropping season.



Salamatu Garba, Executive Director, Women Farmers Advancement Network (WOFAN), Nigeria

“About 80 to 85 per cent of smallholder farmers whom we work with are at risk of losing all their dry season investments as a result of the lockdown due to COVID-19. More worryingly, there are almost no extension services, except for the skeletal visit-and-train system. Farmers and processors are left without field demonstrations. Farmers use old, traditional and obsolete farming methods that have further slowed down production. They’re disappointed that they cannot apply the second-phase urea fertilisers and appropriate pesticides, which are quite critical. Our fear is that the farmers will be able to feed neither their families nor the nation. The food security is dependent on their performance.”

“Although the shutdown approach is a global strategy to break the deadly cycle of the disease, the impact on economies is devastating. In order to mitigate the shock of the pandemic and its related effects on smallholder farmers and processors, building capacities and providing financial and marketing support for the first six months of the closedown would be essential.”

“E-extension becomes very important as an innovative way of working with extension workers and farmers. Farming needs to be led by information and communications technology (ICT), and should turn into a demand-driven vocation. After the pandemic is over, the impact on the nation and the need for Nigeria to diversify from an oil-dependent country to one with an agriculture-led and technology-driven agribusiness systems will require a re-shaping and re-thinking of our agricultural models.”



Fanta Diamoutene, President of women farmers group in Farakala, Mali

“Most farmers like me do not have these smartphones and other virtual platforms that those in the cities are using to connect, and we do not have the knowledge to hold such virtual meetings. Therefore, we are very concerned about missing the season’s activities. We hope that partners will help us get some protection kits in the near future, pending a solution to this pandemic.”



Stella Thomas, Managing Director, Techni Seeds Limited, Nigeria

“At Techni Seeds we perceive COVID-19 as a setback for agricultural business. The pandemic is already affecting business because costs of haulage and inputs have doubled, with no availability of labour. So, we are trying to create an online presence for sales and increase machines to reduce human labour. It takes almost two weeks to move goods from Kano to Ibadan due to interstate issues and bad vehicles. It is a trying time for everyone, but it will pass. Let's keep safe and keep looking out for new ways in seed agribusiness.”



Ibrahima Diouf, President of the Groupe d'Interet Economique (GIE) Jambar, Meouane, Senegal

“In Meouane, we are well aware that this is a global phenomenon and we are trying our best to keep ourselves safe with preventive measures such as lockdown and social distancing. We also perform prayers to ask for divine grace. Due to the geographic location of our village (about 150 km from Dakar) and the scattered distribution of the houses in the village, we strongly believe we will keep safe from the pandemic.”

“The GIE usually receives pre-basic seeds of millet and peanuts from ISRA, the Senegalese agricultural research institution. Due to the COVID-19 outbreak in Senegal in early March, we have not yet received the seeds. Also, the seeds we produced last year still need to be certified, packaged and distributed to farmers. All the processes have been stopped due to the pandemic, while the rainy season is about to start. Although the number of people tested positive has unprecedentedly increased – 100 people per day, on average, since the 1st of May – the government of Senegal has recently decided to unlock containment, allowing the seasonal workers to travel to rural areas. We are worried that this decision may favour the propagation of COVID-19 in rural areas.”



Photo: Agathe Diama / ICRISAT

Nasser Aichatou Salifou,
General Manager, Ainoma
Seed Farm, Niger

“From the start, we initiated awareness campaigns on preventive measures because we noticed that our producers were not informed enough about the pandemic. Currently, their concern is whether

they can go to the field when the rains come. In my opinion, awareness campaigns should be increased through community radios and posters / flyers to better inform farmers. There is still a lot of prejudice because producers are not informed enough about the disease, while those who have access to social media have wrong information or fake news.

“As for the pandemic, we are feeling the effects on marketing of our produce, and this could have an impact on our turnover. We have put some kits at our administration office and at our production site. However, our financial means do not allow us to reach producers or distributors with the kits. Although, right now, the marketing of food products is not too impacted by the pandemic, our worry is that the isolation of the city of Niamey prevents us from setting up inputs shops at our points of sales.

“Also, the training sessions that we generally offer our producers, agro dealers and technicians are being affected in particular because of the social distancing restrictions. We must continue to collaborate in order to adapt our solutions for meetings and training with farmers while respecting preventive measures. And, finally, we need our donors’ support to help raise more awareness about the pandemic.”



Photo: Agathe Diama / ICRISAT

Coulibaly Maimouna Sidibe,
CEO of Faso Kaba Seed
Company, Mali

“COVID-19 has slowed down our activities and reduced our revenues enormously this year. With no flights, we have missed many orders of inputs, including seeds, sprayers, pesticides, etc. that we import from overseas, and

due to restrictions in transport, it’s difficult to go into the field to buy inputs.

“We’ve had to cancel our annual meetings with farmers as they do not have the means to hold virtual meetings and make online purchases. The process of certification and provision of seeds to be distributed to producers of certified seeds will be delayed this year. This will lead to a lack of availability of seed for the production of certified seeds by individual farmers, associations and cooperatives.

“While normally our seed shops are equipped at this time of the year, we are still in the process of collecting samples. We ask our donors to please facilitate access to basic inputs even at subsidised prices. We need support for paying salaries to our staff. We will also need more preventive kits for the farmers’ field demonstrations and trainings this year. Virtual meetings have become essential, and our farmers need to be there.”



Photo: Agathe Diama / ICRISAT

Yalaly Traore, member of ULPC
(Local Union of Cereal Producers),
Dioila, Mali

“Farmers do not have the same perceptions about the pandemic. While some believe it does exist, others think it is a government policy to make money. However, they all agree on one thing: this pandemic is affecting us, because all activities – planning, meetings, training – have slowed down.

“There has been an increase in the prices of agricultural inputs – fertilisers and herbicides – and a shortage of certain products on the market. Due to the closing of the borders,

members of our cooperatives have not been able to sell their stocks, while these cooperatives have taken out loans to build up their stocks.”



Photo: Agathe Diama / ICRISAT

Abdul Razak,
Director General, Heritage
Seeds Company, Ghana

“We cannot go to market to sell our seeds and it is difficult to reach our farmers. Also, because of social distancing, we cannot engage many workers for weeding and/or applying fertilisers, etc. If this continues, we may have to decrease our acreage in production.

“Planning for the future is very difficult because we don’t know what will happen the next moment. We had clients coming from Accra city in the previous years but not this time, because of the lockdown in Accra. Everything else can wait, but production cannot. We need enough seed in the system. Even if there is only one man on Earth, he will still have to eat. Seed is food security. We need to maintain that.”



Photo: Agathe Diama / ICRISAT

Bougouna Sogoba, Director
General, Malian Awakening
Association for Sustainable
Development (AMEDD), Mali

“This pandemic is a major health and economic crisis that can have a negative impact on the rural economy,

create a lack in manpower for cropping season activities and also cause difficulty in getting services to inputs by the private sector and extension services. The donor countries of most NGOs and foundations are being strongly impacted, and this could have repercussions on financing.

“For our NGO, the main challenge has been to carry out our activities while putting in place preventive measures against contamination. We hope that, in Mali, the cropping season and the production will not be much affected. However, this pandemic is also an opportunity to explore new ideas such as the use of digital solutions. We must use this crisis as an opportunity to refresh our approaches and technologies.”



Frédéric Baudron



ML Jat



Timothy Krupnik



Jelle Van Loon

Mitigating labour shortages

Ongoing restrictions on transport and freedom of movement are causing disruptions across the agricultural value chain – with a potentially devastating impact on already fragile food systems in Latin America, sub-Saharan Africa and South Asia. With this in mind, systems agronomists and mechanisation specialists at the International Maize and Wheat Improvement Center (CIMMYT) discuss the impact of restrictions on agricultural labour and production, and the role that farm mechanisation can play in addressing new challenges.

What are the implications of the agricultural labour shortages that are emerging in Africa and Latin America as a result of COVID-19 restrictions?

Frédéric Baudron: The pandemic has demonstrated that food production systems around the world – even in countries where agriculture is thought to be highly mechanised – are highly dependent on farm labour. Africa is often presented as being dominated by farms which rely mainly on the labour of family members. Therefore, one could expect that Africa would be spared from the consequences of unavailability and/or unaffordability of hired labour. However, a recent CIMMYT study shows that farming systems in Africa are far more dependent on hired labour than commonly thought, and that the quasi total dependence of smallholder farming on family labour is a myth. Depending on the farming system, a complete loss of hired labour could lead to a productivity decrease of up to 20 per cent in Eastern and Southern Africa. Hired labour is also likely to be replaced by child labour. Because most production on the continent is rainfed during a single season, most farmers only plant and harvest once per year, making the timing of each task critical. A delay in planting because of labour shortages – as will soon occur in Ethiopia – could lead to dramatically reduced yields. A delay in harvesting – as is currently experienced in Zimbabwe – means that a large fraction of the crop is likely to be spoilt in the field.

Jelle Van Loon: The situation is similar for Mexico and the general Central American corridor, although the main production cycle is only just starting. Proper land preparation and timely sowing are critical, not only in terms of food production and achieving proper yields, but also to ensure that farmers have a stable income at the end of the year. This is especially important now, as financial and food reserves are shrinking at a faster pace due to COVID-19 restrictions, which heavily affect demand on informal markets.

Are you seeing a similar situation in South Asia?

Timothy Krupnik: Depending on the country, we've seen either abrupt interruptions in the move-

ment of agricultural labourers – for example in India, where millions of migrant labourers have not been able to travel home during lockdown – or an influx of people from urban areas who fled to their villages when lockdown began. In the latter case, one might expect this to increase labour availability for farming, but we tended to observe the reverse. People remain largely frightened of coming out of their homes, so even in rural areas which saw an influx of people, labour availability has not necessarily increased.

Where labourers are willing to work, our initial scan of the evidence indicates that daily wage labour costs have also increased considerably due to risks of infection spreading. In either situation, smallholder farmers who need to hire labour to assure crucial crop management activities like planting or harvesting are suffering. Reports are also emerging of increased child labour in the region, as schools are closed and resource-poor farmers are allocating family members and children to work where they can't afford to hire labour.

ML Jat: I would like to cite the specific example of intensive rice-wheat rotation in India's breadbasket and the Green Revolution corridors in the western Indo-Gangetic plains, which provide the bulk of cereals to the national food basket. An ex-ante analysis on the consequences of the reverse migration of the agricultural workforce and social distancing due to COVID-19 revealed that a delay in the transplanting of rice seedlings by two weeks is likely, which will delay rice harvesting and consequently delay the planting of wheat. This will potentially lead to rice and wheat production losses of 10–25 per cent, worth up to 1.5 billion US dollars.

In addition, the shorter turnaround between harvesting rice and planting wheat may further increase the incidence of rice residue burning. This is a major problem which creates significant health issues and may exacerbate the threat of COVID-19 by increasing both infection rates and disease severity.

Timothy Krupnik: The situation has increased interest and policy to support use of scale-appropriate machinery for operations like harvesting. In Bangladesh, for example, there was a recent and very serious

risk of losing much of the rice harvest as the monsoon has started early and flash flooding has been a concern. Without manual labourers to harvest the crop, CIMMYT-led projects like the Cereal Systems Initiative for South Asia – Mechanisation and Extension Activity (CSISA-MEA) have played a key role in assisting the movement of combine harvesters and crop reapers to areas at risk of crop losses and helping to assure that the rice crop is harvested on time.

It sounds as if these machines were instrumental in avoiding crop losses. Does this mean that mechanisation has a key role to play in lessening the impact of these labour shortages?

Timothy Krupnik: During the COVID-19 crisis, scale-appropriate machinery has become even more important for mitigating labour shortages. We work to facilitate the availability of scale-appropriate machinery not only so that farmers can buy and use equipment, but also by encouraging those who own machineries to become entrepreneurial service providers who offer efficient and mechanised land preparation, planting, irrigation, harvesting and post-harvesting to other farmers on an affordable fee-for-service basis.

This is a win-win situation for farmers who can't access or afford the escalating costs of labour. In the COVID-19 crisis, these arrangements assist in responding to the labour crunch in locations where resource-poor farmers are most in need, and also allow farmers to get crucial work done while maintaining and encouraging social distancing.

Frédéric Baudron: Over the past seven years, CIMMYT and its partners have fine-tuned technologies and developed delivery models – based on rural service providers supported by private sector companies – to scale the use of small machines in East and Southern Africa. These are profitable for both farmers and service providers and reduce labour requirements tremendously.

In Zimbabwe, we found that labour requirements were 15 times lower when establishing a maize field with a direct seeder pulled by a two-wheel tractor, and 23 times lower using a similar technology for establishing wheat in Rwanda, compared to the conventional method based on labour and draft power. A ton of maize that would take 12 people a full day to shell manually can be shelled in one hour using

a small double-cob sheller that costs about 300 US dollars.

ML Jat: Rapid policy decisions by sub-national and national governments on facilitating more mechanised operations in labour intensive rice-wheat production regions will address labour availability issues while contributing to productivity enhancement of succeeding wheat crop in rotation, as well as overall system sustainability.

Our ex-ante analysis on the implications of labour shortages in rice-wheat rotation in the western Indo-Gangetic plains due to COVID-19 indicates that adoption of scale-appropriate farm mechanisation has the potential to stabilise food production, as well as reducing the income losses and air pollution surges in northwest India.

The situation in the regions each of you have mentioned is unique, but are there any global trends that you've noticed? And if so, can other regions learn from these localised experiences?

Timothy Krupnik: A huge part of what we do as a research and training institute is facilitating exchanges of information across continents and countries. Different types and designs of machinery that can be used in similar circumstances can be shared, as can business models supporting service providers.

Importantly, part of the concept of 'scale-appropriate mechanisation' is also learning when and where machinery makes sense – where labour is not scarce and rural communities are highly dependent on income from labour to sustain their communities, some forms of mechanisation may not be appropriate. We work to understand these dynamics and target the right machines in the right time and right places.

Jelle Van Loon: In addition to reducing pressure on available labour and alleviating drudgery, modern farm equipment tailored to the needs of smallholders can also increase competitiveness, as it allows for higher precision and efficiency.

In this sense, scale-appropriate mechanisation can stimulate rural transformation incentivising short and efficient value chains while ensuring stable food provision – aspects that have become essential to navigating the present crisis.

Has the current pandemic brought up any new perspectives in terms of how you consider labour and mechanisation?

Frédéric Baudron: We often look at yield and area planted in staple crops to assess the food security situation of a country during a particular year. This pandemic has shown us that we need to pay more attention to labour productivity. In many countries, policy-makers and development agents fear that mechanisation will displace labour, but the dependency of staple crops on labour is a threat to food security, as we currently see in Africa and South Asia. If the production of fruit, vegetables, cash crops and so on will continue to depend on manual labour, it is essential in my view for critical tasks in the production of staples to be mechanised – particularly planting and harvesting. This will ensure the resilience of national food systems in the event of a future disruption similar to the COVID-19 pandemic.

Jelle Van Loon is based in CIMMYT, Mexico. He leads the machinery and mechanisation unit focusing on agro-technical analysis of farm machinery and tools. It involves the production of 'easy to follow' machinery construction guides and the design of modular, multifunctional equipment adapted to various farmers' needs.

Frédéric Baudron is working for CIMMYT in Eastern and Southern Africa, based in Ethiopia. He got into mechanisation R&D from a farming system angle, realising that farm power was a major limiting factor to the productivity of many farms in Africa, as much as good seeds and fertilisers.

Timothy Krupnik facilitates CIMMYT's research on appropriate mechanisation in Bangladesh and contributes to mechanisation research and scaling work in India and Nepal. He works on a portfolio of projects focused on the principles of sustainable and ecological intensification in smallholder farming systems in South and South East Asia.

ML Jat is a Principal Scientist/Systems Agronomist and Sustainable Intensification Strategy lead at CIMMYT, based in New Delhi, India. He devoted more than two decades to intensive work on basic and applied science in sustainable intensification of smallholder systems of Asia. His research on Conservation Agriculture has provided scientifically sound basis and directions for promoting sustainable intensification through policy changes and led to impact at scale in South Asia.
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Putting the emphasis on girls and young women

The COVID-19 pandemic also represents a considerable challenge for the NGO sector. While the spread of the disease has to be checked, existing programmes need to be continued as far as possible. In this respect, Plan International is concentrating on those affected worst by the crisis: women and girls.

By Anabela Brandao

As a global crisis, the COVID-19 pandemic has an impact on the lives of all people throughout the world. However, girls and women are most severely affected – especially those living in crisis areas. Not only because more women have an occupation which exposes them to higher risks of getting infected with COVID-19, e.g. in the field of health and nursing, but also because existing problems, inequalities and power relations are aggravated in crisis situations. Girls and young women are particularly affected by the long-term, secondary effects of the pandemic, which are however decisive as regards their opportunities to participate.

The experience gained during the Ebola epidemic in West Africa in the years 2014 – 2016 and during the COVID-19 pandemic suggests that the current crisis will have a considerable social and economic impact on the lives of women and girls. In times of crisis, girls and young women generally face higher risks of being affected by gender-based violence, being forced into early marriage, getting children early or dropping out from school. This lowers their prospects of leading a self-determined life – even more so than before the pandemic. That is why Plan International always pays special attention to the gender-specific needs of girls and women when implementing its protection and relief measures to respond to COVID-19.

Hygiene activities: dignity kits and hand-washing stations

In its transnational programmes, Plan International focuses on gender-sensitive and gender-specific activities to cover these needs. A key emphasis is put on hygiene and infection control. By providing and distributing so-called “dignity kits” (containing soap, gloves or toothbrushes, but also menstrual hygiene articles), Plan International does not only help people in low-income countries keep minimum hygiene standards and reduce the risk of infection in case of a strict curfew or interruption of supply chains, but also responds to the issues which adolescent girls and women face during their menstruation.

The use of social networks, if available, and radios operated by means of cranks or solar energy ensures that communities and project beneficiaries have access to information and awareness-raising messages. Pedal-operated, non-contact hand-washing stations including soap are being installed for essential institutions and public facilities, such as health centres, schools, distribution points or child-friendly spaces. By providing materials and soap, individual households and facilities are able to construct low-cost “tippy taps” to protect themselves against the virus through hand-washing.

Health workers in the project areas receive protective equipment including soap, disinfectants, masks and gloves, among other things. Furthermore, members of community committees and local partner NGOs are trained on how to prevent infection and how to deal with COVID-19. In order to help girls and young women exert their sexual and reproductive health rights and their right of self-determination, relevant health services are being strengthened and equipped. This means that they can better respond to the needs of adolescent girls and young women.

Social contact restrictions have rendered aid tools which usually help girls and women claim their rights, empower one another or get support in emergencies hardly available. For example, they are not able to attend girls’ clubs, mother meetings, saving groups or similar social gatherings. Furthermore, it is now hardly possible to address claims to political decision-makers. Events, rallies and demonstrations do not take place. At the same time, society as a whole, politicians and authorities pay less attention to topics which are not directly related to the corona crisis – as a result, willingness and capacities of the responsible bodies to commit themselves to other issues



Fifteen-year-old Kaligueta lives in Boussouma department in the Centre-North region of Burkina Faso. She has just taken part in an awareness-raising session on COVID-19. Given the high risk of transmission in a region that hosts tens of thousands of internally displaced people, Plan International is focusing its attention on ensuring that the communities are aware of the disease and know how to stay safe.

Photo: Plan International

have been reduced. This makes it difficult to raise awareness of the hidden effects of the corona pandemic for girls and women.

Protection against gender-based violence

In times of crisis, all forms of gender-based violence increase, especially domestic violence. As a result of protective measures such as social isolation, girls and women are more frequently affected by violent assaults within the family. The COVID-19 pandemic makes it more difficult – or even impossible – to end such violent situations. An exit is only possible when affected girls and women can make outsiders aware of their situation – e.g. at school, during home visits of trained social workers or during organised leisure time activities, such as girls’ and youth clubs. However, the contact restrictions have extremely reduced these opportunities. As a result of the lockdown, we hear alarming facts, e.g. an increase in appeals for help via hotlines, from Latin America and the Caribbean region where domestic violence was a severe problem even before the crisis.

By means of informative messages transported by staff members, partners and volunteers, if possible, but also through the media, such as Facebook, radio programmes and posters, Plan International makes people in the project communities aware of the risks of sexual and gender-based violence for children, girls and women. The organisation sensitises members of community committees, especially those responsible for child protection, as well as community representatives, to the risks in connection with COVID-19. Furthermore, counselling services to address domestic or sexual violence as well as child protection are being established or expanded. These services include hotlines or mentors in the communities who can refer such cases.

Creating income security and preventing economic distress

In times of economic crisis, the risk of exploitation and abuse increases, including prostitution and forced labour. Unconditional relief services in the form of cash transfer or vouchers for girls and women as well as people from high-risk groups such as women-headed households help ensure provision with foodstuffs and non-food items. Furthermore, the distribution of food rations, especially for households with children under five years of age, contributes to food security.

Many women working in the catering or service sector are losing their income as a result of the protection measures against COVID-19. Creative solutions and the development of short-term income opportunities shall provide alternative sources of income for affected



By creating new income opportunities like producing sanitary pads or masks, Plan tries to help women and adolescent girls to secure their livelihood. With all the schools in Bangladesh closed due to the COVID-19 pandemic, 14-year-old Raziya decided to use her free time to make masks and help people protect themselves against the disease.

Photo: Biploby Rani Dey Roy / Plan International

women and adolescent girls – e.g. by their starting to produce sanitary pads or face masks. Not only can this improve their financial situation, it also helps them overcome supply shortages and problems in accessing hygiene articles which have become very scarce or expensive as a result of the pandemic.

If families have a secure income, it will be possible to prevent early marriage. Experience has shown that parents often use early marriage as a coping mechanism due to economic distress. During the Ebola crisis, the number of child marriages increased by 65 per cent in the severely affected areas of Sierra Leone. In the planning stage of all activities, girls and women are consulted to be able to consider their perspective when implementing the measures. In doing so, we make sure that problems and barriers are reduced and the activities respond to the actual needs.

Coordinated approach

As an international non-governmental organisation, we not only face the challenge of how to prevent the spread of the virus in the programme countries and to take care of the affected people, but we also need to carry on with existing programmes. In order to ensure that ongoing projects can continue and existing structures can be used to implement protection measures against COVID-19, all the COVID-19-based activities are coordinated with the ongoing projects. They are orientated towards existing standard activities which are adapted to the context, if necessary, and coordinated with other stakeholders such as local authorities, local organisations like women's or youth clubs or community committees. This includes programmatic additions in countries where we are already active in humanitarian aid. In the Lake Chad Region, for example, work



In Nigeria's Borno State, 1,400 adolescent school girls were provided with dignity kits to help them manage their periods during the lockdown to prevent the spread of COVID-19. The girls also received training on how to use the kits, which included six pairs of pants, a reusable sanitary pad kit and four bars of soap.

Photo: Nubwa Ibrahim / Plan International

with victims of gender-based violence by the terrorist group Boko Haram is expanded to include domestic violence, a problem that has been massively intensified by the COVID-19 pandemic and the associated curfews. To prevent people from becoming infected, trainings and advice that used to take place in larger groups are now replaced by door-to-door activities.

As Plan International has been a stakeholder in the international NGO sector for many years, the organisation is able to use a large network of existing structures in the programme countries when implementing the COVID-19 measures. Trust within the population and many years – or even decades – of experience in the communities help us plan the activities in accordance with the needs and carry them out effectively. In addition, Plan International has been publishing reports on the situation of girls and young women in crisis situations ("Girls in Crisis") for many years to give affected girls a voice and to consider gender-specific needs in the programmes.

