

# Report

## Expert Workshop on Science for Implementing the Sustainable Development Goals

Co-organised by University of Ghana and University of Sussex

Venue: African Regent Hotel, Accra. Ghana

Date: 25<sup>th</sup> June 2019



# Summary Report

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## Acknowledgement

The expert workshop on science for implementing the sustainable development goals has been jointly organised by the University of Ghana and the University of Sussex at the African Regent Hotel in Accra, Ghana. This workshop was supported with funds from the University of Sussex.

From the University of Ghana, Prof. George Oduro Nkansah (IAST), Maamie Hutchful (ORID) and Rhoda Neequaye (IAST) contributed to the organisation and running of the workshop. From the University of Sussex, Fiona Hurd and Louis Pilard supported the meeting preparations.

The programme of the meeting was developed by Chris Gordon and Joseph Alcamo.

This report was written by Millicent Amekugbe with inputs from Sussex colleagues.

Thanks to all the guests and moderators who brought their insight to the conference.

## Abbreviations

AFDB	African Development Bank
AIAEE	Agricultural and Extension Education
APRA	Agricultural Policy Research in Africa Programme of Future Agricultures Consortium
ARUA	African Research Universities Alliance
CDKN	Climate and Development Knowledge Network
DFID-ESRC	Department for International Development Economic and Social Research Council
EPA	Environmental Protection Agency
GEF	Global Environment Facility
GIS	Geographic Information Systems
GRIPE	Ghana Recycling Initiative by Private Enterprises
GSA	Ghana Science Association
IAST	Institute of Applied Science and Technology
IAU	International Association of Universities
ICT	Information Communication Technology
IDS	Institute of Development Studies
IESS	Institute for Environment and Sanitation Studies
IIED	International Institute for Environment and Development
ILO	International Labour Organization
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
ISSER	Institute of Statistical, Social and Economics Research
M&E	Monitoring and Evaluation
NGO	Non- Governmental Organisation
ORID	Office of Research Innovation and Development
R&D	Research and Development
SDGs	Sustainable Development Goals
SSRP	Sussex Sustainability Research Programme
UCL	University College London
UGPRP	University of Ghana Plastics Recycling Project
UK	United Kingdom
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNU-INRA	United Nations University-Institute for Natural Resources in Africa
UOWFUA	Utilisation of Organic Waste for Urban Agriculture

## Introduction

The achievement of the 2030 Sustainable Development Goals (SDGs) depends on the successful implementation of policy decisions by governments. Governments, however, cannot achieve this alone. These policies need to be informed by policy-relevant evidence co-designed and co-produced with the relevant stakeholders, taking into consideration local and political contexts and interests. Universities are uniquely placed to lead the cross-sectoral implementation of the SDGs and advance the 2030 agenda by providing an invaluable source of expertise in research and education on all sectors of the SDGs, in addition to being widely considered as neutral and influential players.

Now that the SDGs are entering their implementation phase it is important for the academic community to discuss how science, research, and academia can further help to achieve these important goals. A particular emphasis of the discussions in these workshop focuses on trade-offs and synergies among the SDGs because of their significant influence on implementation.

The objectives of this workshop are to (i) exchange new knowledge related to the SDGs already gained by research at the University of Ghana and University of Sussex, (ii) discuss how current and future research at these institutions (and elsewhere) could further support the SDGs and address barriers to their achievement, (iii) strengthen cooperation between the University of Ghana and the University of Sussex on SDG-related research.

Topics of the meeting include:

- **Concepts of the circular economy and green economy for achieving multiple SDGs.** What are the current designs and scenarios for a circular/green economy? How would a circular/green economy support multiple SDGs? What are priorities for ushering in such an economy in Ghana, the UK, and elsewhere? How can research support the development of a circular/green economy?
- **Trade-offs and synergies among the SDGs.** What are examples of trade-offs and synergies among the SDGs, and how do they occur? Which actions maximize synergies among the SDGs? How can we reduce institutional barriers that militate against coordinated action? Which methods are available for prioritising trade-offs and synergies at different scales? What are the outlines of a joint project for identifying the most important trade-offs and synergies in Ghana and the UK at different scales of time, space and governance?
- **Urban/peri-urban areas: food systems and sustainability.** How does/can food production in urban and peri-urban areas contribute to the SDG2 for zero hunger? What are the trade-offs and synergies between goals for food production in these areas and goals for water, land conservation, and health? How can the nexus approach to research on water, energy and food as well as water, disaster risk reduction and responsible consumption contribute to sustainable solutions for cities?
- **The contribution of universities and the research community to SDG planning and implementation.** What are priorities for research at the University of Sussex, University of Ghana, and elsewhere to support the SDGs? How can this research be better linked to internal and external policy processes? As an example, are universities in Ghana and the UK internalising the SDGs in their operations? Can the Commonwealth provide a platform for encouraging this research, supporting co-design of research by academics and stakeholders, and disseminating research results on the SDGs?

Since a key objective of the workshop is to strengthen cooperation between the University of Ghana and University of Sussex, participants in all sessions discussed potential joint research projects, sources of funding for joint research, as well as student and faculty exchanges to intensify actions on science for SDG implementation.

## Opening Session

The workshop started with an opening session facilitated by Prof. Chris Gordon. The session included a welcome address by Prof. Daniel Asiedu, the Provost of the College of Basic and Applied Sciences on behalf of Prof. Ebenezer O. Owusu, the Vice-Chancellor of the University of Ghana. The keynote address was delivered by Dr. Eugene Owusu, the Special Advisor to the President on SDGs. Prof George Nkansah, the Director of IAST, Dr. Fatima Denton, the Director of UNU-INRA, Mrs Leina Shi, Head of Global Engagement at the University of Sussex, Prof. Joseph Alcamo, Director of the Sussex Sustainability Research Programme (SSRP), and Dr Ted Annang, representing the Director of IESS, delivered their addresses for the opening of the workshop.

### Vice Chancellor's Remarks

**By Prof. Daniel Asiedu, Provost, College of Basic and Applied Sciences on behalf of the Vice-Chancellor of the University of Ghana**

Prof. Daniel Asiedu in his speech welcomed all participants to the workshop. He acknowledged that the workshop has been organised by the University of Ghana and the University of Sussex, on Science for Implementing the SDGs. He reiterated the objectives of the workshop, which is to exchange new knowledge related to SDGs, discuss how current and future research at both institutions could further support SDGs and address the barriers to their achievements and lastly strengthen cooperation between the University of Sussex and the University of Ghana on SDG related research. Prof. Asiedu professed that he was hopeful the outcome of this workshop will lead to the identification of joint research projects, development of funding proposals and concrete plans for students and faculty exchange for the mutual benefit of both institutions.

### Statement From UNU-INRA

**By Fatima Denton, Director UNU-INRA**

Dr Fatima Denton, Director of UNU-INRA gave the first address of the various heads of institutions invited. Although the SDGs are the most important transformational agenda of our times, not enough science is being drawn upon to achieve this agenda. She mentioned that the IPCC has said that “we have a 12-year window to reverse the trends of global emissions.” And even though the SDGs have a similar time frame they are not very well integrated with greenhouse gas emission reduction goals and policies. She encouraged participants to ensure that relevant science is being drawn on for implementation of the SDGs and climate goals. She also emphasized that science should incorporate indigenous knowledge in some way. This workshop is a good opportunity to focus on how science can be used as a key component of the SDGs