The situation through COVID-19 is a global challenge – also for the NGO sector. Even though the long-term impacts on the programmatic work cannot yet be fully assessed, it is now important to react proactively and flexibly to the new situations and circumstances. Cohesion, exchange and transparency are the most important basis for this.

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Jes
Weigelt

Building our food systems back better

What is required to make food systems provide sufficient, healthy food while not harming the planet? How should food security be maintained given the threat posed by climate change? Our authors look at some aspects of tomorrow's food systems against the backdrop of the corona crisis.

By Jes Weigelt and Alexander Müller



Alexander
Müller

Writing about a crisis that is still unfolding, can only be premature. Uncertainty abounds. Reflections on both the impacts of and responses to the COVID-19 pandemic therefore benefit from modesty. At the same time, significant investment volumes are being made available to soften the impact of the COVID-19 pandemic and the responses to it. Actions are necessary now and are being taken. So, in the below, we would like to offer our reading of how to make food systems more resilient while building back better. Trying to strike a balance between modesty and clarity, we wish to ask our readers to please understand these considerations as the beginning and not the end of the story. We would like to extend an invitation to contribute to a discussion on how to make the food system work for both people and the planet. Today, it is failing to provide healthy food for all while at the same time degrading the planet.

This brief article focuses on building our food system back better. By now, it is a well-established fact that COVID-19 is not only a health crisis but also an economic and food security crisis. The pandemic left rural producers without a market. Export-oriented agricultural businesses quickly dismissed agricultural labourers. The Kenyan flower industry is but one example. Responses to curb the further spread of the pandemic have undermined food access by already poor and food insecure people. The World Food Programme warns that 265 million people will be threatened by acute hunger by the end of this year; that is twice as much as estimated prior to the outbreak of COVID-19. The pandemic, as some observers have commented, has laid open some of the structural flaws of the food system.

So, building back the food system needs to be done in a way that existing flaws in or threats to the system are addressed. Building back bet-

ter also means preparing the food system for the next crisis on the horizon, the impact of the climate crisis. At the same time, building back better must not mean to continue business as usual with more resources being made available by governments!

Our skewed food systems

A cursory look at the food systems shows both internal shortcomings and massive external threats:

- The way agriculture is being conducted is leading to a loss of biodiversity and resource degradation.
- More than 800 million people are food insecure, a figure that has kept rising since 2015. Obesity and malnutrition are omnipresent in so called developing and developed countries.
- The inequalities in the food system are striking. Gender inequalities in access to assets and frequent violation of migrant workers' rights are only two examples in this regard.
- Even at the current roughly 0.8 °C increase in global mean temperature, the temperature increase over land is 1.27 °C. Climate change is already leading to yield depressions of major crops.

Building back cannot mean going back to before, it must mean building back better for a new normal.

Building back better – elements of a strategy

Current investments to combat the immediate impact of the COVID-19 pandemic and the measures to curb it must address the needs

of the food insecure and the vulnerable. They must also be done in a way that they increase the adaptive capacity of those suffering from food insecurity and enhance the resilience of the food system as a whole. The responses to curb the further spread of the pandemic have highlighted some elements of particular importance to achieve urban and rural food security in the future:

One Health. As an immediate conclusion from the COVID-19 pandemic, the concept of One Health is receiving renewed attention. One Health denotes efforts to achieve public health by paying attention to the transmission of diseases from animals to humans and the impact of environmental factors on human health. In short, human health is to be achieved by making sure that animals and the broader environment are healthy as well. In the further development of One Health, it will be important to live up to the integrative nature of the concept. To provide a – potentially simplistic – example, it is of only little value to ensure proper vaccination of livestock against some well-known diseases if the conditions for keeping them, such as high density of animals, create new breeding grounds for diseases. These conditions are not conducive to animal wellbeing in the long run and often rely on the massive application of antibiotics. In conditions such as these, new threats are likely to emerge for human and animal health. Although this is a well-established fact, it is not triggering the necessary action! One Health needs to be designed and implemented in broad terms of human and animal health, within the broader production system, which in turn is embedded in a sustainably managed environment. To apply a concept that is typically used in a different context, truly achieving One Health requires a landscape approach – a landscape approach that is based on cooperation among different actors and openness for new solutions.

The informal sector in urban food systems. The informal sector is of outmost importance as a way for poor people to access food. Yet, this has been one of the sectors particularly hard hit by lockdown measures. Open air markets were closed, and informal food trading was prohibited. This has further undermined food access by the poor. In addition, as they could more easily implement physical distancing regulations, supermarkets often remained open. It is yet too early to see whether this exacerbates inequalities in food systems. It is not too early to conclude, however, that food security policies need to embrace the pivotal role of both the formal and informal sectors to achieve urban food security. Even in highly industrialised countries, the informal food sector has to solve the problems of the highly commercialised food sector. For example, the formal food sector in the USA would never have managed to feed millions of unemployed people. Acknowledging the continued higher prevalence of food insecurity in rural areas and taking into account the high urbanisation rates in developing countries, food security policies need to learn from the impact of COVID-19 and question its productionist and rural biases. As urban geographer Jane Battersby observes: “While the urban has been largely absent in the global discourse on food and nutrition security, food has been equally absent from the global discourses on urban development.” To brace food systems for the next crises, these productionist and rural biases need to be rectified.

Urban agriculture. Measures to curb the further spread of the pandemic have interrupted or inhibited the marketing of fresh produce in cities. In effect, the price for vegetables in cities increased considerably with the advent of the lockdown. Partners from Burkina Faso reported threefold increases on the markets in Ouagadougou. Agriculture in urban and peri-urban areas offers the opportunity to create employment and produce vegetables and fruits closer to urban centres. This potential is increased by emerging low-tech solutions for hydroponics. Not only does urban agriculture have nutritional and income benefits, it also offers social benefits. Analyses from the Cape Flats in Cape Town, South Africa, show that women practising urban agriculture perceive this to increase their “social image”.

Moving horticultural production to controlled environments in peri-urban and urban areas is also advantageous from the point of view

of adapting to climate change. The number of extreme weather events is projected to increase significantly. Production in controlled environments can contribute to reducing the vulnerability of production. Clearly, to succeed in densely populated peri-urban and urban areas, agriculture requires corresponding investments in urban land use planning and securing long-term land use rights for urban and peri-urban production sites.

Securing the natural resource base of agricultural production. If enhancing resilience of the food systems partly means shorter value chains, it also implies protecting the natural resource base for agriculture. Protecting freshwater resources and soils is an inherently local activity. Measures to implement national plans to achieve land degradation neutrality (LDN) are therefore key to achieving resilient food systems. However, this requires that they do not threaten food security by undermining the legitimate rights to land of small urban and rural agricultural producers, a risk that parties to the United Nations Convention to Combat Desertification (UNCCD) have begun to address by their landmark decision emphasising the importance of the Voluntary Guidelines on Responsible Land Governance. In their responses to the pandemic, it seems to be a good point in time for parties to start implementing them.

Agroecological approaches for food security. There is overwhelming evidence that the current way of producing food more often than not undermines the very ecological basis of its own existence. Estimates of the negative externalities of the food system amount to 12 trillion US dollars annually. A resilient food system maintains and enhances the ecosystem services on which it relies. Diversification of production and reducing the reliance on external inputs have demonstrably increased the adaptive capacity of households. In short, agroecological practices enhance food system resilience. Yet, systemic approaches to food and nutrition security do often not find an enabling environment. Building our food system back better implies a revision of the agricultural and food and nutrition security policies along the four dimensions of food security: availability, access, utilisation and stability.

Rural governance for an enabling environment for food security and sustainable natural resource management. We have elaborated earlier on the importance of

an enabling environment for rural development. Rural service delivery systems, the responsible design of rights to land and natural resources, and creating linkages between producers and consumers are all key to sustaining investments in sustainable land management, ecosystem-based adaptation, and other measures to protect and sustainably manage terrestrial ecosystems for food security. Securing women’s land rights is particularly important in this context, as their investments in soil fertility affect household food and nutrition security disproportionately strongly. Investing in such an enabling environment means securing the investments to achieve food security and sustainable resource use.

The time is now

This list of strategy elements is a contribution to the on-going discussions on building back better. It is unlikely to be comprehensive. Yet, we have derived these elements from the reports by partners and colleagues from ten African countries which are presenting their impressions on the daily struggle for food on our Twitter platform @CovidFoodFuture. And we have collated this list with a view to address trends that undermine the resilience of food systems and with the next upcoming crisis in mind, the impact of climate change on all four dimensions of food security. So, while the list might seem eclectic, the overarching message is rather straightforward: For some regions and crops, we are only ten harvests away from meeting or failing to meet the Sustainable Development Goals. As it stands, the odds are not in the SDGs’ favour. Given the level of investments currently mobilised to soften the impact of the COVID-19 pandemic, it would be a huge opportunity lost, if they were not invested in a way to make our food systems more resilient, if they were not invested to increase the adaptive capacity of those whom we have committed “to not leave behind”.

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TMG Research is a policy advice and research organisation working on sustainability issues in the areas of nutrition, climate and energy.



Photo: Jörg Böhling



Africa's rapid economic transformation

Thirty years ago, Africa was synonymous with war, famine and poverty. That narrative is clearly outdated. The living standards of Africans are rising remarkably fast, also thanks to the country's agricultural growth and the development of rural-urban value chains. Our authors are convinced that improving education and entrepreneurship will ensure that the region's progress is irreversible even as it confronts COVID-19.

By T. S. Jayne, Adesoji Adelaja and Richard Mkandawire

In the 1980s, most Africans lived in rural areas that were socially and economically isolated from the rest of the world, had no more than primary school education, and were mostly engaged in semi-subsistence farming. Poverty and malnutrition were rampant and life expectancy was under 50. It is almost mind-boggling how rapidly Africa's conditions have changed. Today, 48 per cent of Africans have a secondary school education, and 10 per cent of college-aged Africans are attending universities. Poverty rates have declined significantly since 2000. The share of people in sub-Saharan Africa (SSA) living on less than 1.90 US dollars (USD) a day declined from 58 per cent in 2000 to 41 per cent in 2015. Over the same period, the proportion of Africans making more than 5.50 USD per day rose from 10 per cent to 15 per cent, as recent World Bank figures suggest. Most Africans are now engaged in off-farm employment that provides considerably higher living standards than farming (Tschirley et al., 2015; Yeboah and Jayne, 2018).

For the majority of the region's population, living standards have clearly risen. Girls have experienced remarkable improvements in pri-

mary and secondary education. Women have become considerably more active in labour markets and are gaining greater influence over household resources in many areas (Oduro and Doss, 2018). Nutritional indicators also show gradual but clear improvement (Masters et al., 2018). Of all regions, SSA gained the most in average life expectancy, which is now 64 years. Governance has improved, albeit unevenly across countries.

Agriculture and agrifood systems are powering Africa's transformation

Agricultural growth enabled SSA's labour force to gradually diversify into off-farm employment. Since 2000, sub-Saharan Africa has achieved the highest rate of agricultural growth of any region throughout the world. According to the World Bank Developing Indicators, SSA experienced an annual inflation-adjusted increase of 4.6 per cent in agricultural growth between 2000 and 2018, roughly double that of the prior three decades. When agriculture grows, its extensive forward and backward linkages with agri-value chains and non-farm sec-

tors expand employment and income growth more broadly. Since 2000, SSA has been the world's second-fastest growing regional economy, exceeded only by Asia. The region's per capita GDP increased during this period by almost 35 per cent in real terms, doubling in some countries (Barrett et al., 2017). These trends have fuelled employment opportunities in off-farm stages of the agrifood system, and especially in non-farm sectors, creating more diversified regional economies (see Table on page 17).

Africa's agricultural growth has been catalysed by a growing class of commercialised, entrepreneurial and relatively well educated African farmers (Jayne et al., 2019). Parts of sub-Saharan Africa are witnessing profound changes in farm size distributions. "Medium-scale" farm landholdings of five to 100 hectares now account for 30 per cent or more of national area under cultivation in many African countries, and this share is rising in countries with substantial unutilised land (Jayne et al., 2016). Over roughly a decade starting in the early 2000s, the value share of national marketed crop output accounted for by medium-scale farms rose



Photo: Nichole Sobacki/ Redux/ laif



Photo: Jörg Böhling

in Zambia from 23 per cent to 42 per cent, in Tanzania from 17 per cent to 36 per cent, and in Nigeria from 7 per cent to 18 per cent (see Figure on page 16). Of the additional value of national crop output during this period in Ghana, Tanzania and Zambia, medium-scale farms accounted for at least 45 per cent of growth in each country (Jayne et al., 2019). Perhaps ironically, the amount of land acquired by this category of African farmers since 2000 far exceeds the amount of land acquired by foreign investors (Jayne et al., 2014a). This might be considered a surprising development, but in retrospect, perhaps it should not have been. The dramatic rise in global food prices after 2007 initiated major foreign investment in African farmland. Why shouldn't African investors have done the same?

Agricultural growth has also synergistically co-evolved with the rapid development of value chains that link farmers to Africa's growing urban areas. The wealthiest African today built his fortune on the back of agriculture by pioneering large-scale production in sugar, flour, beverages and other food products. No wonder the President of the African Development Bank, Dr Akin Adesina, recently predicted that the next generation of African billionaires will be farmers. Powered by rapid population growth, rising incomes and urbanisation, the size of Africa's agrifood systems by 2030 will reach 1 trillion USD. Not surprisingly, small and medium-scale enterprises in agrifood systems are an important part of the region's development. And unlike in prior decades, it is educated, savvy and capitalised Africans who are leading the charge.

How sustainable?

At the same time, the pace of transformation has been highly uneven across the region. Valid questions arise regarding whether the transformation narrative will falter, whether it has been sustained by primary commodity price booms, and whether transformation is occurring without industrialisation or poverty reduction. Indeed, some countries' performance may justify these concerns, while many others do not, highlighting the widely varying pace of transformation in the region.

To assert that Africa is rapidly developing is not to assert that life is rosy for everyone. Sub-Saharan Africa remains the poorest region of the world. But at least most key indicators of livelihoods have consistently moved in the right direction for several decades now. So, as Africans mobilise to tackle the region's many sobering challenges, it is not constructive to hold on to the "doom and gloom narrative" from the 1980s and 1990s, especially when Africans themselves have never been more optimistic about the future and vibrancy of the region, as the latest Africa Youth Report states.

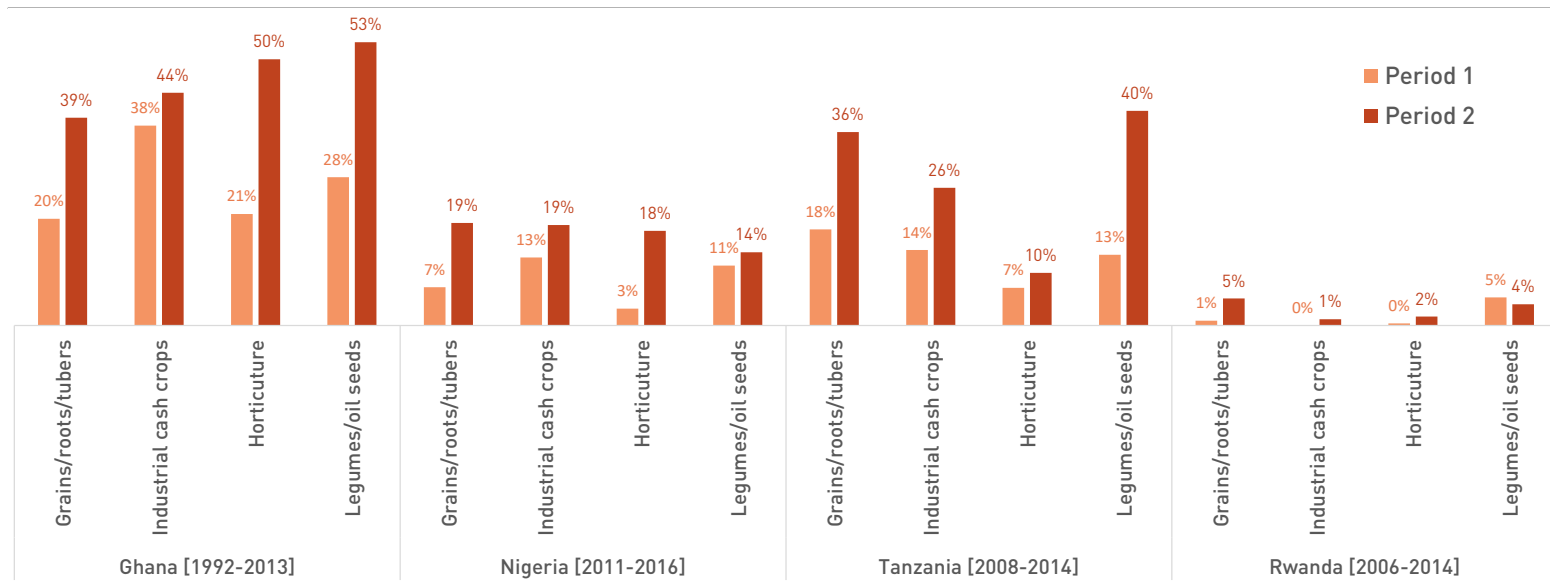
While these trends point to SSA's remarkable development progress over the past several decades, one might question how sustainable they are. We believe that Africa's long-term progress is irreversible for three interrelated reasons: an increasingly savvy and informed work force, driven by rising levels of education, the explosion of readily accessible information, and improving governance and political accountability.

A more entrepreneurial workforce and informed electorate

Rising levels of educational attainment is the main reason that Africa's rise will be sustained. The percentage of Africans over 25 years of age who completed lower secondary school has climbed from 23 per cent in the 1980s to 43.7 per cent in 2017, and is over 75 per cent for both men and women in rapidly developing countries such as Ghana (World Bank, 2019). Student enrolment in tertiary education grew from 1 per cent in the 1970s to 10 per cent in 2014 (Darvas et al, 2017). Quality of education has declined over the past several decades as universities have strained to accommodate rapidly growing numbers of students. But in 2006, the most recent year for which data is available, African countries' average public expenditure per university student was 2,000 USD per year – more than twice as much as non-African developing countries invested in tertiary education. There is also growing diversity in the fields covered by these institutions, including greater focus on technical education and entrepreneurship. The pace of educational improvement in Africa is more rapid than any other region of the world has experienced. While decades behind the rest of the world, Africa is starting to catch up.

A more educated workforce means that decision-making in the private sector, which includes millions of micro-entrepreneurs, is becoming more effective and competitive in the global workplace, thereby contributing to economic growth. It also means more informed public policy-making. Rising educa-

Medium-scale (5–100 ha) farms' share of national marketed crop output value



Period 1 represents the market share of medium-scale farms in the first year indicated for each country, e.g., 2011 for Nigeria. Period 2 represents the market share of medium-scale farms in the most recent survey year indicated for each country.

Source: computed from national household survey data collected by the national statistical services in each country. See Jayne et al. (2019) for details.

tion levels are driving Africans' demands for better governance, too. In the early 1980s, we were struck by how most Africans looked to governments for protection, for employment, and for ensuring access to cheap food. They viewed markets with suspicion. They bought the narrative that governments were looking out for their welfare after decades of foreign colonial rule. As Africans have become more educated, they have become more politically astute and active. It is hard to fool or oppress educated people. Today, most young Africans demand greater accountability from their governments and view markets as their source of opportunity and livelihood. A recent study from Kenya found that wealthier and more educated people were more likely to support democracy and vote for the opposition. Today's African youth are transforming the continent, not because they are young but because they are more educated, more entrepreneurial, more savvy, more technically skilled and better able to utilise global information than any other generation of Africans before them.

The digital divide is being narrowed

Especially when combined with a more educated workforce and electorate, the rapid rise of publicly accessible Information and Communication Technology (ICT) and phone-based information even in the most remote rural areas of Africa will almost certainly have profound pro-development impacts. A recent special section of "World Development" shows that information can indeed improve

development outcomes when users perceive it as relevant, and when they have both the power and the incentives to act on that information. Rising education levels will therefore contribute to more effective utilisation of the rapidly expanding supply of information and its conversion into improved livelihoods.

A special issue of "Foreign Affairs" documents the rapid growth in Africans' use of mobile banking and software-based provision of information and services. Former Netscape founder Marc Andreessen predicted recently that almost every African would own a smartphone by 2025; in anticipation, software providers are feverishly working to meet this growing market for digital services. As governments and businesses move deeper into the information age and digitise many of their processes, opportunities are rapidly emerging for the growing number of African information technology (IT) firms. With the rapid development of new communication technology, important aspects of the economy such as banking, payment systems, government revenue collection and online education are becoming increasingly digitised, especially in urban areas. The alarming digital divide that Africa faced three decades ago is gradually being narrowed.

In parallel to the transformational effect of digital technologies on business practices in developed countries, African farmers are gaining access to information that improves their decision-making and makes them more competitive. New digital technologies are slowly emerging for farm management practices, rural

transport services, market price information, buyer opportunities, electricity payments, input purchases and social welfare benefits transfer. Digital technologies hold great potential to reduce, if not overcome, the historical link between remoteness and poverty, and even to redefine what remoteness means. Digital transformation has also enabled Africans to connect with the global community in a manner that was not the case two decades ago. Millions of Africans now have access to global news and know-how in ways that would not have been possible decades ago.

Governance improving

Governance conditions are clearly improving for the region as a whole. Conditions for any given country may improve or decline in the short run, but the long-term trend is unmistakable. In the 1980s, most African governments were repressive. Coups d'état were common. African big men ruled by iron fist and imposed horrible policies on their people. Free presses were rare. This situation describes only a few of SSA's 45 countries today. Macro-economic management has improved dramatically in the post-structural adjustment period. Gone are the days of Idi Amin forcing finance ministers to print money; today, most Ministries of Finance are run by professionals who are committed to a market economy and adhere to global guidelines. Since 2000, there have been few cases of African countries falling into massive debt, requiring bailouts from international financiers, or experiencing hyperinflation or

Proportion of labour force in farming, off-farm agri-food systems, and non-farm activities among working-age population (15–64 years).

Country	Survey year	Working age individuals (15–64 years) in labour force in millions	----- % of full-time equivalent jobs in -----			
			farming	off-farm agrifood system		non-farm sectors
				agro-processing	downstream distribution	
Ghana	2005/06	9.5	43.5	6.3	8.6	41.6
	2012/13	12.1	34.3	3.7	15.5	46.5
	2016/17	12.8	28.6	7.9	16.7	46.8
Nigeria	2003/04	61.9	21.8	1.4	3.3	73.5
	2012/13	66.7	33.7	4.6	18.6	43.1
	2015/16	78.2	28.3	3.7	30.3	37.7
Rwanda	2005/06	4.4	65.7	0.4	7.4	26.6
	2010/11	5.1	54.0	1.2	7.7	37.0
	2014	5.7	59.7	1.2	7.6	31.5
Tanzania	2008/09	17.4	60.8	1.7	4.5	32.9
	2012/13	21.5	48.3	1.6	15.6	34.5
	2014/15	21.7	49.1	1.2	14.1	35.6
Uganda	2005/06	11.0	57.0	2.8	10.2	30.0
	2011/12	12.3	48.1	3.3	12.3	36.3
	2014/15	14.5	54.2	3.0	10.8	32.1
Zambia	2005	4.9	61.2	1.6	3.1	34.1
	2012	5.9	46.7	2.1	7.1	44.1

Note: Full-time equivalent jobs account for the fact that many individuals have more than one job in a given year. For this reason, sectoral employment shares based on primary sources of employment tend to overestimate the labour force share in farming.

Source: Yeboah and Jayne (2018), based on analysis of Ghana Living Standard Survey 5, 6 and 7; Nigeria's Living Standard Survey (2004) and General Household Survey (2013 and 2016); Rwanda Integrated Household Living Survey (EICV 2, 3 and 4); Tanzania National Panel Survey (2009, 2013 and 2015); Uganda National Panel Survey (2006, 2012 and 2014); Zambia Labour Force Surveys (2005 and 2012).

rapid currency depreciation. The majority of African countries have stabilised their macro-economies over the past 20 years, and this has attracted massive foreign direct investment and improved economic performance in the region.

Improved governance and cooperation have also aided freer movement of capital across boundaries in Africa and expanded intra-African trade (Songwe, 2019). Four decades ago, foreign banks controlled the banking sectors of African countries. Today, a number of indigenous banks dominate Africa's banking sector. Many of these banks now operate regionally. As investment opportunities have emerged across the continent, investment and private equity firms from the more advanced African countries are investing in less advanced ones (Silici and Locke, 2013). For example, many Nigerian banks operate across Africa. Entrepreneurship, agro-enterprises, women-owned business and food enterprises are increasingly the focus of emerging private equity funds. The Tony Elumelu Foundation has committed 100 million US dollars towards creating 10,000 entrepreneurs, 1 million jobs and 10 billion US dollars in new economic activity within ten years and has leveraged co-financing from international organisations.

Parliamentarians and government officials are mirrors of their society and constituents. And fortunately for Africa, as education levels continue to improve, the quality of governance will become more open, more egalitarian and more responsive to constituents. This doesn't mean that there won't be major hiccups along the way – one can point to setbacks and worrying developments in any country – but what matters is whether the cumulative impact of the positive developments outweigh the negative ones. On net, the governance trends in African are generally moving in the right direction, and this has been the case for at least three decades.

Conclusions

Thirty years ago, Africa was synonymous with war, famine and poverty. That narrative is clearly outdated. A middle class has started to emerge in Africa, propelled by agricultural growth, economic diversification, digitisation, entrepreneurship, labour mobility and urbanisation. Africa's rise has much to do with broadly improving education, greater access to information and opportunities, the spread of democracy and greater rule of law. Virtuous cycles are being initiated: as the more educated

and informed classes raise their voices in demanding clean and accountable governments, the quality of public services, infrastructure and economic opportunities will continue to improve as it has over the past several decades, but at a faster pace. While Africa's positive trajectory is unmistakable, it will be at least several decades before most of its countries are firmly middle class. Compared to other regions of the world, that is a remarkably short period, even though millions of poor people will understandably regard it as painfully slow.

It is difficult to accurately predict how COVID-19 will affect the region, but certainly it will kill many, create great pain especially for poor households, and arrest the region's development at least temporarily. COVID-19 will also almost certainly set in motion great pressures for governments to invest in water, sanitation and health facilities and galvanise the region's efforts to strengthen its own capacity to address pandemics and other types of shocks, and meet its citizens' basic human needs. These investments will reinforce Africa's long-term development trajectory.

Former hockey player Wayne Gretzky quipped that a good hockey player plays where the puck is, but a great hockey player plays where the puck is going to be. Because change is occurring so rapidly, Africa's future is best understood not by overly focusing on its current position – which can easily blight one's vision – but by considering where the trajectory of its many long-term trends is pointing.

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Informal household enterprises in sub-Saharan Africa – livelihoods for rural transformation

Seeking a “formalisation” of the informal sector, many national and local governments would like to see informal household enterprises vanish from public spaces. However, our author believes that such a development would be disastrous, and calls for informal-sector-friendly policies.

By Louise Fox

Informal nonfarm household enterprises (HEs) are a critical part of rural transformation and poverty reduction. At the household level, they are an income source in the off-season or year-round as the rural agricultural and non-agricultural economies develop. At the level of communities, towns, and cities, they are a vibrant part of the economy, creating economic growth and increased incomes. While the history of economic development suggests that they diminish in importance as agriculture and non-agricultural sectors become increasingly modernised and commercialised and countries reach higher incomes levels, HEs are economically and socially important during key transformation phases.

What are informal nonfarm household enterprises?

According to the International Labour Organization and UN statistical definitions, the informal sector is a group of production units which form part of the household sector as household enterprises or, equivalently, unincorporated enterprises owned by household. Key points in this definition are:

- Size: small-scale, self-employment or under five workers who are either household members or casual employees;
- Usually not registered under national law (often national law excludes these businesses from registration requirements); and
- Lack of separation between household and enterprise assets and finances.

HEs are quite common in rural and urban Africa. In terms of hours worked, HEs account for 40 per cent of total

reported hours, more than either wage employment or on-farm activity. In rural areas, they account for as many hours as on-farm work. About 40-50 per cent of rural households have an HE, and for around 40 per cent of rural owners, the HE is their primary livelihood. The majority of HEs are in the retail trade sector, small-scale manufacturing (e.g. oil-seed pressing or furniture making) or service provision (e.g. haircutting or repairs). HEs operate on the street, in a market, or from home. Almost all HEs in Africa sell their goods and services to households or individuals, not to other businesses.

As countries develop, HEs become less common, and wage employment (formal and informal) in modern enterprises more common. In low- and middle-income Asia, HEs account for 26 per cent of reported hours worked, in Latin America for only 20 per cent (see Figure).

Why do they exist?

A range of push and pull factors account for HE existence and growth in rural areas.

- As on-farm incomes rise, household demand increases for a range of nonfarm goods and services which HEs conveniently supply.
- HEs supply services cheaply and conveniently – in the owner’s home, often at off-hours relative to farm work, and in small quantities (e.g. one cigarette), affordable for poorer households with limited cash.
- HEs increase household incomes – by 10 to 60 per cent, depending on the country, sector, scale of operation and location.

- Households have few other opportunities in rural areas to diversify their income sources, as nonfarm wage jobs are scarce and often low-paid.

Even in urban areas in Africa there are not enough wage jobs for those who have the educational and skill qualifications. Currently, African HEs account for as many reported hours worked in urban areas as wage jobs (casual or formal).

Opportunities and constraints

In rural areas, HEs not only offer an opportunity to reduce seasonal underemployment and increase income, they also represent an option to use under-utilised human capital. Outside of a few jobs in the public sector (teachers, health workers or agricultural extension and support), rural Africa offers few opportunities for using secondary education, even as access to this level of education becomes more widespread. In rural HEs, returns to completed primary or some secondary education are high, on average. HEs also offer opportunities for women to have an independent source of income, as these earnings are harder for male family members to appropriate.

Employment in the HE sector in Africa grows almost entirely through household creation of new businesses. Ninety per cent of African HEs have no one outside of family members working in the business. Ninety-five per cent never increase their employment over the life of the business. In other words, these are not growth-oriented enterprise gazelles; that is not the HE business model. While HEs clearly offer opportunities for increased household incomes

and consumption, they are nonetheless a precarious livelihood. In both rural and urban areas, HEs depend on other households' income for demand for their products. This means that any economic shock – a natural disaster, an economic downturn, a global pandemic – hits HE sector incomes hard. In rural communities, they are not immune from the risk agricultural incomes face. Household-specific shocks – such as illness or death – also negatively affect enterprise incomes, even causing business to fail.

HEs tend to be undercapitalised and use limited skills. This makes business entry easy, but also increases competition, pushing down profits. Too small and risky for the formal banking system, HEs are started and survive primarily through loans or gifts from family and friends; some get loans for working capital or new investment from micro-finance institutions (MFIs). HE owners, especially in urban areas, often face harassment, request for bribes, and even assault from suppliers, passers-by or local police. Local governments often ignore them, or worse, slap on punitive taxes or fees (frequently not reported in local accounts), which jeopardises profits and business survival.

Policies to support HE incomes and livelihoods

In the past, economists, urban planners and policy-makers would disparage

HEs, often calling them a symptom of failed development policy. In many African countries, this bias continues, especially in larger cities including the capital, as local and national governments seek to establish “world class cities”. In this view, capital cities should have clean, empty sidewalks; no open, covered or night markets so that HEs can sell products, offer services, and prepare and serve food; no small-scale bars created out of shipping containers, no motorcycles, bicycles or rickshaws offering rides; no informal waste picking scavengers, and no unlicensed barbers, haircutters, and manicurists working from home. Advocates of this position want to “clean-up and clean out” the informal sector. They often advocate “formalisation”, a term which has various meanings.

There is no doubt that informal enterprises, if not supported by friendly local governments, can create congestion and hygiene problems. However, efforts to control, reduce or eliminate this sector can impoverish households who own and operate these businesses (or want to open one), as there are simply not enough alternative income-earning opportunities in low- and middle-income countries. Instead, national and local governments could enact policies and programmes to support the survival and growth of this sector, within a national development vision and strategy. Such a development strategy would imply understanding that economic growth and development requires creating

more, and more productive, modern labour-intensive enterprises offering good, formal, wage and salary jobs, but until there are enough of these enterprises to employ the majority of the labour force, “informal will be normal”. It would also imply recognising HEs for what they are – and are not.

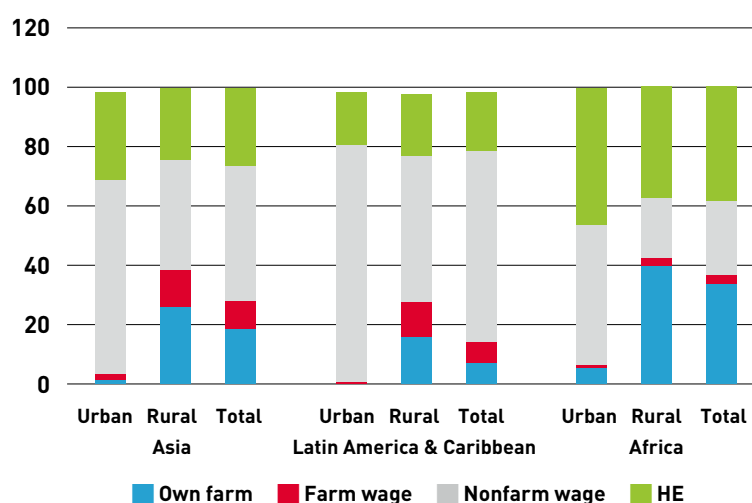
What would informal-sector-friendly policies look like? Primarily, they would cover:

- The right to exist, and do business in one's own name, without incorporation.
- Provision of adequate workspaces for different types of businesses within city plans, taking account of HE's need for electricity, water, sanitation, and solid waste disposal; for market infrastructure to cluster and be near foot traffic (including bus stops and mass transit stations, and in the central business district), and to have a secure place to work and store inventory.
- Financial inclusion, especially cheap and reliable mobile money so that HE owners do not have to carry and store cash (a major business risk) and can record transactions, allowing them to qualify for higher loan amounts or better terms.
- A licensing and permitting regime that is transparent, affordable given HE profit margins, and backed up by reliable public service provision (e.g. police protection in markets).

Some have argued for increased training in business skills for HE owners as well, but these programmes have had almost no success in raising HE profits. Approaches designed to teach negotiation and other “soft skills” appear to have had more success, but the evidence is still meagre, limited to a very few studies.

Some stakeholders argue for “formalising the informal sector”, drawing on evidence that formal businesses (modern, more capital-intensive enterprises) are more productive and pay higher wages. However, this policy prescription misses a key point. If HE owners knew a business model that could be as productive as a modern enterprise employing 20 or more people (and had access to capital to implement it),

Hours worked by type of employment



they would apply it. The informality seen in HEs (small scale, etc.) reflects the only business model which HE owners can implement. They lack the management skills to hire and manage workers, organise production at scale, adopt and adapt new technologies, procure inputs and manage inventory, and develop new customer bases. Asking HE owners to incorporate makes no sense – incorporation offers few benefits, and it would be an increased cost.

Incorporation and VAT registration do not change a business model, nor do they make a business more productive or more credit-worthy. Informality needs to be permitted for its own sake – as a livelihood strategy.

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References: www.rural21.com

Leveraging the employment potential of industries without smokestacks

For decades, economic growth and structural transformation was equated with manufacturing-led development. This applied to most of today's advanced and many emerging economies. With a global trend of premature deindustrialisation, an entirely different pathway could now open up for Africa, as examples from several countries show.

By **Brahima S. Coulibaly**



Like horticulture and tourism, agro-processing is intensive in low- and semi-skilled labour.

Photo: Jörg Böhling

Economists have long regarded economic transformation – the movement of workers from lower to higher productivity employment – as essential to successful economic development. Traditionally, the development of export-oriented industries, notably manufacturing, has been a key driver of structural transformation. Since the first Industrial Revolution in the 18th century, manufacturing has helped transform most of today's advanced and richest economies and, more recently, has been the catalyst of the East Asian Miracle. In these

economies, large numbers of workers leaving agriculture moved into manufacturing, driving growth, job creation and poverty reduction. However, evidence is emerging that manufacturing-led development is losing its effectiveness.

In 2015, Harvard economist Dani Rodrick documented a global pattern of premature deindustrialisation – in other words, declining peak shares of output and employment at lower levels of income – in recent decades. For

example, whereas manufacturing could absorb 30 per cent or more of labour for early industrialisers such as Great Britain or Sweden, now its share of labour is peaking at around 15 per cent or less in many emerging market and developing countries. Across Africa, manufacturing as a share of total economic activity has stagnated at around 10 per cent, with economic activity moving from agriculture to low-productivity services instead.

This global pattern of premature deindustrialisation suggests that manufacturing-led growth may no longer serve as a viable development model for current low-income countries. In this context, new research by the Brookings Institution's Africa Growth Initiative finds a promising alternative path towards economic transformation based on tradable services. These tradable services or “industries without smokestacks” (IWOSS) include subsectors like tourism, horticulture, agro-processing and certain ICT-based services.

Three salient features of manufacturing made it an effective development escalator. First, manufacturing goods are tradable, which provides possibilities for countries to scale up production beyond the consumption capacity of local economies, thus boosting national income. Second, manufacturing benefits from technological transfers, which allows productivity of local production to converge with that of global production. Third, importantly, manufacturing absorbs large numbers of moderately skilled labour at a productivity premium, de-

livering sustained aggregate productivity gains and driving structural economic transformation.

Within its research project, the Africa Growth Initiative has identified an emerging, novel pattern of structural change in Africa based on industries without smokestacks. Indeed, these sectors are outpacing manufacturing in many countries. Between 1998 and 2015, services exports grew more than six times faster than merchandise exports. Kenya, Rwanda, Senegal and South Africa have vibrant ICT-based services sectors. Tourism is Rwanda's largest single export activity, accounting for about 30 per cent of total exports, and provides 14 per cent of GDP in Tanzania. In 2014, 9.5 million tourists visited South Africa, contributing 3 per cent to its GDP. Ethiopia, Ghana, Kenya and Senegal all actively participate in global horticultural value chains. Ethiopia has achieved extraordinary success in flower exports, so much so that the country is now a global player in the sector. Industries without smokestacks are also relatively more labour intensive.

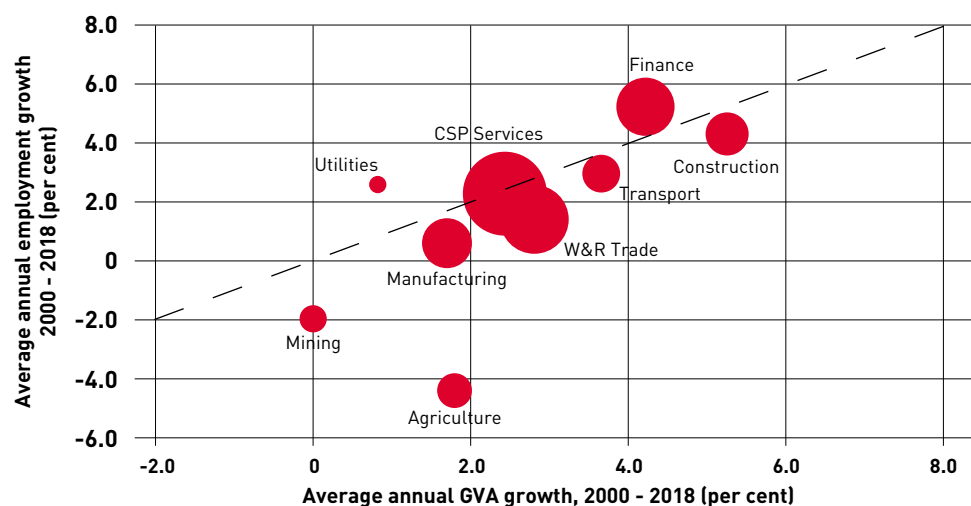
Leveraging IWOSS to address the employment challenge

While premature deindustrialisation is a global phenomenon not unique to Africa, the process will be more consequential for the continent, given the scale of the demographic and employment challenges. By some estimates, Africa's working-age population will grow by approximately 450 million people – about 3 per cent per annum – between 2015 and 2035. By 2050, Africa will have 362 million young people between the ages of 15 and 24 years. Where will the region find the productive jobs for such a rapidly growing, young population in the context of premature deindustrialisation? The ability to move large numbers of workers from lower to higher productivity activities will boost overall aggregate productivity and deliver structural transformation. The Africa Growth Initiative is conducting a research programme to assess the employment creation potential of industries without smokestacks in ten countries across Africa. The preliminary results, which are available for Rwanda and South Africa, show that IWOSS have an encouragingly high employment potential.

The case of South Africa

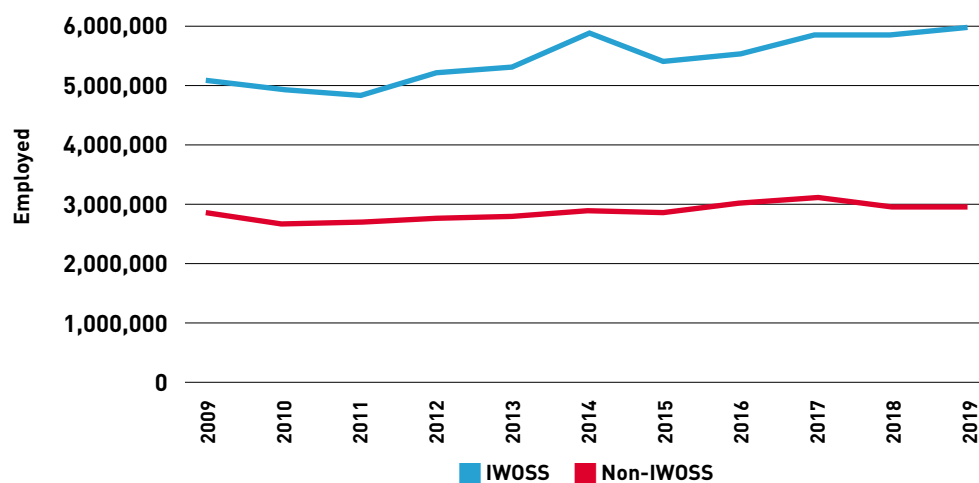
Economic growth in South Africa has remained very low since 1994, averaging just 2.7 per cent. The country's youth unemploy-

Gross value-added (GVA) and employment growth in South Africa, by sector, 2000-2018



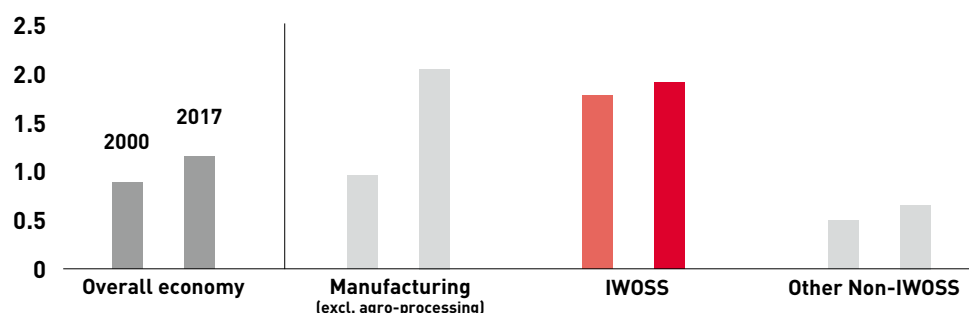
Source: Haroon et al. (2020)

Formal private sector employment in IWOSS and Non-IWOSS sectors in South Africa, 2019



Source: Haroon et al. (2020)

Labour productivity in Rwanda (millions of Rwandan Francs per worker)



Source: Newfarmer and Twum (2020)

ment rate – at close to 55 per cent in 2018 – is considerably higher than in comparable upper-middle-income countries or other countries in sub-Saharan Africa. Moreover, both overall unemployment and youth unem-

ployment have shown an upward trend over the past ten years or so. In short, like in many countries across Africa, South Africa's current growth path has failed to provide enough jobs for the low-skilled unemployed.

The post-1994 South African economy has been characterised by an eroding primary sector and a stagnant manufacturing sector – both concerning trends (see upper Figure on page 21). At the same time, there has been a shift towards services sectors, with finance, transport, construction and other services experiencing modest employment growth. Notably, the financial and community services sectors have accounted for over half of the increase in employment between 2000 and 2019. In short, while the shift to services may offer South Africa an opportunity for the type of structural transformation previously anchored by growth in manufacturing, this achievement depends, importantly, on the type of services. The middle Figure on page 21 shows the evolution of employment in IWOSS and non-IWOSS sectors. Out of 8.9 million formal private sector jobs in South Africa in 2019, IWOSS sectors account for over two thirds (68 per cent), more than double the share of non-IWOSS sectors.

In the face of premature deindustrialisation, South Africa already appears to be on a path of structural transformation characterised by a shift toward IWOSS. Industries without smokestacks, notably agro-processing, horticulture and tourism, are all intensive in low- and semi-skilled labour; in fact, about 90 per

cent of total employment in these sectors can be characterised in such a way. Thus, these sectors have the potential to generate employment for the low-skilled labour force on a large scale, if the operating scale of these sectors can be increased. Indeed, early projections indicate that, annually and on average, around 3.4 times more jobs are to be created in IWOSS sectors in comparison to non-IWOSS sectors, and that IWOSS will account for nearly 80 per cent of all new jobs through 2028.

The case of Rwanda

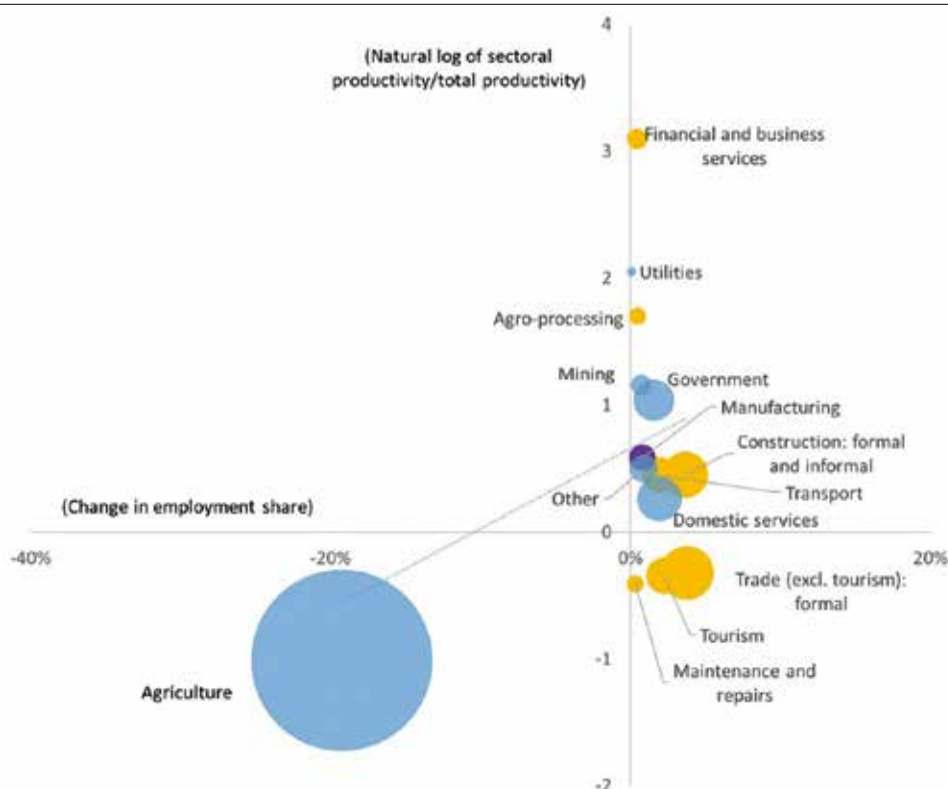
In contrast to South Africa’s economy, that of Rwanda has expanded rapidly, at an impressive eight per cent annually since 2000. However, like South Africa, Rwanda’s economic transformation has involved the movement of workers into progressively higher-productivity industries without smokestacks. As shown in the lower Figure on page 21, labour productivity, defined as value-added per worker, is comparable to that of manufacturing and twice as high as productivity in the overall economy. As such, the movement of labour into IWOSS sectors is occurring at a productivity premium that is boosting aggregate productivity and overall economic transformation.

Between 2000 and 2017, employment growth in IWOSS averaged nine per cent, three times higher than in the rest of the economy. Notably, employment in key IWOSS sectors such as agro-processing and tourism expanded at double-digit rates. By 2035, IWOSS are projected to generate nearly 70 per cent of new employment in Rwanda.

Shared characteristics allow two-tier development

As the preliminary results for South Africa and Rwanda illustrate, industries without smokestacks are tradable services with the potential to support structural transformation in low-income countries given their shared characteristics with traditional manufacturing. Like manufacturing, apart from being tradable, they benefit from technological innovation, and, very importantly, they are intensive in low- and semi-skilled labour. IWOSS sectors also benefit from agglomeration, including information and knowledge spill-overs. Most low-income countries often focus on developing special economic zones (SEZs) to promote manufacturing. SEZs are relevant to IWOSS sectors such as agro-based industries as well. The enabling environment that supports the development of manufacturing, including an adequate investment climate, capacity to export and agglomeration, is like that for industries without smokestacks. While economists have been increasingly confident that development models for today’s low-income countries, notably those in Africa, will be different from that of East Asia, they have been less certain about what shape these will take. The industries without smokestacks model offers an answer. Because manufacturing and IWOSS have similar characteristics and enabling environment, from a public policy perspective, it is happily not a choice between manufacturing and IWOSS. Policy-makers can develop industries without smokestacks alongside efforts to develop those with smokestacks, thus offering a multifaceted approach to achieve structural transformation and overall economic development.

Changes in share of employees and movement into higher productivity sectors in Rwanda, 2000-2017



Source: Newfarmer and Twum (2020)

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Demand-driven extension and advisory services – catalysing opportunities for youth in agriculture

While education access has improved globally, gains are uneven, and development impacts driven by increases in education continue to be left on the table, especially in rural areas. Demand-driven extension and advisory services (EAS) – as a key institution educating rural people while providing agricultural advice and supplying inputs – have a critical role to play in bridging the education gap. This can help ensure that millions of young people successfully capitalise on opportunities in agriculture markets, as surveys in Rwanda and Uganda demonstrate.

By Steven Franzel, Jane Lowicki-Zucca, Richard Miiro and Nicolas Uwitonze*

More people than ever before are accessing education around the world. In the last two decades alone, the number of out-of-school girls dropped by 79 million, and in the past decade, girls have become more likely to be in secondary school than boys. Evidence is clear that, on average, increased education is associated with increased opportunities for employment, lifetime earnings, national growth rates and innovation, and decreased poverty, gender inequality, child marriage, child mortality and child stunting. The global rate of return on one additional year of education is approximately nine per cent per year, with those in private sector employment benefitting even more.

However, major regional and country-level disparities have continued to leave 258 million children, adolescents and youth out of school, particularly at the primary level in sub-Saharan Africa. Although at 8 per cent, the proportion of youth in sub-Saharan Africa who are Not in Employment, Education or Training (NEET) appears more promising than the global figure of 20 per cent, informal employment predominates and masks the realities African young people face in finding and sustaining better (higher earning and more youth inclusive) jobs. About 38 per cent of Africa's youth live in extreme working poverty.

Many of the countries with the fastest growing youth populations in the world are in Africa. With a rapidly growing labour force, employment transformation (from household and self-employment to wage employment) is slowed. Most African youth must pursue informal, mixed livelihoods or commercial agriculture in household and other enterprises. Youth are often underemployed, and their level of success in agriculture and supporting markets is highly constrained by – among others – low levels of education (secondary, and management, technical and soft skills), lack of access to capital and technology and gender norms.



A young village agent with farmers in Uganda. The village agents use smartphones for registering farmers, helping them order inputs, sell produce and access information via call centres and videos and access services such as microfinance, insurance and soil testing services.

Photo: m-Omulimisa

Demand-driven EAS has a key role to play

Mass formal education and technical and vocational education and training (TVET) have not been able to keep pace and deliver high-quality, relevant education and skills development opportunities at scale to serve the record numbers of African youth expected to enter the workforce each year over the next 30 years. Vocational training investments have largely lagged behind market demands, supplying graduates with skills which are often mismatched to business needs, and which are able to reach only a highly limited number of youth. Although investments in high-quality formal education systems are critical, without

increased government revenue and conducive policies and governance, their inclusivity and sustainability will continue to fall short while pressure for youth employment generation rises.

Particularly in rural areas of developing countries, demand-driven extension and advisory services (EAS) have a major role to play in bridging gaps in know-how and connections that would enable large numbers of young people and businesses to successfully engage with one another in agriculture and supporting markets in the near term. More attention has been paid in recent years to targeting youth both as providers and recipients of EAS. But how is this occurring?

The United States Agency for International Development (USAID) Feed the Future Developing Local Extension Capacity (DLEC) project conducted a three-country study on youth and EAS in Rwanda, Niger and Guatemala. These case studies provided a landscape analysis to inform actions to strengthen the inclusion of youth in EAS to improve their livelihoods and increase the effectiveness of EAS systems. Following on from the three-country study, DLEC expanded the research to examine youth engagements in EAS in Uganda and Rwanda, and take a special look at demand-driven, private sector-led, youth-inclusive EAS models. The objective of this latter study was to assess how private sector EAS engages youth and what the potential is for greater engagement. It focused on private sector initiatives, public-private partnerships, and government, NGO and project initiatives to engage youth in the private sector. Results of DLEC's work are described below. Multiple methods were used to collect data for this study, including a literature review, key informant interviews and focus group discussions. Interviews were conducted with youths involved with such EAS initiatives across the two countries and with representatives of 37 private companies, NGOs, government, educational institutions and farmer organisations engaging with the young people in the initiatives.

Models for youth engagement in EAS

The following demand-driven models for engaging youth in EAS all involve youth as recipients of extension, while in the first, second and fourth, youth are also providers of extension. All four are pluralistic in terms of involvement by government, private sector and NGOs, but the private sector usually leads in the first two models whereas the public sector usually leads in the last two.

1. Fee-based extension services

Fee-based extension services are not widely considered as offering opportunities for youth employment because of youths' lack of expertise and experience. But youths have started successful fee-based extension companies in Rwanda and Uganda by focusing on niche enterprises for which there was scant expertise in the country. For example, youths returning from agricultural training in Israel started two private companies, HoReco in 2016 and Agriwin in 2017. HoReco trains extension staff, volunteer "farmer promoters" and farmers in irrigation and production techniques, and cooperative staff on cooperative management. Agriwin trains farm managers and their

employees on fruit and nut production. The companies took different paths to growth, with Agriwin relying on contracts with private farmers whereas HoReco's contracts were largely with government and donor agencies. As of early 2020, HoReco employed 104 extension staff (89 per cent youths) and Agriwin 20 (100 per cent youths). In Uganda, the Uganda National Apiculture Development Organization has trained 150 "drones" (the name they give to their extension staff), all youths, who provide fee-based advisory services to beekeepers and start other businesses in the honey value chain.

2. Village agents

Village agents in Uganda link farmers to input suppliers, produce buyers and other service providers. Often paid through sales commissions, they may work directly for these service providers or for NGOs, projects or private companies which link farmers to inputs and services. There is much variation in the amount and types of information that village agents supply to farmers. Village agents of some companies, such as m-Omulimisa Ltd., provide only basic information about the inputs they are selling. Village agents of other companies provide general extension advice, and some, such as those of Akorion Ltd., are able to share videos, weather information and other resources through their smartphones. Some conduct soil tests to customise fertiliser recommendations. Some also, such as m-Omulimisa, "bundle" inputs, providing them on credit and deducting the debt from produce sales at harvest time. The agents manage this process at the village level, and many use apps on their smartphones to do so. Many also facilitate interactions between farmers and other value chain service providers such as banks and insurance companies. Five companies interviewed in Uganda employed 106 agents on average and served about 130,000 farmers. Around three-quarters of the agents were youths.

3. Strengthening youths' skills and capacities

Programmes to strengthen rural youths' skills and capacities with a business focus were common. For example, the Africa Institute for Strategic Services and Development at Makerere University, Uganda, trains rural youth in livestock and business skills on demand. An important weakness of some training programmes was that they were not integrated into a broader strategy of increasing employment and offering support services such as coaching and credit. The USAID "Get Trained and Lets Work" Project in Rwanda

addressed this weakness by using a holistic approach, the Youth Options Pathway Model, which ensures that technical training is integrated with financial services, soft skills such as work readiness, and coaching, leading to self- or wage-employment. Needs assessments are conducted to find out youths' aspirations, assets and constraints. Training topics include foundational training such as goal setting, leadership and financial literacy, as well as technical vocational training. Business incubation hubs such as the one at Bishop Stewart University, Uganda, which helps youths create and grow young businesses, are an important sub-category of this model.

4. Internships

Internships offer an effective way for youth to strengthen skills, gain experience, enhance their marketability, develop professional networks and realise that there are fulfilling careers in agriculture. The Rwanda Development Board (RDB) has an internship programme for university graduates, placing them in public institutions or private companies and paying the interns a stipend for six months. USAID's Private Sector Driven Agricultural Growth Project (PSDAG) worked with RDB and other partners to strengthen the programme by extending 328 internships to agribusinesses and cooperatives to one year, providing orientation training and helping interns find long-term employment. The programme also had an additional dividend – many interns were hired by their hosts when their internships ended.

Implementing EAS models – lessons and recommendations

Even though the individual models are based on very different approaches, some common conclusions can be drawn from the surveys.

Differentiating among youth. More consideration needs to be given to understanding the heterogeneity of youth, and programmes need to be tailored to the contexts of particularly vulnerable youth segments. For example, more attention is needed for helping economically poor rural youth who have not completed high school and understanding their varying aspirations, needs and contexts. Dedicated resources for conducting youth assessments should be required in project planning, and targets should be set and monitored for achieving levels of youth inclusion. Incentives for private companies to hire youth should also be encouraged, such as corporate social responsibility awards or tax credits.



Constraints including domestic responsibilities and negative attitudes towards women's capabilities lead to women still being underrepresented in public and private extension services, despite many improvements.

Photo: Steven Franzel

Helping young women. A corollary of the above is the need to focus on gender at the same time as youth. Otherwise, the benefits accruing to youth may benefit only young males, particularly if the unique constraints that young women face are not addressed. These include domestic responsibilities, which limit women's mobility and time-flexibility, lack of access to land and negative attitudes about women's capabilities. Again, it is imperative that incentives, such as those mentioned above, are created for organisations and companies to set, monitor and meet gender targets. Public and private extension services have learned a great deal in recent years concerning how to increase their proportion of women, such as proactively encouraging women to apply for positions. These lessons need to be more widely shared.

Market-based solutions. Private sector, market-based solutions help ensure sustainability, as in the above-mentioned cases of fee-based extension and village agents. Inclusive markets are achieved when youths benefit from engaging with and within the private sector, and when other actors, including the private sector, benefit from engaging with youth in markets. The right incentives are needed to ensure that private-sector engagement with young people involves extension, where information is exchanged that gets at learning gaps among youth and others. Sometimes, businesses take the initiative, and other times, governments and development actors have facilitation roles to play, including that

of reducing risks of investing in new ways of doing business. One of the underlying private sector interests in youth engagement is workforce development, as exemplified by the internship model. Among other motivations for youth engagement, businesses are also interested in increased sales, market share and profits, public relations, and at times, the achievement of social impacts.

Ensuring that youths also have incentives to engage is critical, and short-term financial gain, though important, is not the only incentive that youths consider. For example, the fact that some village agents have gone on to become input suppliers provides a huge incentive for other youths to become village agents. Non-financial incentives are often also important such as improving one's social status and developing social networks. Village agents who are youth may be best-placed to influence and engage other young people in agricultural markets and encourage more expansive peer-to-peer exchange.

Effectiveness of public-private partnerships. Many successful initiatives feature collaboration among different types of development partners. For example, the internship programme mentioned above involved the Rwandan government administering the programme, private companies hosting the interns and a development project providing training. Private companies, government and development projects also partnered effectively in Uganda's village agent models.

Digital tools. Digital tools have important benefits: enhanced communication and feedback, improved economic efficiency and added prestige to agricultural enterprises. The considerable emphasis being given to digital tools needs to be sustained. Increased research is warranted to assess performance and guide future use of these tools, particularly for ensuring that the economically poor and traditionally underserved have access to them.

Interestingly, the above models are not being implemented uniformly. Rather, there are important variations in each of them as different implementers test different approaches. Do twelve-month internships in extension result in significantly more youth employment than six-month ones? Or would six-month ones give an opportunity for twice as many youth to get involved? Will the cost of making the young village agent an extension agent pay for itself in increased sales, or is a village agent that does not provide EAS more cost-effective? Or is backing up the village agent with a call centre, as two Ugandan companies do, a more effective strategy? Research to rigorously assess the advantages, disadvantages and cost-effectiveness of different models and how best to implement them could go a long way towards improving the viability of the models and the potential for young people, and the companies and markets they engage with to benefit from them.

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Skills development – what the dual approach can achieve

Traditional apprenticeship training should again be given more significance in development cooperation, ideally via the dual training approach, our author maintains. In the article below, he explains why this concept is so promising and how it can be applied in the Global South.

By Winfried Heusinger

Learning, i.e. the dissemination of knowledge and skills has made humans what they are today. This ability, in its complexity and immanent function, which is based on the transfer of abilities and skills from an experienced practitioner to the learner, accompanies an individual from birth. It is thus a central feature of our civilisation, which has been manifested through apprenticeship training for thousands of years. In all cultures, the older and more experienced individuals pass on their skills to the next generation. Apprenticeship training is thus not only a tradition but also a characteristic of our species, especially when it comes to the acquisition of practical skills.

As a result of the ongoing process of academisation, which is being driven by the commercial interests of international education providers and a universal tendency in society to portray academic education as a superior form of education, traditional apprenticeship training has been removed from the focus of development cooperation, and has even been regarded as backwards, assigned to the informal sector or, at best, ignored. This is all the more surprising because the universally recognised dual system of vocational training, which has been particularly successful in providing the economy with the necessary qualified specialists in Central Europe, is based on traditional apprenticeship training. Thus, dual vocational training is an optimised apprenticeship training, combining the increased demand for theoretical background knowledge, which is becoming more necessary to carry out practical work professionally, with the master craftsman-apprentice principle, for the benefit of all stakeholders.

Creating a win-win constellation

Consequently, forward-looking, sustainable and financially viable vocational training systems will emerge in the Global South if the traditional apprenticeship system can be success-



Two young men being trained as energy technicians in Mongolia.

Photo: Winfried Heusinger

fully designed as a dual system. This requires part-time vocational schools to make apprenticeship training an integral element of the formal education system, thus simultaneously improving the quality of vocational training. It is crucial for success that there is no excessive bureaucracy, which is inevitably linked to mechanisms that promote corruption. Rather, the aim is to establish a trusting partnership between the private and public sectors. Such a partnership will only be successful if a win-win constellation is created which enables companies to carry out apprenticeship training without financial losses and at the same time provides young people with the quality of training that enables them to successfully position themselves on the labour market.

By being trained directly in the work process, the learners are equipped with the skills that are actually required by the employer. The learners are also given the prerequisites to be able to become self-employed after training, for example as a subcontractor, which is a common

form of employment in many economies of the South, as existing companies are often unable to provide enough jobs. The countries are frequently overburdened with the necessary resources for satisfactory vocational training. Part-time vocational schools can make more effective use of the scarce resources of the state. At the same time, it can be assumed that the quality of training in vocational schools will increase because both places of training benefit from the alternation between practical training in the company and in the vocational school, as knowledge and know-how is actively transferred to both partners by the learners.

A constellation must be created for the training companies which prevents the employer from incurring a financial loss through apprenticeship training. However, particular care must also be taken to ensure that apprentices are not misused as cheap labour. Rather, the employer must see the vocational training as an investment that pays for itself in

the course of the training. This is already the case with traditional apprenticeship training. The combination with part-time vocational schooling can be expected to significantly increase the effectiveness of the training process, as well as generating a technology transfer to the participating training companies.

A dual approach must therefore take into account the interests of all parties involved in order to create a system that can function without payment flows, as money transfers basically carry the risk of corruption. Additionally, a cost-effective framework is to be created which, unlike a CBET system (Competency-Based Education and Training, a very popular educational product which is mainly marketed by English-speaking countries), functions without formalities that cannot be financed, such as complicated accreditation procedures or small-scale certification mechanisms. Instead, the system is based on traditional procedures that are integrated seamlessly into the social and cultural reality of the people.

Bridging the gap between the world of work and the world of education

Not only are school-based vocational training systems hardly affordable, they also lead to a relatively large gap between the world of education and the world of work. This is due to the fact that the teaching staff move further and further away from the reality of the world of work the longer they teach. However, if the largest and especially the practical part of vocational training takes place in the companies, then, thanks to the system, this gap does not arise. Apprenticeship training is therefore a guarantee that vocational training produces skilled workers who are optimally prepared for the labour market. Of course, at this point it is of crucial importance that there are responsible persons in the companies who can act as In-Company Trainers (In-CT). Basically, an In-CT is a master craftsman from the traditional apprenticeship system who has to continuously be qualified further, not only to guarantee the desired training quality, but to also strengthen the competitiveness of the participating companies. The integration of the apprentices into the labour market will only be successful if the training can be carried out in the companies with the appropriate quality. This is therefore an essential factor which must not be neglected under any circumstances. Almost all cultures have a positive concept of the master craftsman, and here too there is a good starting point for profiting from the traditional apprenticeship system. Master craftsman training can be formalised and integrated into the qualification framework. This can also provide young people with an attractive and valuable alternative to further qualification outside the university world.

While practical apprenticeship training in companies is carried out directly in the work process, the quality improvement through digitisation offers opportunities for the transfer of theoretical and methodological background knowledge. Teaching staff in vocational schools often do not have access to necessary and up-to-date training material. Moreover, teachers are often very poorly paid, which means that the motivation situation is not optimal. Didactically well-prepared training sequences that are oriented towards actual customer orders and made available via online platforms have a considerable potential to enhance the quality of apprenticeship training.



A trainee at a construction industry inter-company training centre in Frankfurt am Main/Germany.

Photo: Winfried Heusinger

Taking advantage of this potential can build on the fact that smartphones have now also become standard in the countries of the South. For example, apprentices can be encouraged to produce their own learning sequences in video format and make them available to other apprentices on the Internet. This can significantly increase the learning effect on the one hand, and on the other hand it gradually creates a rich pool of learning videos, which enables learners to gain an insight into other working environments. This can ultimately improve the learner's chances on the job market. A professional evaluation of the learning applications created must be carried out by a competent body.

Paving the way for lifelong learning

If a learning ecosystem is created in which the learner is actively involved in the learning process, an outstanding goal of dual vocational training can be achieved: preparing for lifelong learning. We all know that we are living in a time of rapid technological change – a change that has affected all sectors of the economy. We also feel that this change will continue, making it clear that what has been learnt previously cannot guarantee its value for the labour market in the long term. In

dual vocational training, it is clear to the learner that he or she can see this process as an opportunity. The focus of training is not on processing pure factual knowledge, but rather on developing a mentality that enables the apprentice to learn. Above all, this includes how continuous learning can be structured, how the necessary information can be found and verified and how this can be used to arrive at optimal decisions for the work process. In such an approach, which is only a representation of the design of a work process, the learner is qualified to realise continuous learning as part of working life.

There are promising approaches in Afghanistan to make traditional apprenticeship training more efficient using dual components and transferring it to the formal education system. Other examples from Nepal, Bhutan and African countries also show that dual vocational training concepts adapted to local conditions can lead to a win-win constellation between apprentices, companies and the state. For state institutions, the dual approach creates the opportunity to use their own resources more effectively.

For example, a part-time vocational school can provide three classes instead of one using the same premises and teaching staff. An increase in the quality of training can also be expected since the intermittent approach means that the two learning locations correspond with each other at the technical level as well.

The dual training approach can also be transferred to higher education. In dual courses of study, the training time is divided between the university and the company. The same mechanisms are used here as for apprenticeship training, with a stronger focus on planning and organisation. For the companies, this has the advantage that graduates of such a dual course of studies can get to know the structures within the company, which is of great advantage for the pursuit of engineering tasks, for example. Here, too, it is evident that this form of training leads to skilled workers who are optimally prepared for the job market. The companies in turn gain access from human resources whose level of quality cannot be found on a labour market.

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What works in rural (youth) employment?

Job creation has become a major objective in development cooperation. However, regarding rural areas, there are only few strategic analyses that address the aspect of which factors promote (youth) employment. A study of different approaches in a number of African countries demonstrates key success factors.

By Julia Müller and Frank Bertelmann

The population in Africa will double by 2050, the average sub-Saharan African is about 18 years old. Every year, 25 million new jobs need to be created for young people entering the labour market in Africa. A large proportion of them live in rural areas. With both a fast-growing demand for food and under-utilised resources, the agri-food sector has by far the largest potential to create additional employment opportunities, as shown in recent studies, e.g. by OECD-SWAC on “Agriculture, Food and Jobs in West Africa”. However, major challenges need to be addressed. Rural youth often see (traditional) agriculture as a less attractive, low-opportunity occupation with high risks and drudgery owing to outdated working practices. They tend to be biased towards white-collar jobs in urban areas. Additionally, access to education and training, advice and services (especially financial services), land, markets and networks, physical and digital infrastructure and technologies is comparatively weaker than for more experienced adults and their urban peers. Young rural women are affected disproportionately with a “triple burden” as framed in IFAD’s 2019 Rural Development Report.

In order to better understand what works in rural youth employment promotion, eleven programmes being implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in Africa have been analysed in the context of a stocktaking study. The pro-

grammes cover a wide range of global, continental, regional and bilateral projects against the background of different development approaches e.g. rural and value chain development, vocational training and private sector cooperation as well as national employment policies. Based on eleven case studies focused on the African continent, the study presents systematic insights on how projects address the issue and what can be learned from that for future strategy and portfolio development.

Adapting the integrated approach to the context of rural areas

In German development cooperation, an integrated approach has proven to be useful in employment promotion. In a nutshell, it connects the main elements of labour demand and labour supply with matching services and an enabling environment. Nonetheless, given the distinct characteristics within the agri-food sector, the approach needs to be adapted regarding a number of key aspects related to the specific features of rural economies.

First, in rural settings, informal and entrepreneurial training approaches take a higher priority on the supply side of the labour market than formal vocational education and training. Secondly, small and micro-enterprises and small-holder farmers with a high share of self-employment and family labour play an important role on the demand side of the labour market. Thirdly, due to limited institutional capacities and public services in rural areas, matching services are much more challenging and should include the matching of labour (e.g. access to freelance work, job placement, internships) as well as products and services (e.g. farmers’ access to markets for their products). And finally,

the addition of “labour market foundations” addressing the inclusion of young rural women, changing the perception of agriculture as

well as building the right meso-level support structures (including e.g. strong youth networks, training and incubation centres, etc.) is important in complementing the key interventions in promoting skills development and business opportunities.

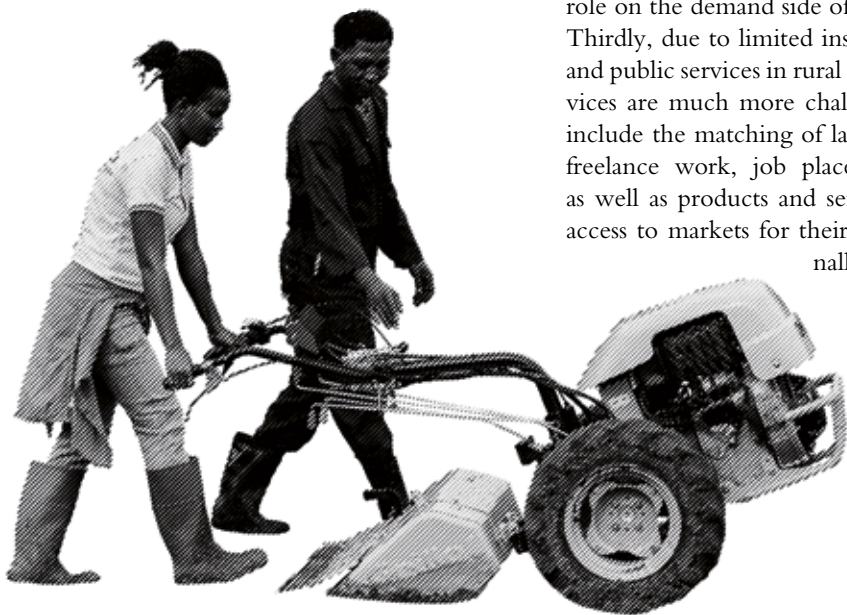
Key success factors

Derived from the detailed analysis of good practices and lessons learnt from each case study, 18 success factors have been mapped and clustered along four project dimensions (see Figure). While several of the success factors are specific to rural youth employment, others are relevant in the broader context of rural development or employment promotion programmes or even development projects in general. By further generalising these success factors, four main aspects are of particular importance as they played a crucial role in nearly all the programmes and represent, as it were, core standards that every project on rural youth employment should consider:

Leverage local partner structures to strengthen youth as key actors for development.

To be successful in a complex topic like rural youth employment promotion, programmes should pay attention to relevant context factors. This can be achieved, e.g. by close alignment with national or continental development agendas. Fostering buy-in and ownership of (political) partners and promoting activities that cultivate trust between rural youth and political decision-makers can be of additional value. Projects must promote a sense of shared stakeholder ownership and collaboration in local ecosystems and multi-stakeholder platforms. Embedding programmes in national policy frameworks, e.g. the integration of agricultural curricula into national education frameworks, may add to their complexity, but it usually pays off by contributing to efficacy, sustainability and the potential for upscaling.

Acknowledge the employment realities and needs of rural youth and work with multi-component approaches. Since youth in rural contexts usually face a wide range of



specific and interrelated challenges, programme strategies and design factors should include a multi-component or “integrated” approach, addressing key factors of skills development, enterprise development and matchmaking services. Thus, it is paramount to adapt and tailor formats and delivery modes to local conditions and employment needs, especially as the rural youth are no homogenous group. Youth organisations and networks play an essential role in involving young people in decision-making processes. They should, therefore, be an integral part of the stakeholder landscape.

Transform the image of agriculture – from subsistence agriculture to profitable business models. Offering youth a broader view of the agri-food sector, especially on attractive on- and off-farm job opportunities along value chains, can help to spark their interest. Drafting specific business-opportunity studies and setting up flexible implementation structures allow projects to identify and build service offers around context-specific business models. Programmes can promote the development of modern and innovative agri-food networks, including parties who grow, harvest, process, package, transport, and market agricultural products, consumers, restaurants and waste disposal, too. Supporting awareness campaigns and successful “agripreneurs” as role models and mentors will help in transforming the perception of the sector and developing productive employment opportunities.

Strengthen multi-stakeholder coordination and cooperation with the private sector. Programme activities should be well-coordinated and agreed with the diverse range of relevant public and private stakeholders to capitalise on existing resources. In this way, they can break up so-called silo thinking and facilitate the creation of coherent support services. Private sector perspectives are particularly relevant for the selection and development of employment-intensive value chains as well as for needs-oriented curricula and qualification offers. Market-driven approaches help to identify robust business models with relatively low risks and investment costs that are

SUCCESS FACTORS OF RURAL YOUTH EMPLOYMENT (RYEP)

PROCESSES

- Alignment with national or continental development agendas
- Buy-in by political partners and local authorities
- Empowerment of rural youth through meso-level support structures
- Improvement of young people’s perception of agriculture

PARTNER & PEOPLE

- Use of an integrated approach to employment promotion
- Use of a long-term time frame
- Use of specifically focused programme design
- Provision of support using a multi-component approach
- Adaptation of employment-promotion activities to the needs of rural youth

CONTEXT

- Business opportunity studies to identify market-driven opportunities
- Flexibility in programme structures
- Use of RYEP indicators and a theory of change
- Exchange of knowledge with other programmes or organisations

DESIGN

- Use of co-funding to increase flexibility
- Collaboration with private sector to respond to market needs
- Facilitation of stakeholder coordination and alignment
- Work through local partner structures
- Capacity-building for local service providers

Source: Own elaboration, based on GIZ projects interviewed.

suitable for young entrepreneurs. The private sector is also crucial to harnessing the expertise and, finally, to mobilising resources for investments in job creation and income generation.

Further recommendations and key takeaways

Building on the results outlined above, there are two main recommendations for shaping youth-specific interventions as well as the overall portfolio for rural youth employment promotion. First, it is important to address employment promotion more holistically, combining activities on the supply side and demand side of the labour market. For successful employment creation, all elements of the integrated approach should be comprehensively analysed and addressed if necessary. However, this does not mean that everything needs to be realised within one project or institution alone. It is crucial to take the distinct characteristics of employment in rural areas into account and shape approaches accordingly. Secondly, depending on specific contexts and target group demands, policies and programmes need the right balance between mainstreaming youth aspects in broader economic development promotion and developing youth-specific solutions to address challenges such as access to

information, land, capital and markets. Both are necessary to capitalise on the manifold opportunities that the agri-food sector offers to contribute to a true “youth dividend”.

To really answer the question “what works in employment creation”, further research and more systematic knowledge management will be necessary. Only comprehensive programme evaluations will allow for a deeper understanding of the most effective approaches to create broad-based employment opportunities and to achieve scalable impacts. However, it is interesting to already see the different types and scales of results, outreach, and impacts on rural youth employment and beyond, that the projects achieve in their specific contexts. The study also outlines a couple of additional open questions for further research, e.g. on the impacts on land

rights, the prevention of a brain drain, effects of mechanisation and digitalisation, or the quality (and future) of work. In this sense, the results of the study represent an important, albeit only initial step for future strategy development and project design, helping to shape development programmes and investments in the field of rural youth employment promotion. Besides the suggested research, it would also be of interest to broaden the regional and institutional scope of the analysis by including experiences of other institutions who are likely looking for similar answers.

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Link to study: www.rural21.com

Africa's face of agriculture is female

Africa has a huge opportunity to make agriculture its economic driver. However, the potential for this is far from being made exhaustive use of, one reason being that women face considerable difficulties in their economic activities. The organisation AWAN Afrika seeks to change this state of affairs.

By Beatrice Gakuba

If you are driving along any major highway in Africa, you will not miss women crowding at bus stops, farm produce in their hands, seeking possible buyers for their wares. Unmistakably so, because women control a sizeable portion of trade in agricultural produce in Africa, be it in production, where, according to the United Nations Food and Agricultural Organisation (FAO), 50 per cent of the entire agricultural labour force is made up of women, growing nearly 70 per cent of Africa's food and therefore contributing about 21 per cent of sub-Saharan Africa's Gross Domestic Product (GDP).

These statistics are a clear indication that women contribute to Africa's economic and food security. Yet policies in African countries continue to deny women the full rights over the land that they tend or even the earnings that they derive from their produce. According to the Center For Women's Land Rights, 65 per cent of land in Kenya is governed by customary law, which gives men precedence in land ownership over women and applies in various forms throughout Africa. It means that the women who tend to the land cannot use it as collateral should they need a bank loan.

Furthermore, women are denied a seat at the decision-making table that determines land rights as well as agricultural policies. Yet numerous research programmes have shown that if women had the same access to resources as men, then agricultural yields in Africa would increase by up to 4 per cent, reducing the number of hungry people by 17 per cent. Despite being endowed with more than 20 per cent of the world's arable land, Africa's food import bill stands at 35 billion US dollars and is expected to reach 110 billion by 2030. In this decade of action, Africa has a huge opportunity to make agriculture its economic driver.

Yet there are several barriers that hinder women's success in agribusiness, despite their representing 70 per cent of Africa's agricultural activities. Women lack access to capital, farming inputs as well as knowledge on new technologies on sustainable farming practices and local, regional and global market trends,



An AWAN Afrika B2B session during the organisation's Continental Conference 2019 in Kenya, Nairobi.

Photo: AWAN Afrika

just to mention a few restrictions. Value addition is still not fully exploited on the continent – most African countries continue to export their food, for example cocoa, tea and coffee, as raw materials and then import it as finished products. African markets are still stationary buildings which to access farmers must use a poor road network, where movement is weather-dependent, so that a lot of food does not reach the markets and will waste away in farms with poor infrastructure and poor storage facilities. While E-commerce is slowly gaining ground on the continent, it is still a preserve of a few tech savvy farmers especially the youth, who unfortunately have no access to land and capital to start businesses.

A tailwind for women and youth-owned agribusinesses

As a non-profit network limited by guarantee, the Africa Women Agribusiness Network (AWAN) Afrika was established with a vision to create a platform for African women and youth in agribusiness to access finance, markets, and trade information. The aim is to enable and accelerate their businesses by leverag-

ing opportunities available within the regional markets, and for them to tap into the newly created Africa Continental Free Trade Area (AfCFTA) and global markets. It is a network that comprises individual members' businesses such as producers, processors, aggregators, export companies and input suppliers, among others, across 38 countries in Africa.

For agriculture to be profitable, we have to embrace technology. The organisation provides women-owned and youth-owned agribusinesses with an E-Hub, which is a repository of information on agriculture along value chains and supply chains and also facilitates access to new agricultural technologies. #AWANAfrikaUnder30 champions are African youth of either gender engaged in agribusiness. Since our establishment, we have registered 1,500 women- and youth-owned businesses and groups in our network in 42 countries, and we have impacted over one million women-owned small agribusiness enterprises (mama fish, mama mboga), which we do through regular coaching.

Some of the major obstacles to Africa's agribusiness that I mentioned above would be

solved if women and youth had access to finance and financial services, yet women and agriculture are still considered a risky business by most banks and lenders, who will not offer them loans for farming. At AWAN Afrika, we work with financial institutions advocating for innovative financing models for our members, be it digital loans or the use of facilities other than land as collateral. We also lobby governments to work on policy that makes it easier for governments to support lenders who prioritise women and youth in agribusiness.

Furthermore, we train our members on the need for market-driven agriculture, which ensures them ready markets for their produce. This ties in with our other two pillars of Technology and Trade facilitation – where we see to it that our members are keeping up to date on agricultural information via our E-hub repository for agricultural information, which informs them about trade, including agreements between trading blocs, as well as standards and certifications. It also provides them with the latest information on trading in different markets. At the moment, we are engaged in ensuring that our members are not left out of the African Continental Free Trade Area, which will offer a bigger market and a chance for Africans to trade more with each other.

We are in the process of finalising a platform that will connect our continental digital platform with the aim of linking women's agribusinesses with buyers, exporters, investors, Agritech companies and other value chain actors to facilitate inclusive participation in the continental and global markets.

Moving forward

We have but scratched the surface, and much more needs to be done if women are to benefit from their labour in agriculture. Working with development partners, African governments must deliberately introduce training on the whole agricultural value chain, targeting women and youth. It is clear that agriculture will be the next youth employer. But out of the eleven million youths entering the job market in Africa each year, only three million are able to get gainful employment. Governments and development partners should support initiatives like AWAN Afrika to scale up our activities in order to reach more women and youth.

What about COVID-19?

Finally, as Africa stares at its first recession in 25 years, owing to the effects of the COVID-19 pandemic, international solidarity with the continent is required to keep businesses afloat. The first victims of the sustained lockdowns and restriction of movement measures put in place to contain the spread of the Coronavirus are women smallholder farmers and young agripreneur start-ups. Women will be affected down to the household level due to additional work as a consequence of the lockdown.

Post-COVID-19, the international community has been left devastated, and traditional lenders will be dealing with their own domestic challenges. While big businesses will decry a lack of stimulus packages, for informal traders and smallholder farmers, these packages may

IMPACT OF COVID-19 ON AGRIBUSINESS

31 African countries have imposed full border closures – as governments battle to contain the spread of the virus, this means that in some areas, smallholder farmers, who make up 80 per cent of Africa's food producers, cannot farm.

There are fears that production will fall in the various sectors. Much of Africa's agricultural production is manual, and the ongoing lockdowns and restrictions in movement are likely to cut labour supply but also harvests and supplies. The disruptions have also affected the value chain, for those in agribusiness are not able to reach markets.

Unlike wealthy countries, African agribusiness players do not have the resources to cushion their businesses from the effects of prolonged closures and lockdowns. This therefore calls for urgent financial interventions to help them build resilience for their businesses and also recover from the effects of the coronavirus pandemic.

actually not be the solution. We need to seek solutions that will impact the lives of millions of vulnerable farming families.

AWAN Afrika is in the process of finalising a survey on the impact of COVID-19 on Small and Medium Enterprises. We aim to understand their coping mechanisms and what their businesses are going to look like eight months from now. Women will suffer a double blow, because now, in addition to losing income, they must take care of their children, who are at home as schools are closed, they lack labour to manage their farms, and domestic violence is on the rise.

We, the AWAN Afrika initiative appeal for the support of our project, which is based on a business model that seeks flexible funding to help our Small and Medium enterprises survive the economic shocks of COVID-19. Businesses need cash, and our women have no access to cash sources. As many of these women have told us, for them, hunger is closer and more dangerous than COVID-19.

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A common sight along Africa's roads. Women control a sizeable portion of trade in agricultural produce.

Photo: Jörg Böhling

References: www.rural21.com

Livelihoods beyond survival

Dignity, stability, resilience: Our author from the Living Income Community of Practice explains how the concept of a living income evolved and why putting it into practice is more important today than ever before.

By Sheila Senathirajah



Many farming families in the Global South are not able to earn enough for a decent life.

Photo: Curt Carnemark/ World Bank

Ensuring resilient livelihoods and sustained employment for vulnerable communities was already a stretch in normal (pre-COVID-19) times, but we have now entered a new reality. For most of us, this situation has largely meant a change in the way we work and live, an inconvenience at most but still largely manageable. However, for vulnerable communities that lack a stable income, the impact is significantly different. With border closures and travel restrictions in place, the subsequent downturn in trade has massively affected income and employment of vulnerable communities, particularly those that are self-employed. These self-employed people also include small-scale farmers. Currently, more than 475 million smallholder families work on less than two hectares of land. In addition, average equilibrium market wages can be low, with prices that farmers earn for agricultural produce economically unsustainable.

It is a fundamental human right to be able to earn enough for a decent life. But for far too many people, particularly farming families in the Global South, their income barely covers the cost of living. Families struggle to afford

the food and healthcare they need or to send their children to school. Even for those who are getting by, a bad harvest, an accident or some other unexpected event – like the one we are experiencing now – is all it takes to tip them back into poverty.

It does not have to be this way. When farming households earn enough to live on, it is more than their own quality of life that improves. They can afford to reinvest in their farms, buy equipment and new seeds, and raise the quality and diversity of the crops they produce. Yields and profits increase. Families can set something aside to see them through difficult times. Women set up new businesses. Children no longer have to toil in the fields, and their parents can pay school fees and buy uniforms. The vicious cycle of poverty becomes a virtuous circle.

Living income – directly linked to the SDGs

The concept of living income clearly has implications for sustainable development and links directly to a number of the UN's Sustain-

able Development Goals (SDGs), in particular, SDGs 1 (no poverty), 2 (zero hunger), 8 (decent work and economic growth), 10 (reduced inequalities) and 17 (partnerships for the goals). This is not to say that these are the only associated goals. In fact, organisations such as the Sustainable Food Lab and Business Fights Poverty have identified levers for improving smallholder incomes that strongly associate with several other SDGs.

An increasing number of organisations have begun focusing on the concept of a living income – defined as the net annual income required for a household in a particular place to afford a decent standard of living for all members of that household. This includes food, water, housing, education, healthcare, transport, clothing and other essential needs, including provision for unexpected events.

The concept of living income builds on the work of the Global Living Wage Coalition, which publishes living wage levels for different countries based on a shared definition and methodology. While a living wage applies to hired workers in farms, factories and other enterprises, a living income also encompasses the hundreds of millions of smallholders and farmers who are self-employed and can be more complex to address. These households may earn income from multiple sources, including off-farm labour and other businesses as well as a variety of crops. To understand and address this complexity, a multi-stakeholder approach is needed.

Chances and challenges

Of course, efforts to reduce poverty and improve conditions for smallholders are hardly new. But the idea of a living income is about more than just basic subsistence and survival: it is about dignity, stability and resilience. And it leads to lasting change. Because so many of these smallholders are linked to global agricultural and commodity supply chains, it is a shared responsibility.

The business benefits of assuming such responsibility and investing in smallholder sup-

ply chains are also evident. They can include long-term supply security, improved quality and yields, greater supply chain transparency and new market creation. Supporting smallholders can also build stronger government relationships, increase the ability to meet stakeholder expectations, enhance reputation and align with initiatives such as the SDGs. In some cases, investing in local supply chains reduces costs and minimises price volatility and currency risks.

While tackling poverty may seem impossibly broad, a living income provides a clear, measurable and consistent view. By looking at what constitutes a living income for smallholders in a region and what they earn today, it's possible to get a clearer idea of what action needs to be taken to close that gap and subsequently move beyond.

Effective strategies to close the income gap

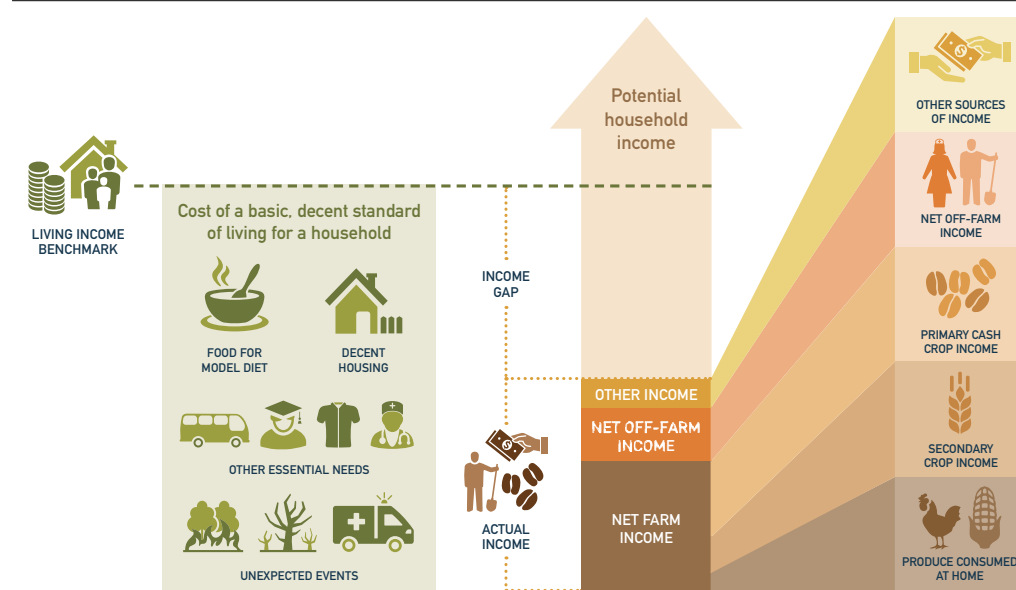
There are various levers in place to help drive change and close the income gap, such as:

- implementing sustainable programmes at the producer level
- applying a smart mix of solutions to balance supply and demand
- embedding sustainability systems and strategies to specifically address living income.

In addition to this, subsequent monitoring and reporting on improved outcomes is equally important. In this respect, sustainability standards play a significant role in implementing activities and functions to help bring about specific short- and medium-term changes, which help achieve long-term goals. We see examples of these in the Fairtrade living income strategy, which comprises a holistic approach to address income as a specific topic, and the Roundtable on Sustainable Palm Oil's smallholder strategy, which not only stresses the importance of smallholder inclusion in sustainability programmes, but also places livelihood improvement as a key objective.

In addition to these efforts already in place, more needs to be done to better address the biggest challenges faced by all (not just a few) segments of vulnerable communities. For example, the poorest of the poor that are hit the hardest. Greater inclusion involving governments and the public sector need to be considered. Questions remain. What have we not yet done? What other strategies need to be consid-

The Living Income Story



Source: The Living Income Community of Practice

ered? Who are the other relevant stakeholders that need to be in these conversations?

The Living Income Community of Practice, coordinated by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Sustainable Food Lab and ISEAL Alliance, is a vital platform for tackling such questions. Formalised in 2015, the community of practice acts as a platform for motivating actors across sectors to help close income gaps, so that smallholders can earn a decent standard of living as a basic human right. It drives multi-stakeholder discussion on common definitions and approaches to calculating actual and living incomes. Providing clarity and guidance on baselines and benchmarks are conducted. Transparency and data sharing among stakeholders is encouraged. Through the community, different actors in the living income space can share information about their efforts, including updates on upcoming living income studies, benchmarks and development activities.

Where are we today?

To better understand the income gap, some organisations, such as Mondelez and Fairtrade International, have embarked on measuring actual income levels. In addition, work has been done to calculate what a living income benchmark should be for particular commodities, in particular regions, and these can be referenced on the Living Income Community of Practice website. These questions are essential to define boundaries and targets for the short, medium and long-term interventions needed

to raise incomes. They also help to clarify the role that different actors, from public to private sectors, have in effecting change.

Over the last few years, significant strides have been achieved in some sectors, but more needs to be done. We still need more information to know with real certainty where we are or where we need to be regarding farmer incomes. To determine what farmers are actually earning, existing datasets have to be improved and verified, and data managers need to improve data transparency. We also require better information to assess the level at which farmer incomes allow for a decent standard of living and a sustainable sector. The Community of Practice provides clarity on the various methodologies and their applicability through published guidance papers.

Enabling smallholders to earn a decent living is critical to breaking the cycle of poverty and achieving the SDGs. But it is something that can only be realised by working together across supply chains, regions and sectors. Efforts to ensure a sustained and resilient living income for all are a topic more relevant than ever before. The time to make these efforts is now.

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References: www.rural21.com



Why East Africa chose to develop a regional bioeconomy strategy

In 2019, seven countries in East Africa opted for the development of a bioeconomy strategy for the region. The aim is to use the rich biological resources of the continent in a sustainable way while promoting economic diversification. The innovative potential that this holds also became apparent in the response by scientists from Tanzania and Uganda to the advent of the coronavirus pandemic.

By Julius Ecuru

East Africa is endowed with plants, animals, insects and microorganisms (tiny living things which cannot be seen by the naked eye) of various kinds. This rich diversity of biological resources is a strong foundation for a bioeconomy. The term “bioeconomy” is widely understood in the region as the use of scientific knowledge to add social and economic value to biological resources in a sustainable way. This added value is expressed in healthier foods, safer medicines, useful substances from biological waste and other environmentally friendly processes in manufacturing, distribution and consumption of goods and services. The region chose to develop an innovation-driven bioeconomy strategy, the first of its kind in Africa,

which will ascertain priorities, build partnerships around shared goals and guide investment in a wide range of biological resources.

The recent coronavirus disease 2019 (COVID-19) pandemic, which first broke out in China in December 2019 and spread all over the world, has further highlighted the importance of having a resilient bioeconomy. As part of the response to the pandemic, a team of scientists in Tanzania and Uganda started to produce alcohol-based sanitisers from the fermentation of cassava peels and stalks of sweet sorghum, respectively. These materials are usually discarded as waste. Alcohol-based sanitisers having a concentration of alcohol above

60 per cent v/v (i.e. 60 per cent of the liquid is alcohol) are effective disinfectants, which kill microorganisms (e.g. viruses, bacteria and fungi). In an active bioeconomy, scientific ideas involving biological resources and the agility of scientists in responding to emerging situations such as disease outbreaks are vital assets for countries.

Seeking a low-emissions pathway from the start

Countries all over the world are gradually turning to biological resources as a means to reduce carbon dioxide and methane emissions, which

Ms Njeri, a fruit and vegetable vendor in Kenya. East Africa's rich diversity of biological resources is a strong foundation for a bioeconomy.

Photo: Valine Moraa



are responsible for global warming. These emissions arise from the use of fossil fuels like oil to power automobiles or make plastic materials, etc., and coal to generate electricity or produce cement for house-building. If people were to change the way they produce and consume these things and adopt biological-based alternatives, then emissions would drop, and the planet would be saved from potential catastrophic climatic effects of global warming. Regions like East Africa, which still have low carbon emission levels, can choose a growth and development pathway that circumvents the pitfalls of a fossil-driven economy. This pathway is a bioeconomy!

Developing an East African bioeconomy is attractive because the region has a rich biological resource base. It also has scientists who, when given the necessary support, are capable of harnessing knowledge from within and elsewhere in the world, to add value to these resources in a productive and sustainable way. The region has the fundamentals for growth. There is relative macroeconomic stability – markets are liberalised and fiscal policies are effective. A lot of investment has been made in security of persons and property. Infrastructure like roads and electricity are being built,

and many foreign companies are also investing in the region. Collectively, these factors have driven the region's GDP growth rate consistently above five per cent in the last decade, as data from the International Monetary Fund and African Development Bank show.

Going forward, the challenge is for the region to increase this growth rate to at least seven per cent per annum, if it is to realise its ambition of achieving upper middle-income status (where gross national income per capita is between 3,996 and 12,375 US dollars) within the next 30 years. To a large extent, this challenge can be addressed by diversifying sources of growth. Why does a bioeconomy offer more opportunities for economic diversification in the region?

Linking farmers to new value chains

Over 65 per cent of people in East Africa depend directly on biological resources for food, fuel, medicine and other uses. They use these biological resources in their raw form, and dispose of significant portions as biological waste. By adding value, numerous other uses of the biological resources can be found, e.g. biowaste can be turned into biofertilisers and energy, and high-value green chemicals can be recovered from the waste. These new uses bring new business prospects and jobs, thus diversifying the economy. With rising urbanising trends in the countries and the continent as a whole, farmers who produce or are custodians of most of the biological resources can be linked to new value chains that demand their produce.

It is in this regard that seven countries in East Africa (Burundi, Ethiopia, Kenya, Rwanda, South Sudan, Tanzania and Uganda) identified a need and chose to develop a regional innovation-driven bioeconomy strategy. Demand for the strategy received further impetus from a consensus at the Global Bioeconomy Summit 2018, which called on countries and regions to develop bioeconomy strategies that meet their unique development aspirations and priorities. Developing the regional bioeconomy strategy for East Africa began in 2019, and has already motivated several countries, e.g. Ethiopia, Uganda and Tanzania, to start developing their own national bioeconomy strategies. The regional strategy will enable countries to pool their resources to address shared regional priorities, while national strategies will deal with highly contextual needs and also be a vehicle for domesticating regionally agreed actions.

Stakeholders are contributing views on what the regional bioeconomy strategy for East Africa should look like and what it should address. But already there appears to be a growing recognition that the strategy should focus on increasing economic and social value of regionally traded biological-based goods and services, on converting biological waste into useful material (thus promoting circular production), and connecting national, regional and global biological-based value chains. There is also a growing appreciation that if properly implemented, the strategy would increase the region's capacity to fully participate in and benefit from the African Continental Free Trade Agreement, which was signed on the 21st March 2018, in Kigali, Rwanda.

Incentivising the informal sector and productive partnerships

Incentivising the informal sector, which currently dominates much of the businesses and makes up over 50 per cent of non-farm employment, should be a vital element of the strategy. Promoting bioeconomy clusters of innovation and entrepreneurial activities based on renewable biological resources is one way in which this can be done. The other element would be to support universities and research organisations in the region to work co-creatively with industry and government in moving biological-based ideas and inventions to the market. This is possible. It has already been demonstrated through regional initiatives like BioInnovate Africa that scientists from universities, research institutes and firms in the region can work collaboratively to add economic and social value to biological resources. These types of productive partnerships can be expanded with support from the region's governments and development partners. The scientists in Tanzania and Uganda, who used their knowledge involving biological resources to produce hand sanitisers in response to the COVID-19 situation, is only a glimpse of the wide latitude East Africa has to innovate using biological resources and contribute to a sustainable economy in the region.

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References: www.rural21.com

Green urban development creates rural employment perspectives

By creating novel value chains from agro-waste for construction materials, rural areas can significantly benefit from urban growth. At the same time, opportunities develop for greener and more sustainable construction in Africa's expanding cities. Female farmers could especially benefit from these new value chains.

By Wolfram Schmidt, Kolawole A. Olonade, Nonkululeko W. Radebe, Vincent Ssekamatte and Faudhia Zando

The destiny of sub-Saharan Africa's (SSA) urban areas will inevitably be determined by their surrounding rural areas. They provide the goods that are required and consumed in urban areas, such as food, energy, minerals and materials for production. With a growing urban population, more rural goods are required. Therefore, the low capacity for rural livelihood enhancement along with the dramatic urban growth is detrimental to sustainable socio-economic developments in Africa.

Average annual urban growth in sub-Saharan Africa is 4.13 per cent, with a 6.48 per cent maximum and a 0.14 per cent minimum for Equatorial Guinea and Mauritius, respectively. In contrast, average rural growth is only 1.95 per cent, with a 3.77 per cent maximum and a -0.81 per cent minimum for Niger and Gabon, respectively. Although the rural population is increasing in most countries of SSA, its growth relative to urban growth is dramatically smaller.

On average, the urban population grows 2.12 times faster than the rural population, and the decreasing livelihood potentials in rural areas are likely to increase this ratio in the future. Service, a typical urban business, grew by 12.17 per cent from 2000 to 2018, while the agricultural market dropped by 10.90 per cent in the same time. The better urban employment perspectives in SSA are also underpinned by a service employment growth of 26.91 per cent compared to a decrease of 14.16 per cent in agriculture. Furthermore, the income gap and the number of people below national poverty level are much higher in rural areas.

Making use of synergies between urban and rural development

Nevertheless, the better urban potentials do not always result in better living conditions. Approximately 60 per cent of SSA's urban population live in low-income, disadvantaged settlements, with a maximum of 96 per cent in South Sudan and a minimum of 18 per cent in

Zimbabwe. A recent workshop on children's visions of their city of the future at the Star Kids Initiative in Mukuru estate in Nairobi, Kenya, clearly showed that the urban children dreamt of more space, plants and animals, which resembles a rural setting rather than an urban one. In contrast, a similar workshop with girls and young mothers at the Forward Step Organisation in rural Bagamoyo in Tanzania clearly showed that the major wishes of the female rural population were closer to an urban setting. The most important wishes addressed were infrastructure, water and energy supply, as well as short distances to services, health and educational facilities. In summary, from the perspective of their future dwellers, this means that cities should have more rural and villages more urban components.

Thus, instead of overdeveloping already urbanised areas, the development of rural areas becomes vital. The creation of rural employment perspectives and better livelihoods is key to a more balanced development of urban and rural areas. With the aforementioned limited development perspectives in the classical rural business areas, it becomes necessary to identify new perspectives, which lie in the synergies between urban growth and rural development.

Climate-friendly construction materials offer new income sources

The most relevant employment and business perspectives in growing African cities results from the sheer need for construction materials. Only 20 per cent of the urban structures that will have been installed by 2050 are already built. In return, this means 80 per cent



In Africa, only 20 per cent of the urban structures that will have been installed by 2050 are already built. Construction material is in high demand.

Photo: Arne Hoel/ World Bank

of urban construction will take place over the course of the next 30 years. Although often considered as unpopular, concrete is the most feasible material for future cities. Compared to all other construction materials, it has the lowest carbon footprint and energy demand. In addition, it is the only resource on Earth that can meet the tremendous global demand.

In Africa, steel has to be imported, and timber is prohibitive in most countries because of already dramatic deforestation. And although building heights should generally be limited to save materials, building heights are per se limited with timber construction. However, given the tremendous amount of concrete required in the world, its binder cement alone is responsible for about ten per cent of the global carbon emissions. Future African urban concrete construction will significantly add up to this already high climate impact. In return, Africa also has more potential than any other region in the world to invent green and low carbon concrete innovation, by applying state-of-the-art knowledge and using local supplies in an innovative way.

In order to identify where urban construction can create rural development perspectives, it is important to understand typical rural economies. Agriculture usually accounts for about 60 to 80 per cent of the livelihoods. Mining is another major contributor. Retail, administra-

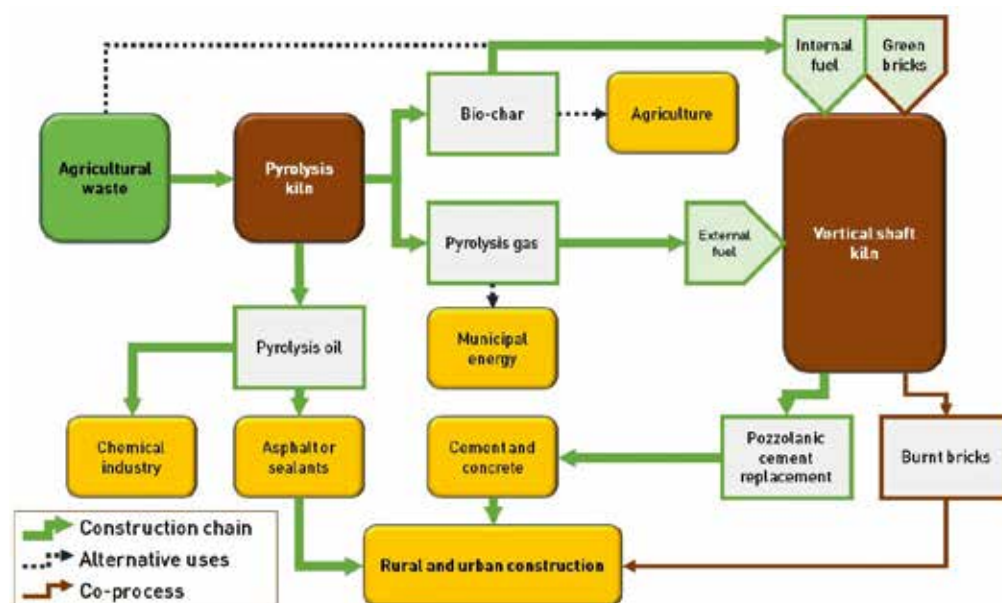
tion and social services are significantly less important. Therefore, the large branches should be focused on. With regard to potentials in mining, novel future perspectives lie in choosing clays that cannot be used for ceramics but can perform excellently as cement replacement after calcination.

However, one largely neglected available resource is agricultural waste materials, which can be converted into high-performance concrete constituents. The African continent provides about 60 per cent of the global unused arable land. Most agricultural waste from food production has a high content of organic residues. Although they cannot be used for food, they can still serve as water-reducing or robustness-enhancing admixture in concrete, and thus contribute to higher performance with less cement consumption. These agro-based organic admixtures can create new and local business opportunities by replacing crude oil-based agents, which today in Africa have to be imported at high prices.

While construction chemicals are a small and specialised market, cement is a high-volume market. Therefore, the most relevant resource is ashes from agricultural waste, which occurs in vast amounts and today is not used for other technologies. If agro-waste is burnt at temperatures between 600 and 800 °C, it often contains significant amounts of reactive silica and alumina oxides, and thus can replace Portland cement clinker in concrete by up to 30 per cent or more.

In order to make maximum use of the process, the burning of the ashes can be done in paral-

Possible climate friendly and low-emission processes from agro-waste to construction materials



lel to the burning of clay bricks or the energy can be used for food processing. An ideal process with a maximum yield of by-products and minimum carbon emissions can be obtained if the agro-waste goes through a pyrolysis process before being burnt to a reactive ash. This process produces pyrolysis gas (energy), pyrolysis oil (chemicals), as well as a bio-char that can be further processed as fertiliser or cement replacement. In order to prove the concept, a small-scale 2-stage pyrolysis plus kiln pilot plant was built recently on the campus of the University of Ghana within the context of the INFRACOST project, funded by Germany's Federal Ministry of Education and Research (BMBF). An example of the larger scale coupled with a vertical shaft kiln technology is given in the upper Figure.

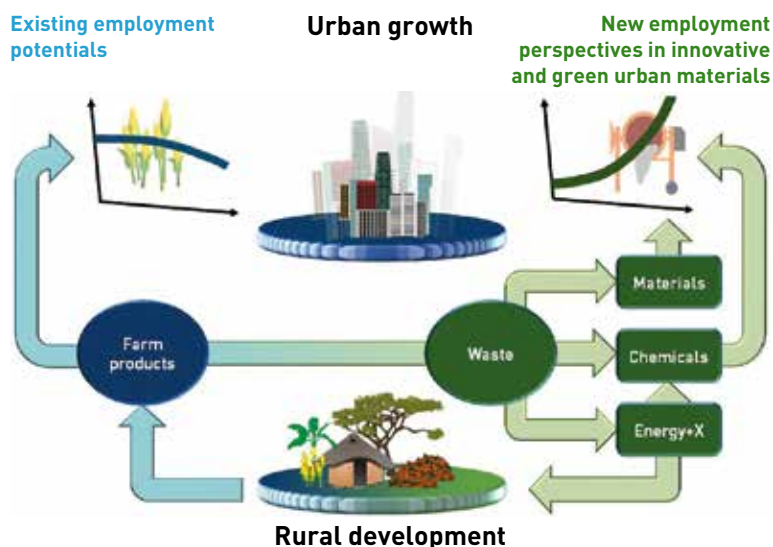
Wastes such as sugar cane bagasse, rice husks, cassava peels or palm kernel excellently qualify as green Portland cement clinker replacement. Normally, these wastes have no or low-value use today. However, as shown in the Figure on the left, by developing the

right value chains in the urban construction business, formerly unused rural wastes can be converted into cement replacement materials, construction chemical, energy and precursors without creating additional competition. This way, rural farmers can significantly enhance their livelihoods and in parallel contribute to reduced emissions of climate gases.

Value chains based on cassava waste in Nigeria

Cassava is a staple food for over 500 million people in the world, and it represents a source of food for about 80 per cent of people in SSA. It is a cheap provider of carbohydrates that grows on marginal soil without complex processing. Besides food, cassava starch has also been established in paper, textile and pharmaceutical industries. Africa accounts for nearly 60 per cent of global production. With its 56 megatons per year, which is 35 per cent of the African and 20 per cent of the global production, Nigeria is the largest producer world-wide. Since cassava has relatively thick peels, the waste represents up to 20 per cent by mass of the tuber, which today creates large challenges of effective disposal. The peels do not qualify for livestock feeding, as they cannot be well digested and contain low protein. Typically, they are dumped in landfills, burnt uncontrolled, or just left to rot. This causes malodour and environmental pollution, and it requires plenty of space which could be made better use of. There is no significant value chain for the wastes to date, although they

Possible climate friendly and low-emission processes from agro-waste to construction materials





Kolawole Olonade and students of the University of Lagos during a workshop on the development of high-strength self-compacting concrete with cassava peel ash.

Photo: Wolfram Schmidt

could be used entirely for high-performance urban construction materials. Firstly, the starch adhered to the peels can be dissolved and converted to a plasticising chemical admixture which has proven to have the capacity to reduce the water content in concrete to increase its strength. Secondly, the residual peels can be burnt, and the residual ashes can help replace cement in concrete in an environmentally friendly manner.

While the technical potential has been proven scientifically before, the socio-economic and climatic impacts are the topic of research within the Local-Care project, which was awarded the German African Innovation Incentive Award of the BMBF in 2018. Within the project, for the first time, a real structure made out of cassava-based concrete (see left Photo) will be built in 2020 on the campus of the University of Lagos – an important matter, because research innovation needs tangible pilots in order to find acceptance in society.

In this project, a survey among 200 cassava processors in Nigeria indicated that 81 per cent were females, mostly between 20 and 50 years of age. Approximately 75 per cent only had primary education, and thus little potential to enhance their livelihoods. The revenues from the peels were marginal. Less than 20 per cent were sold. Hence, at least 80 per cent would be available for the cement and concrete industry, which could enhance the potentials for better livelihoods of the local producers significantly. Assuming that all available peels will be collected and used as sustainable cement replacement, this would translate to 2.5 to 5 per cent of the Nigerian cement market, or approximately 0.7 million tons of saved carbon emissions. Both peel ashes and starch can



Cassava peels could be used for high-performance urban construction materials, providing income for female cassava processors.

Photo: Wolfram Schmidt

be used either on a small scale by formal or informal smallholders, or by the large cement industry, where the cassava peel ashes could be blended with cement to be sold in the national and international retail market. This would require complex waste collection infrastructure and homogenisation. Smallholder producers could directly use the ashes to reduce their cement in concrete for the local market, but unlike in the large-scale industry, more training and technical support would be required.

Obstacles and skill requirements

The biggest obstacle for the implementation of such green construction materials techniques is the societal misconception that agricultural waste products only qualify for low-end use. Furthermore, and despite the striking added values that can be created, new technologies are always accompanied by yet unknown challenges. Typical challenges arise from residues of fertilisers as well as scattering qualities and production volumes. These obstacles can be solved technically but require research and interdisciplinary competences.

Therefore, the knowledge has to be brought to the prospective rural decision-makers, who need a clear picture of the economic and societal potentials of agro-based construction materials markets. Despite new income sources, these markets also help to empower female farmers and create more independence, which is of utmost importance in the rural environments. At the same time, decision-makers need clear information about technical challenges and infrastructure that has to be established prior to implementation. This requires closer collaboration with academia and relevant disciplines such as

civil and environmental engineering, economics, agriculture, materials and chemistry.

Seizing the opportunity

By creating novel value chains from agro-waste to construction materials, rural areas can significantly benefit from urban growth and contribute to greener and more sustainable construction in Africa. This can also be a potential to accelerate rural development, which in return would reduce the driving force for migration to cities. Since one-fit-all solutions for agro-waste value chains do not exist, best-practice solutions have to be developed individually, based on the local boundary framework. These must be worked out in close collaboration with local academic units, which are typically located in cities. Hence, the development of construction materials based on agro-waste offers a unique opportunity for business and knowledge transfer between rural and urban areas with mutual benefit, and with a highly positive impact on the global climate.

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Women completing PV training at the Strathmore Energy Research Center in Nairobi, Kenya.

Photo: SERC

Creating livelihoods through clean energy and agriculture

Just 35 per cent of the African population have access to electricity, with rural access rates at less than one-third of urban communities. Not only could decentralised renewable energy technologies help in meeting energy demand in rural areas in a climate-friendly manner, and promoting innovations in the agri-food sector, they are also an important potential driver of local job creation and the formalisation of labour – provided that the skills gaps hindering the sector's growth can be closed.

By Rebekah Shirley

With the economic impacts of the current pandemic projected to be of historic proportions, the future of work is a source of major uncertainty, particularly in emerging economies. After two decades of per capita income growth rates that outpaced those of rich countries, economic activity in sub-Saharan Africa has decelerated, driven by factors involving external developments, difficult domestic conditions and low commodity prices. Economic growth was down to 2.3 per cent in 2018, severely impacting the availability of jobs. The growing impact of climate change on Africa's largely rain-fed agricultural sector compounds these issues, deepens the food crisis, and also affects the predictability and availability of work for millions in farming, which

employs over 65 per cent of the continent's labour force. Increased automation and mechanisation will improve yields and reduce farm costs but may jeopardise traditional agricultural job opportunities.

Meanwhile, as jobs grow scarce, recent improvements in healthcare access, among other factors, have led to a youth explosion. As of 2018, the rate of population growth has exceeded the rate of economic growth for four consecutive years, and according to the African Development Bank, young men and women between the ages of 15 and 24 years comprise over 34 per cent in sub-Saharan Africa today. The World Bank estimates that each year, ten million young Africans join the ranks of those

looking for work. So, there is an urgent need to regain momentum on sustained growth. Virtually of all the various "big push" agendas, from the Africa Union to national development strategies, list energy and infrastructure development among the top priorities for Africa.

Renewables at the core of Africa's energy transition

The challenges of energy infrastructure include a lack of adequate transmission networks to support the distribution of power resulting in grid congestion, system inefficiencies and high losses, utility mismanagement, the difficulty of cost recovery as usage rates remain

low across the continent, and more. Another major challenge lies in the difficulty of delivering electricity to remote and rural communities. In fact, access to electricity stands at 35 per cent of the population, with rural access rates at less than one-third of urban communities. The United Nations estimates that globally, 650 million people will still lack access to electricity in 2030 and nine out of ten of them will be in sub-Saharan Africa. Many African countries are in the midst of an energy transition as utility-scale solar, wind and geothermal power projects displace diesel generation, battery storage systems make headway and rural electrification receives growing attention.

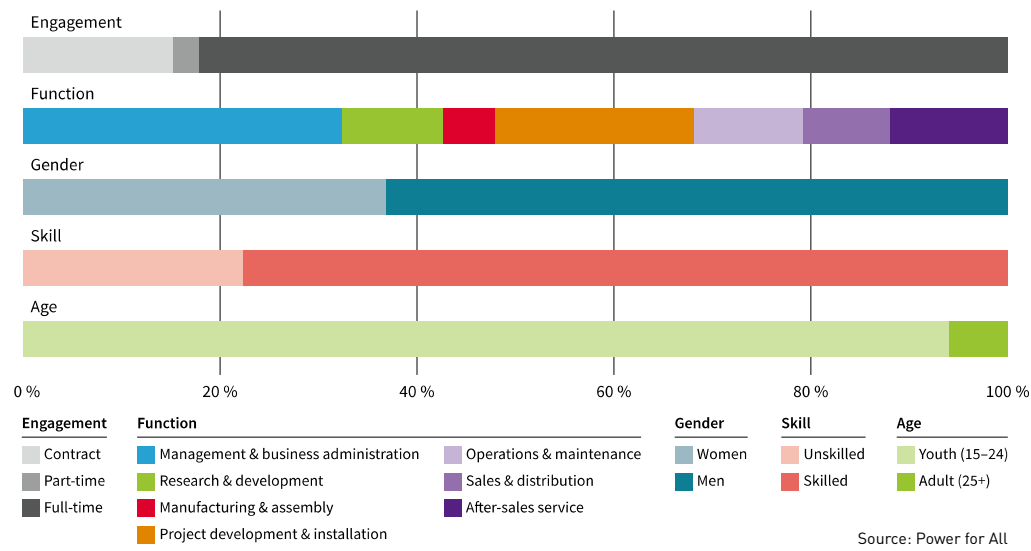
Renewable and decentralised technologies are at the centre of this energy transition. Eastern African countries alone have announced more than 2,000 MW in new solar photovoltaics (PV) and wind power projects coming online in the next three years. In fact, more than 40 per cent of sub-Saharan Africa countries have official rural electrification targets, and at least a third have specific decentralised renewable energy targets or plans. From January to June 2019, over four million quality-certified solar lanterns, multi-light and solar home systems were sold on the continent. And while there are only 1,500 mini-grids currently installed, another 4,000 mini-grids (mostly third generation solar-hybrids) are in various stages of planning and development across Africa.

Quantifying jobs in the clean energy sector

There may be a major opportunity for employment through delivering energy services to the 650 million people who still lack access. Decentralised renewable energy technologies – which enable power generation to happen close to the node of consumption – are agile, able to reach remote communities or “the last mile” more efficiently and are growing their market share quickly, already helping to stimulate productivity. In fact, agriculture, the sector which still dominates the African economy, is likely the sector best poised to benefit from the potential of clean energy access to mitigate climate change, unlock productivity, and thereby boost near-term economic growth and, of course, create local jobs. So, food security, livelihoods, energy access and advances in renewable technologies are inherently connected. The question is: how can we unlock the potential of this interconnectivity?

Part of the challenge is the lack of data for informed, sharp, targeted policy intervention.

A snapshot of the solar mini-grid operators workforce profile in Kenya



There are few studies to date that provide reliable job counts for the renewable energy sector in Africa, and there is little quantitative data on the specific skills gaps that hinder the sector’s growth. Filling the data gap needed to inform policy is the goal of the #PoweringJobs campaign, founded by a coalition of partners, led by the international non-profit organisation Power for All. Recently, the campaign launched a job census – the first of its kind, bottom-up count of employment in decentralised renewable energy in sub-Saharan Africa. It focuses on Nigeria and Kenya – one of the fastest growing and one of the most mature renewable energy markets, respectively.

Released in 2019 this is the most comprehensive job survey known to date, but only scratches the surface of job estimation, creating a baseline for future data collection exercises. The survey captures employment data for over one hundred companies in Nigeria and Kenya which are engaged in renewable energy products and services, from those selling solar lanterns, solar home systems and solar irrigation systems to commercial and industrial stand-alone solar systems and renewable energy powered mini-grids. This means the sample covers decentralised renewable energy companies working in off-grid, weak-grid or on-grid communities across the local supply chain, from manufacturing and wholesale imports to sales, installation and operations.

Enabling job creation through productivity

The early data shows that the renewable energy sector has emerged as a significant employ-

er in emerging markets. Although nascent and just beginning to scale, decentralised renewables have already grown a direct workforce comparative to traditional utility-scale power sectors. In Kenya, the sector employs around 10,000 people in direct, formal jobs, almost as many as the national utility company in Kenya according to its own estimates. Decentralised renewable energy companies in Nigeria employ about 4,000 people in direct, formal jobs, the same order of magnitude as those in the electricity, gas and steam sector in Nigeria. Importantly though, compared to this formal job impact, decentralised renewables engage twice as many workers through informal jobs. This is critical as informal work is the largest source of employment for most sub-Saharan Africa.

Moreover, applying best estimates from the literature suggests as many as five times the number of persons may be gaining employment through jobs stimulated by newly powered productivity, enterprise and business in rural areas. While salons, food, retail and entertainment kiosks are popular, a new wave of agriculture-processing enterprises is emerging – from fruit drying to refrigeration and cold storage, milling, egg incubation, honey processing and more. There are over 100 firms developing off-grid solar productive use appliances for the African market and hundreds more distributing them. Sales are still relatively low since many agro-processing units are as yet in pilot stage, but this is anticipated to be a major new sector in the coming years.

This is important because women and youth are the hardest impacted by the dearth of rural employment opportunities, due to lack of

education, traditional perceptions of gender roles, lack of social mobility and a host of other sociocultural factors. To give a sense of scale, rough estimates of ‘productive use jobs’ stimulated through new or improved electricity access were 65,000 in Kenya and 15,000 in Nigeria at the time of study. But because energy companies do not standardly track end-user job creation as a performance metric, they cannot place strong confidence in their estimates. And as mentioned, the literature is thin, requiring more research.

Exactly what types of jobs are renewable energy creating in Nigeria and Kenya? Companies employ electrical engineers, programmers, technicians, technology designers, metering experts, data analysts/data managers, software engineers and monitoring experts. Finance, legal and business managers, as well as sales, retail, product distribution, logistics managers, customer care and customer engagement agents are also all core to business function. There are of course further jobs in upstream industries (like local solar panel manufacturing) and downstream industries (such as waste recycling).

For each type of technology, the value chains and thus the required job functions vary. Solar mini-grid companies, for instance, are seeing need for micro-financers, community trainers and entrepreneur support service professionals, to support the businesses and enterprises developing through access. These types of customers are important to revenues, so mini-grid companies expect this aspect to become more core to their business model over the near future. Over two-thirds of the decentralised renewable energy workforce is skilled and full-time, with average retention being more than 30 months and average compensation falling within the middle-income range of both countries.

Filling the skills gaps is crucial

Pairing these findings with publicly available future market projections suggests that many, many more jobs may be possible, but decentralised energy companies say they are challenged by skills gaps, and by recruitment barriers. In fact, it is said that human resource, not technology, is what makes or breaks companies in this field. While technical (STEM) training is key, companies revealed having the most difficulty in recruiting for management, finance, legal, sales and marketing skills. But entry-level graduates from these programmes are often in short supply, and established recruit-

ment channels to reach them are frequently just simply missing.

These challenges, compounded by other social barriers and business cultures, leave women’s representation lacking. On average for Kenya and Nigeria, women make up less than a third of direct, formal workforce and fill about 25 per cent of managerial roles. But women are critical to the sector’s ability to expand access. For instance, women, as the social influencers within their communities, play a major role in successful sales, product distribution and micro-enterprise development. Alongside technical skills, companies

explained that recruits were often not industry-ready, in terms of lacking general business soft skills, like communication, leadership and critical thinking. Soft skills are important to every job function across the board for strong business performance. This applies especially to younger, entry-level recruits. Although young people make up 40 per cent of the sector’s workforce in Kenya and 30 per cent in Nigeria, companies agreed that there was opportunity to hire even more.

Strategies to unlock the renewable energy job creation opportunity

This kind of data provides many insights for interventions that can help increase job creation in the near term. There are clear skills needed to both expand renewable energy at scale and create more employment. First, stronger collaboration is needed to develop standardised, accredited, industry-relevant training programmes and career development programmes for graduates. Second, establishing formal recruitment pipelines for youth and women is an overlooked area where vocational training, higher education institutes and industry associations can play a pivotal role. Third, the sector’s massive footprint in the informal and productive use job creation presents an opportunity to directly support new innovations in agricultural processing, while also encouraging direct training interventions,



Solar PV technicians at work in Athi River, Kenya.

Photo: Rebekah Shirley

and the formalisation of labour to align with local and international decent work standards, compensation standards, and social protection. Finally, all these early indicators suggest that much more quantitative research is needed to understand job displacements in other sectors, indirect and induced job impacts, and productivity, requiring more cross-sector data, and standard reporting metrics and sampling tools directed toward end users, with a focus on different productive use value chains. Delivering affordable, reliable energy access quickly through renewable energy solutions that meet people where they are is a major way to open economies, especially in rural areas. Particularly in these times where identifying ways to jumpstart economic recovery and build resilient systems is key, renewables should be core.

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A win-win-win model: urban investors finance rural agriculture

A new business model that could catch on – with their company “I Support Farming”, two brothers from South India’s Chennai are bringing investors from the city together with farmers who lack capital for necessary investments. The investors bear the risk, while the profits are shared.

By Jency Samuel

As a practising farmer, Sridharan Venkatachalam could not believe that total strangers would pay him 231,000 rupees, money he had spent on preparing his ten-acre farm and on sowing paddy. The strangers offered to guide him in his cultivation process. They wanted a percentage of his profit, if their work showed results. The proposition was so irrational that the farmer thought it was a scam. It came from siblings Vijaykumar Mani and Vasanth Kumar Mani of Chennai, a city in South India. Having observed the disconnect between rural farmers and urban consumers, the duo decided to bridge the gap. They quit their corporate jobs and founded a company called “I Support Farming”.



Farmer Sridharan Venkatachalam (right), who has benefitted thanks to associating with ISF, speaks to visitors.

Photo: courtesy ISF

Fallow farm lands because capital is lacking

The brothers practised farming on their six acres of land near their hometown. As they were employed in Chennai, they would visit their farm about 170 km from Chennai during weekends. During the visits, they observed that the neighbouring farms were left fallow. They found that the farmers were not cultivating because they did not have money to prepare the land, and buy farm inputs. “To cultivate paddy, a farmer needs about 25,000 rupees – 300 euros – per acre per crop cycle. As farmers generally have two or three acres, they need double or triple that amount,” says Vijaykumar. “Since they don’t have that much money, they don’t make use of their lands.” With growing input costs and increasing risks because of unpredictable weather patterns, farmers – 86 per cent of them marginal and small farmers with landholdings of less than two hectares – are unable to sustain on farming as a livelihood. Hence many of them take up other labour, leaving their land fallow. As per the agriculture census of 2011, eight per cent of farmland in India – about 13 million hectares – is thus affected.

Working capital to start cultivation is a major challenge for farmers. Depending on various factors, they borrow money from one of three sources to start cultivation. According to

Vasanth Kumar, farmers take crop loans from banks or financial institutions at an interest of 7 to 9 per cent per annum, or borrow from local money lenders at an interest of 24 to 48 per cent per annum. The third option is not borrowing in the true sense. Agricultural input shops give fertilisers and pesticides without taking money from farmers. In turn, farmers sell their produce to the supplier at the end of the crop cycle. “Normally the shops hike up the price of inputs and also pay a lower price for the produce. So the farmers lose out on both counts,” says Vijaykumar. After repaying the loan with the harvest, farmers were left with a small profit if they had a good yield. If they suffered a crop loss because of pest attacks or natural calamities, they did not have the means to repay the loans.

Urban investors de-risking farmers

Vasanth Kumar observed his colleagues becoming interested in farming when they learnt that he was a weekend farmer. Often they asked him about his farm, farming practices, farmers’ debts, etc. And they wished to support farmers. “On the one hand, a farmer could not prepare his land because he did not have the 1,000 rupees needed for ploughing. On the

other hand, an urbanite would spend the same amount, say, on dinner. The same amount has different values in the city and in the village,” explains Vasanth Kumar. The brothers decided to connect the farmers to urban consumers. Leveraging the urbanites’ interest in farming, they resolved to spur them to invest in farming. They arranged a farm visit, bringing friends and farmers together, where the latter explained the issues they were facing. The meeting resulted in the formation of a new farming business model that the brothers had developed. They founded I Support Farming (ISF) in May 2016. Their first project involved two farmers whose land was near theirs. With the investment of seven urbanites, they started cultivation on eight acres (1 acre = 0.4 hectare) of land.

As capital was the main issue for farmers, the ISF model has completely de-risked them financially. Farmer Sridharan reluctantly agreed to let ISF guide him in his farming. “I always maintain financial records. So ISF understood that my expenses were for real and paid me,” he says. Then ISF’s field staff visited the farm every day. They ensured that fertilisers and pesticides were applied only when necessary and only in required quantities. The higher yield surprised the farmer. He recalls paying the brothers Rs 43,800 (524 euros), their margin.

The investment from the city is spent directly on the farm. Right from purchasing certified seeds and farm inputs, to giving guidance on proper and timely application of fertilisers and paying the workers every day, ISF's field staff take care of every farm activity. "Thanks to ISF, we don't need to invest any money at all for cultivation. They buy the inputs, pay the workers, they sell the produce, and they give us our share of the profit. So there is absolutely no financial risk for us," says Sridharan.

Smart technologies and economies of scale ensuring success

While bringing in urban capital was part of the ISF business model, for the model to work, the brothers had to increase revenues for everyone concerned. "Our aim is to reduce cost and increase productivity," says Vasanth Kumar. With a sizeable acreage under its patronage, ISF buys seeds, fertilisers and pesticides in bulk, which results in an overall cost reduction of five to ten per cent. Similarly, as the company operates on a large scale, ISF's quantum of produce is high. This gives the company the negotiating power on the price. "In the procurement market, a local trader generally buys the paddy from farmers and sells it to rice mills. We sell directly to the rice mills. This gives us a 10 to 20 per cent benefit on the price," says Vasanth Kumar.

ISF relies more on a scientific approach to farming and technology, to increase productivity and minimise expenditure. "As the field staff are agriculture graduates, they are able to guide us in improving productivity. Using certified seeds has increased the yield," says farmer Sridharan. "Earlier, the yield was 35 bags of paddy per acre, with a bag weighing 63 kilograms. Now it's a minimum of 40 bags. Once I harvested 53.5 bags."

According to Sridharan, previously, when farmers like him observed crop stress, they would not know the cause. They would spray three or four pesticides available locally, with the hope that one of them would abate the problem. "There is no penetration of technology in agriculture in India. Farmers know there's crop distress only on visual observation. But an aerial view in variation of colours gives a better idea," Vijaykumar explains. ISF uses a drone-mounted multispectral camera that takes images in multiple shades of green. Using a special software, the ISF team analyse the images and identify whether the colour variation is due to weeds, moisture stress or disease. The exact diagnosis helps the farmer apply the

appropriate solution only in that part of the field which needs it. This results in considerable cost reduction.

ISF ensures that the farmers are benefitted the most. Depending on the risk and work involved, the profit is divided as 80:10:10 or 60:20:20 between farmer, investor and ISF. As it is a zero financial investment for the farmer, if a crop fails, the loss is borne only by the investor and ISF. The farmer merely loses time and efforts.

Sridharan recalls a flood that occurred, when he thought he would lose his crop. "But ISF salvaged it, and I got 57,000 rupees as profit. If not for ISF, I would have borrowed money, and the profit wouldn't have been enough to repay it," he says. A detailed costing by the brothers shows that on average, an ISF farmer gets a minimum net profit of Rs 11,500 (138 euros) per acre per crop cycle, whereas a farmer following conventional methods earns a net profit of Rs 5,000 (60 euros). The net profit varies according to the crop that is cultivated.

Gokulavan Jayaraman, who works in an Information Technology-enabled Service (ITeS) company in Chennai, is one of the urban investors. He gets about five to six per cent returns on his investment.

A farmer-friendly solution

ISF identifies a lead farmer to collaborate with. The success of the partnership brings in more farmers. Sometimes ISF identifies farmers with the help of local non-governmental organisations working in the farming sector, and also with the support of field staff. The team do a complete background check before taking a farmer on board. ISF signs a contract with each farmer and a separate contract with each investor, to make things binding for everyone.

Initially one could invest in multiples of Rs 5,000. Now the company encourages investment in multiples of Rs 25,000. Depending on the amount invested, ISF maps it to one or more farmers. "If a farmer has five acres, money from five or six investors goes towards his cultivation expenses," says Vijaykumar. A technology platform assists the brothers in keeping track of each investment and each crop. This helps them e-mail investors on a regular basis to keep them abreast of the farming activities.

The brothers have been growing single harvest grains and pulses. Starting with cultivating pad-



Brothers Vasanth Kumar (left) and Vijaykumar have brought in urban capital to the rural farm sector, to make agriculture beneficial to farmers.

Photo: courtesy ISF

dy, they have now advanced to growing maize, groundnut and vegetables, besides water melon and musk melon. Soon they plan to do value addition and sell directly to consumers via an online portal. "There are many, especially in the IT field, who are interested in agriculture and feel the need to address rural distress. They lack time. There is no-one to point them in the right direction. That's where ISF scores and is a success," opines Gokulavan. Listening to the farmers voicing their concerns at the farm meeting prompted him to invest in ISF. He also got a handful of his friends to invest. After his initial investment, he has made additional investments twice. "One should not invest with the sole aim of profits. Investing in agriculture through ISF helps one play a part in alleviating farm distress as well as getting a reasonable return on investment," says Gokulavan.

ISF's innovative business model of urban investment and nil risk for farmers and its ensuing success attracted media attention. The company's social media engagement also garnered interest among the public. Their success being evident in the four years they have been in operation, increased urban investment has enabled them to bring more than 200 farmers and 600 acres of land under the ISF umbrella.

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Will Zanzibar's algae farmers soon be ruined?

Carrageens are contained in soft drinks, shampoos and ready meals. These carbohydrates, which are also known as E407, are gained from red algae, also in the shallow water along the coast of Zanzibar, where they constitute an important – and sometimes the only – source of income for women. However, trading this much-demanded natural resource is threatened.

By Klaus Sieg

Turquoise water and white sand as far as the eye can see. Paje Beach, in Zanzibar's Southeast, is a dream destination for all tourists. If they don't happen to be lazing by the pool of their resort or hanging out in one of the countless bars, they can be seen sitting or lying on the beach, usually holding a drink or an ice-cream. In the evening, they will help themselves at the buffet and, just like nearly everyone else throughout the world, brush their teeth. Some of them then also apply a lotion to their skin, which has had to bear the equator sunshine. Only few of them will probably be aware that in consuming all these products, they have nearly always come into contact with an ingredient which is gained from the shallow water along the beach, right in front of their noses.

Mwanaisha Makame peers across the beach with squinted eyes. The brilliant sun, the white sand and the salty air – it all puts a strain on the eyes. "But we have to keep looking after our algae," 45-year-old Makame says, tightening her colourful scarf, pulling up her long skirt a little and then wading into the lukewarm water together with two other algae farmers. Their goal is behind the gentle surf rolling towards the beach. There, the water of the Indian Ocean, which is still shallow and very warm, laps around wooden poles stuck into the sand in rows. The women bend down, pull out weeds, fasten some algae anew and remove individual impurities. They also harvest some of the algae. Finally, they carry a couple of yellow-green bundles to the beach. Pointing at one of these bundles, in which the

slithery stems full of little branches which look like rubber worms intermingle, Makame says: "This is what the miracle plant which they use all over the world actually looks like."

A substance for all needs ...

Not very appetising – but that's not an issue as far as the final product, carrageen, which is gained from these fast-growing aquatic plants, is concerned. And this is why everyone talks about it. As E407 binds and thickens glaze, yoghurt and other dairy products, pastries, soft drinks, diets for sportspeople, sausages, chocolate bars, ketchup, custard or ready meals. E407 is one of the few additives also permitted in organic food. Above all the



Mwanaisha Makame (right) is the chief earner in her family.

Photos: Jörg Böhling



Hardly any women in Zanzibar can swim. Women have to rely on men's support in sailing boats and diving for algae.



Dr Flower Msuya is the chairperson of the Zanzibar Seaweed Cluster Initiative.

burgeoning group of vegetarians and vegans eat it frequently. Agar Agar, used as a gelatine substitute in jelly babies, sandwich spreads, soy milk or tofu cold cuts, and also obtained from algae, is likewise popular among them. What is more, carrageen is used in many cosmetics and body care products, in the dye and paint industry or as an additive in drugs. "Demand has been growing for years, and new fields of application are still being created," says a spokeswoman for Cargill, one of the world's biggest carrageen manufacturers. Food developers in particular would hardly find an alternative substance with such excellent properties. Despite its health impact recently having become somewhat controversial, the popularity of E407 is still on the rise.

A bit of financial independence

This is good for Makame, who has been growing algae for more than 25 years. "Success was initially modest, and now I am the chief earner in my family," she explains. Although her husband works as a diving instructor, his income is irregular. She can harvest the algae eight to ten times a year, and she can plant them just as often. For this purpose, Makame ties little saplings to ropes, which are then fastened to poles in the water. Nature sees to the rest virtually on its own. After two or three months, the algae are ready for harvesting, they have formed the crucial ingredients, and their biomass has grown twentyfold. So the plants aren't much work.

This was also what Tanzania had in mind when it introduced the two red algae varieties *Eucheuma spinosum* and *Eucheuma cottonii*, originally from the Philippines, in the semi-autonomous archipelago off its coast in the 1980s. Both species are especially suitable

for the production of carrageen, although they do need tropical water temperatures. Women in particular were intended to earn income growing them alongside seeing to the household and the family, thus gaining independence in a traditionally shaped culture. This appears to have been a success, albeit at a modest level. Makame earns the equivalent of roughly 40 euros a month. That is almost half the wage of a labourer in the city. And with it, you can buy a lot in Zanzibar, as long as you're shopping outside the tourist hotspots. And then there is Makame's proud smile. Otherwise, she and the other women would find hardly any employment on the island of spices.

"Most of the algae farmers used to depend on government support, which they no longer need," says Flower Msuya, an expert on algae at the University of Dar-es-Salaam, whose marine research institute is located right at the ferry terminal in Stonetown, the old city of Zanzibar's capital. There are piles of papers and files on the little table and the warped shelf in her office. An old-fashioned PC screen is flickering in the dark room without any windows. This senior researcher is about to leave for a conference in Dar, as the capital on the coast of the mainland opposite is known. Her expertise is in high demand, and she was involved in the introduction of the algae right from the start. One of her activities has been the setting up of the Zanzibar Seaweed Cluster Initiative (ZaSCI), a network that is meant to bring together farmers, traders and producers. "After the Philippines and Indonesia, Tanzania is the third largest area the plant is grown in world-wide," she explains, referring proudly to what has been achieved so far. "With its 24,000 women farmers, the algae business now employs the largest number of people in our archipelago," Msuya notes.

Climate change is threatening the trade

However, the red algae business has run into difficulties. Climate change is to blame. Over the last 30 years, the Indian Ocean's temperature has risen by one degree – with disastrous consequences for the shallow water off the coast. "In the 1990s, it was never warmer than 31 degrees, but now it can heat up to 38 degrees." This is making the red algae vulnerable to disease. The women are losing parts of their harvest, which is why Msuya and her colleagues are attempting to establish cultivation in deep water, where temperatures are lower.

The coast in front of the village of Muungoni, in the Southeast, has no white, sandy beach – and hence no tourists. Instead, there are plenty of jagged rocks and coral reefs. The rubber gloves of Jina Makame and the other members of the group are correspondingly tattered. The women have just gathered algae to reproduce them. For this purpose, they tear the plants into finger-long ends that are tied to ropes, and then they are pulled through blue pipes into longish nets that are subsequently anchored a couple of metres deep out in the sea. "This keeps the current from drawing the saplings away," Jina Makame explains. This vegetative reproduction of red algae enables unlimited further cultivation. The farmers are still working with the offspring from the red algae imported in the 1980s.

Once all the nets are full, Rajid Mohammed starts the boat's outboard motor. The women, all of them wearing lifejackets on top of their colourful clothes, carefully step onto the boat, which is swaying to and fro. "We can't swim," Jina Makame grins timidly. Hardly any women in Zanzibar can swim, even though they live right next to the sea. Here, it is simply not cus-

tom for girls and women to swim. This is why Mohammed and his two helpers have to deal with swimming and diving, which, alongside the costs of the boat and fuel, is a further hindrance to deep water algae growing, at least if mainly women are to continue benefiting from the business. Algae cultivation in deep water would enable double the present yield. And the demand is there. “If we give him a call, the buyer will come on the same day, for he is very anxious about us selling the harvest to someone else,” Makame later on explains in front of her house in the village and, grinning, strokes her arms painted with henna-coloured ornaments. The 37-year-old woman is sitting next to sacks full of red algae that sea salt is trickling from. Next to them, the harvest just brought in is drying on the ground, with the individual plants turning more and more colourful. “Unfortunately, they only buy them dried,” says the mother of six. She is paid the equivalent of 40 euro cents for one kilogram. On average, this earns her 30 to 40 euros a month, which one kilogram of carrageen costs a multiple of in the industrialised countries. According to Makame, the price is better than it used to be thanks to the engagement of the Seaweed Cluster Initiative, although she notes that it is “still too low”.

Value is added elsewhere

With Cargill, CP Kelco and a further US corporation, three major carrageen manufacturers are represented in Zanzibar that produce and distribute the substance world-wide. The buyers travelling around the villages supply the subsidiaries of these major corporations, which have their own warehouses at the docks where the algae are further dried, cleaned, pressed and packaged. The miracle material is produced in Europe, the USA, the Philippines and China. “We export almost 15,000 tonnes of dried algae to these countries,” notes Haji Abdul Hammid as he peers from his office window across the port of Zanzibar, where the quay’s only crane is just loading a ship with containers bearing the names of the well-known international shipping companies. Hammid heads a Trade and Industry Ministry agency promoting small and medium-sized enterprises. “We really have to make better use of this potential, and this means that Zanzibar needs carrageen production of its own,” he stresses.

In order to extract the carrageen, the red algae are washed and boiled in an alkaline solution for up to 48 hours. The solution is sub-



Jina Makame is paid the equivalent of 40 euro cents for one kilogram of red algae.

sequently filtered. Only then is the carrageen precipitated with alcohol or gelatinised with potassium chloride. Once it is dried, the substance thus obtained can then be ground into the state usually traded and packaged. “Not a particularly difficult process, but we need technical support and above all investors seeking to put their money elsewhere than into tourism,” says Hammid. He has developed a business plan for a carrageen factory. Also, he will soon be meeting experts from Indonesia to explore options for how such a plant could meet the required quality standards. “In the Philippines, the Chinese are currently establishing carrageen production – but we don’t necessarily want to invite them here,” Hammid remarks.

Too many obstacles to local production

For some time, reports have been circulating in the media that the production of carrageen and Agar Agar is soon to commence in Zanzibar. Tanzania’s Ministry of Agriculture recently launched such a plan in collaboration with a major seafood producer based in Dar-es-Salaam. At local level, however, such reports vanish into thin air. Responding to queries about the challenges involved in manufacturing carrageen, the corporation states that in addition to the constant supply of red algae of the right quality, this also requires detailed know-how regarding the various requirements for the wide range of applications. Actors at national level also tend to be more sceptical about manufacturing the miracle substance in Zanzibar.

“Establishing carrageen production may be a good idea, but I am not sure whether this can work here,” says one of the leading buyers of red algae in Zanzibar, a local who doesn’t want to have his name mentioned.

He says that the tax burden in the archipelago is too high and port handling of cargo is chaotic. “Sometimes, our containers are stuck for weeks or even months,” he notes, adding that the corporations then have to buy the respective capacities elsewhere. “And yet the quality of the red algae here meets the standards, and everything that is harvested is bought up by the companies,” the buyer remarks.

Nevertheless, the producers cannot always supply. Water that is too warm causes diseases among the plants, while storms and other weather events lead to interruptions in supplies as well. And if the algae are not sufficiently covered by seawater, rain or dryness can threaten the harvest. Cargill confirms these challenges and difficulties too. This corporation, which buys red algae on four different continents, has therefore launched the Red Seaweed Promise initiative. According to Cargill, world-wide, around a million producers and their families and communities depend on red algae sales. The initiative is meant to offer them more support in growing, harvesting and marketing the product.

Mwanaisha Makame and her group of women algae farmers from Paje have started their own production with the aid of the United Nations Food and Agriculture Organization. They manufacture soap, oils, pasta or fried snacks with their algae. Red algae contain many minerals and vitamins as well as anti-oxidants. “During the season, we sell quite a lot to the tourists,” she says, greeting a tourist approaching her on the beach. However, the women only process a very small portion of their harvest for their own production. They continue to sell most of it in dried form to the buyers. They have only limited influence on whether this will stay a source of income for their families. If global warming is not stopped, all that can help them will be new varieties of red algae that can cope with the rising water temperatures. Otherwise, only the tourists will be left on the beaches of Paje.

'Cellfilms' and 'Photovoice' – how visual tools can help understand farmers' adaptation to climate change

Use of mobile phones holds great promise for identifying and understanding gendered climate change adaptation strategies in rural areas of the Global South. Our authors describe the methodology and results of a case study with women, men and youth farmers in Uganda demonstrating the benefits and challenges that need to be addressed.

By Laura Kawerau, Regina Birner, Athena Birkenberg and Thomas Daum

Climate change is increasingly affecting rural communities and food security around the world. Research on how farmers adapt to climate change has been intensified in the last years. Many studies use quantitative research designs in order to generate statistically representative data. Qualitative methods such as focus group discussions are also relatively common in this field, but the use of visual research tools is still rare. Considering that a picture is worth a thousand words, such tools can have a considerable potential to generate new insights on climate adaptation in agriculture.

As part of a research project on climate-smart agriculture (see Box on page 49), we implemented two participatory visual research tools in Uganda: 'photovoice' and 'cellfilm'. The goal was to explore how small-scale farmers – including male, female and young farmers – adapt their farming practices to climate change.



Part of a video by farmer Nabbona Cissy Mulumba, who participated in the project.

Photovoice and cellfilms as participatory research tools

The methodology of photovoice was developed in the 1990s by Caroline Wang (University of Michigan, USA) and Mary Ann Burris (Ford Foundation), who first implemented this method in China in a women's health and development programme. The researchers gave cameras to the study participants to document their health issues and needs. Using this approach, they pursued three goals: 1) to empower people – especially women – to record and reflect on their community's strengths and challenges, 2) to promote critical consciousness about key challenges through group discussions of the photos taken, and 3) to reach policy-makers.

Another visual research method is 'cellfilm'. This term was coined in 2009 by Jonathan Dockney and Kethan Tomaselli from the University of KwaZulu-Natal, South Africa in the context of cinema/film studies and refers to short videos (films) recorded on cellphones. This concept was later popularised as

a participatory action research tool in a book edited by Katie MacEntee, with goals similar to those of photovoice: to empower people, raise awareness on critical issues and promote social change. Cellfilm follows the tradition of earlier methods that have used videos. Participatory videos were chiefly used to engage a group or community to produce a film using professional equipment in order to inform policy-makers about a community's needs. Cellfilms are different in that they are shorter, created by individuals and use the video applications of mobile phones. Since these visual research methods have not yet been widely adopted in rural and agricultural studies, we wanted to explore whether they can unravel additional insights into how farmers relate and adapt to climate change.

Spending six days with farmers

With our project collaborators from the Ugandan Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) and the Africa Insti-

tute for Strategic Animal Resource Services Development (AFRISA), we conducted this study in six districts of Uganda. We stayed in each district for six days and worked with one group of women, men and youth, respectively. We conducted a first group discussion with each of these groups on climate change adaptation and also handed out the smartphones to participants. The discussion included open-ended questions about livelihoods, general agricultural activities and gender-specific activities. Subsequently, we asked if participants had experienced a change in climate during their lifetime, which signs of climate change they had observed and how they had been adapting to those changes. After these interviews, we introduced the photovoice and cellfilm approach to each group. Depending on the interest of members, we handed out 5–12 smartphones per group. After training the farmers on how to use the smartphones as cameras for taking pictures and videos, we left the smartphones with participants for two days and asked them to capture their climate-smart practices and strategies in cellfilms and pho-

tographs. On the day after handing out the smartphones, we visited participants on their farms to check if they had any questions or problems concerning the use of the phones. This visit created an opportunity to give feedback on photos and cellphilms already taken and to charge batteries of the smartphones in case they were running low and farmers had no access to electricity. The following day, our research team collected the smartphones.



Before, only my daughter knew how to use a smartphone. Now I am able, too.

We transferred the recordings from the phones to an external hard drive and selected at least one picture or cellphilms from each participant for the second group discussion, which was held on the following day. Selection criteria for the photos and cellphilms included reference to a relevant climate change-related practice and visual quality. Blurred recordings were only selected if they showed a relevant practice and no alternative of better quality was recorded. In a second round of group discussions, we reviewed and discussed the photos and cellphilms with each group using a portable and battery-operated projector. In order not to overburden the meeting, we showed a maximum of 20 photos and cellphilms. During the screening, farmers explained the climate adaptation strategies that they had documented.

Afterwards, the facilitator wrote the practices down on a flipchart paper and drew a simple picture to visualise the practices for the benefit of members with limited literacy. Using a common participatory ranking procedure, each participant received three stickers and was asked to rank the practices considered to be most important in adapting to climate change. Afterwards, the participants explained why they considered the selected practices important. On the last day, a third, joint group meeting with all participants of the three groups (male, female and youth) was conducted, in which each group presented their three to four most preferred practices. Members of other groups were encouraged to ask questions to the group presenting, and the participants engaged in lively discussions. A feedback round completed the meeting and the whole research week in the respective district (see upper Table).

Overview on research design in all districts

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 st group discussion women + handing out smartphones	1 st group discussion youth + handing out smartphones	Visiting youth	Collecting smartphones of youth	2 nd group discussion men: screening of cellphilms and photos	Joint group discussion men + women + youth
1 st group discussion men + handing out smartphones	Visiting women	Collecting smartphones of men + women	2 nd group discussion women: screening of cellphilms and photos	2 nd group discussion youth: screening of cellphilms and photos	
	Visiting men				

Practices recorded on photos and cellphilms, but not mentioned during interviews (women)

District	Bukomansimbi	Kalungu	Kiboga	Mubende	Nakasongola
Livestock	Housing for animals	Housing for animals	Treating livestock with traditional concoctions	Treating livestock with traditional concoctions	Treating livestock with traditional concoctions
		Livestock feed management		Livestock feed management	
Crop management	Agroforestry	Agroforestry	Handpicking pests	Agroforestry	Application of pesticides / herbicides
	Manual weeding	Manual weeding	Trapping pests		Intercropping
Water and soil management	Application of traditional concoctions	Intercropping			
		Planting trees			
		Pruning of bananas			
	Application of organic manure	Application of organic manure	Application of organic manure	Application of organic manure	Water harvesting
	Mulching	Mulching	Mulching		Mulching
		Soil and water conservation structures			
Land use			Deep ploughing		
Other		Bee keeping	Bee keeping		
		Cultivating degraded land			
		Energy-saving stove			
		Income diversification			

Visualisation is beneficial, participation is empowering

The cellphilms and photos elicited additional adaptation strategies that had not been mentioned in the first set of discussion groups. The use of photos and cellphilms thus revealed additional preferred practices in use. During the discussions, women generally mentioned fewer strategies compared to men and youth, but they took an approximately equal number of photos and cellphilms recordings. The recordings thus elicited more information, especially from women. This finding indicates that al-

lowing women to take photos and cellphilms is a suitable method that allows them to express themselves.

While there was no strategy that was solely recorded on photos and cellphilms, some practices mostly came up in the recordings. For women, these practices include mulching, application of organic manure and agroforestry (see lower Table).

Overall, the number of climate change adaptation practices mentioned was larger during the Focus Group Discussions, since it takes

less time to talk about strategies during a conversation than to take photos or cellphilm of these practices. In addition, brainstorming in a group generally brings up ideas more easily than thinking about them individually. Hence, the distinctive advantage of photovoice and cellphilm can be seen in revealing additional insights into climate adaptation of farmers, and particularly women farmers, which are not easily discovered without such visual methods.

The research experience also showed that participants were very creative in how they recorded practices: some held the smartphones themselves, showed their plots and explained how they, for example, dig trenches as soil and water conservation structures; others asked a family member or friend to film them while they were digging a trench. However, some photos were not self-explanatory and required further clarifications from farmers. With their active participation in the research process, farmers not only learned to use a new tool, they were also empowered by contributing to a first analysis of their own findings during the second group discussions. Farmers' self-esteem was visibly enhanced by the opportunity to share their knowledge and experience on climate change adaptation. One woman said: "We found out that it was us who had all the information that we shared, so it was us teaching you [the research team], and we just fail to practise what we know." Participants also saw value in learning how to use a smartphone. One woman pointed out: "Before, only my daughter knew how to use a smartphone. Now I am able, too." Moreover, participants were able to teach someone else to use the smartphone and record them, because they often wanted to be seen in the photo or cellphilm themselves as demonstrating the practice.



We found out that it was us who had all the information that we shared, so it was us teaching you [the research team], and we just fail to practise what we know.

The general enthusiasm in engaging in the smartphone activity can probably be explained by the appeal of smartphones to people. The majority of farmers were eager to participate, and the enthusiasm demonstrated required the research team to request farmers to limit re-

The project "Reaching Smallholder Women with Information Services and Resilience Strategies to Respond to Climate Change" is funded by the German Federal Ministry for Economic Cooperation and Development with further support from the CGIAR Research Program on Policies, Institutions, and Markets (PIM), and is implemented jointly by the International Food Policy Research Institute (IFPRI), the University of Hohenheim in Germany, the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) of Uganda as well as the Africa Institute for Strategic Animal Resource Services Development (AFRISA) of Makerere University. Other partners include the national movement of grassroots women-led community-based groups (GROOTS) Kenya and the Self-Employed Women's Association in India. The project aims to reach more than 30,000 women farmers with information on climate-smart agricultural technologies and practices to improve gendered yield gaps, women's empowerment and resilience to climate change.

cordings to 20 each. Moreover, in most groups there were more volunteers than available smartphones, so we encouraged members to share phones and assist each other in recording climate adaptation practices, which they did. Collecting the smartphones back from participants did not pose any challenge. Not a single smartphone was lost, but possibly this was due to the fact that we worked with farmers' groups and the group leaders assisted in collecting the phones.

However, some farmers were sceptical about smartphones, suggesting that these devices may create controversy or even conflict within communities. As an example, one woman in a youth group stated that her parents would not approve of her using a smartphone, so she chose not to take part. Using photovoice and cellphilm needs to take local perceptions of digital devices into account and should be considered carefully in each context. In addition, the empowerment of participants might well be limited to the duration of our study, since we collected the smartphones as well as digital recordings at the end of the study.

Using visual research methods also requires researchers to reflect on the power relations between participants and scientists. If smartphone ownership in developing economies continues to increase, researchers may want to choose using participants' own devices, so that they can keep their photos and cellphilm after the study is completed.

Availability and access to electricity can pose a challenge to this research approach. Occasional power cuts in our research areas made it difficult to charge phones before distributing them and also affected the selection of cellphilm and pictures for the second meeting, since such data transfers discharge smartphone batteries rather quickly.

A final challenge was the need of a dark room for the second meeting where the recordings

were shown using a projector. These meetings were held in participants' houses or public facilities, such as schools, but in some locations, suitable rooms were hard to find.

"It is a good method to learn from friends"

In addition to having value for development practitioners and researchers, short videos taken by farmers may contribute to developing new ways of knowledge exchange among farmers, between farmers and agricultural extension workers, and between farmers and researchers. Once recorded, a cellphilm can be distributed, shared and watched independently from weather, seasons and infrastructural challenges, such as impassable roads due to flooding after heavy rains. Videos can be installed on the phone of an extension officer, who shows the video in the communities he or she works in, and they can also be shared with community members via messaging services such as WhatsApp. Innovative solutions of small-scale farmers for coping with changing climate conditions could thus be shared with a much larger community, enhancing rural development and communicating (women's!) perceptions, needs and strategies to policy-makers.

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Sharing knowledge – to the benefit of all

Germany's Thünen Institute has increased its activities in Africa in recent years. Scientific training and education are a crucial part of many of these activities. Specific examples are presented in this article, as are opportunities and challenges in the sharing of knowledge.

By Veronika Jorch, Heino Fock, Aida Gonzalez-Mellado and Goran Schmidt

As a Federal Research Institution, the Thünen Institute and its predecessors have more than 100 years of experience in providing scientific advice to the German government and stakeholders. Long-term monitoring of greenhouse gases, fisheries surveys, soil and forest inventories, and extensive modelling capacities, such as fisheries and agro-economic modelling, are the main tools to generate advice for national and international policies. Combatting climate change and the management of fish stocks requires internationally coordinated efforts, and bound by the terms of international trade and exchange, ecological-economic policies can only be successful if conducted at regional to global scale. Present and historical ties between European and the African countries are strong, and the neighbourhood status makes science collaboration between Africa and Europe a natural process. With a strengthening of German policies towards African countries in recent years, the Thünen Institute has acknowledged its responsibility to contribute with an increasing number of partnerships and research activities with African institutions.

As for policy consulting, developing networks and scientific infrastructure can only be successful in the long term if a sufficient number of adequately trained researchers, laboratory staff, technicians and consultants are available and employed in the target regions. Also, the effectiveness of bilateral research collaboration will be higher if both sides dispose of an understanding and sound knowledge of the respective other region. Therefore, a core element in our cooperative activities is to develop capacities among both partners with shared training and education programmes. Moreover, research in rural areas will only be efficient if it benefits the local population. So our activities follow a holistic approach in which stakeholder involvement and the com-



Scientific Production Technician Mbulelo Makhetha with the CTD [Conductivity, Temperature, Depth] rosette aboard the research vessel 'Meteor', during a practical training & research cruise.

Photo: Anne Sell/ Thünen Institute SF

munication of results for other segments of the population, meaning farmers, government and consumers, are included. In the following, we present a selection of activities run at the Thünen Institute.

Agricultural economic modelling for strengthening food security

Agricultural economists from the Thünen Institute use agricultural mathematical models as tools to estimate potential agricultural and economic developments for key agricultural markets in Germany and European Union countries. Policy-makers use these estimates to assess how the agricultural markets will behave

under the current policies. In the project 'AGMEMOD goes Africa' (the abbreviation stands for AGri-cultural MEMber State MODel), scientists from the Thünen Institute and six African countries work together to develop similar agricultural models in order to project the future situation regarding local and imported food supplies. Thünen scientists have been preparing training sessions on the building of agricultural economic models since 2013. Furthermore, scientists communicate continuously to maintain and extend the models, but also to evaluate results together via video conferences. Regular training is provided in Germany for new staff starting to work with the model in the partner countries. As the project has already been running for eight years, it has been possible to establish a cooperative network, particularly in Eastern Africa.

Enhancing local training capacities for fisheries research

In close cooperation with African and European partners, a series of fishery research projects build up on each other and interlink strongly. This has contributed significantly to the enhancement of academic fisheries science capacities in several African countries and Germany. The series began in 2013 with AWA (Ecosystem approach to West African fisheries) in Senegal. Cheikh Anta Diop University in Dakar and the Thünen Institute shared supervising several Senegalese PhDs. This comprised inter alia mini-symposia in Germany, summer schools in Senegal and training on-board a research vessel. International conferences have been organised to strengthen the regional network of marine science in terms of fisheries research and other ocean-related issues. During the PREFACE project (Enhancing the predictability of tropical climate), the Thünen Insti-

tute continued the activities in Cabo Verde at graduate and post-graduate level in cooperation with the University of Cabo Verde. The first Master's degree in fisheries science will be conferred in 2020. The concept of individual doctoral theses evolved into a full academic post-graduate programme within the WASCAL framework (West African Science Service Centre on Climate Change and Adapted Land Use), of which the maritime branch has been hosted by the University of Cabo Verde since 2019. Within WASCAL, research and educational capacities are shared between eleven West African countries and Germany. Thünen experts contribute in the fields of marine genetic resources, fisheries biology and assessment, and hydro-acoustics. The Coastal Ecosystem Monitoring in Cabo Verde project augments fieldwork for the WASCAL programme which also addresses non-academic capacity-building. Finally, these activities feed back into the EU maritime "All Atlantic" strategy as one of the pillars of Thünen Institute marine research.

In Namibia and South Africa, African partners and Thünen colleagues co-supervise individual students and support them in their academic careers to reach Masters and PhD degrees. Participation in international research cruises is provided to enable sea-going training, and training sessions will be organised to strengthen the networking component.

BioHome – research-driven education on recycling resources

Sub-Saharan economies consume enormous amounts of non-African imported building materials, while waste management and eco-industrial products are in their fledgling stages. A shortage of skilled staff further exacerbates this scenario. Low-threshold teaching formats for specialists may overcome such constraints. One example is the BioHome project, in which the Thünen Institute is cooperating with University of Hamburg/Germany and the universities in Ethiopia, South Africa and Ghana. The BioHome team develop building materials from by-products of combustion, post-consumer plastics and waste lignocelluloses. They work on frugal processes, e.g. compounding waste agricultural foils into high value building products. Consumer acceptance of their utilisation in the urban social housing sector is analysed and the substitution potential identified.

The project's backbone is postgraduates from eleven countries doing research-driven edu-

The Thünen Africa Concept

The Thünen Institute is a diverse and geographically dispersed departmental research institution. It consists of 14 specialised institutes that carry out research and provide policy advice in the fields of economy, ecology and technology. Alone in 2019, Thünen Institute cooperated with 57 partners in 23 different African countries. Cooperation centres on the topics of food security, climate change and sustainable use of natural resources.

The exchange and coherence underlying the different activities in Africa is more demanding than for other central organisations. To address this challenge, the institute is working out a special Africa Concept, following the idea that capacity development in distant countries is a process of change, involving all partners and individuals. The core of the Thünen Africa concept is to:

- establish an Africa contact point at the Thünen Institute both for scientific cooperation as well as for the political level and the Ministries;
- create an internal network of scientists taking an interest in Africa;
- provide guidelines for project planning for cooperation with African institutions, based on the knowledge of partners and colleagues;
- contribute to the national network of capacity building institutions.

cation and training. Together with the University of Hamburg, they are designing a masters' curriculum in "Wood Science" for Addis Ababa University, Ethiopia and Kumasi Technical University, Ghana, and are building open educational resources. The postgraduates are grouped thematically (Geopolymer-Wood-Composites, Wood Plastic Composites and Mass Flow Analysis) and perform as learners and as teachers. During summer schools in Germany and hands-on workshops in Ethiopia and South Africa, the African students learn about cost-saving processing and characterisation methods whilst the Europeans study the infrastructural circumstances of recycling and construction in urban Africa. The teams develop their teaching content based on their genuine research work and qualify themselves with e-learning tools (markdown, wiki, github). Excerpts from the lectures are translated into local languages and are illustrated to further mutual understanding between academics and locals.

Scientific education needs long-term, trustful relationships

Long-lasting trustful und respectful relationships are important to enhance an environment for exchange and mutual learning. Moreover, learning, and thus education, are never-ending processes of progress and adapting to new conditions. The world-wide Corona pandemic has hampered international education efforts. BioHome and WASCAL courses as well as the yearly-organised AGMEMOD Summer School had to be transferred completely to online formats. This highlights the importance of digitalisation in the development of capacities in international collaboration, reduces the car-

bon footprint of teaching programmes and can be seen as a model to sustain capacity building programmes cost-effectively. Thus, the "screen-sharing button" in most conferencing tools evolves into a "knowledge-sharing button".

The promotion of a suitable environment for effective scientific education is challenging, given the short 3–4-year lifetime of most projects. Therefore, within the African activities, the Thünen Institute attempts to build a complementary series of projects by pursuing one topic with a number of successive ventures, as described for fisheries research. In addition, approaches to obtain independent project funding for education and training are underway. Two examples are curriculum development by BioHomes and the capacity-building activities in the area of agro-economic modelling. Scientific education is a crucial part of the Thünen activities in Africa, while other important components involve the manner of communicating scientific results to different segments of society. Moreover, scientific education can only be effective if the educated persons find jobs or can be encouraged to create their own enterprises at home. This asynchrony needs to be solved by governments and international organisations.

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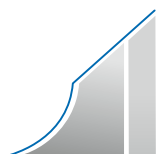
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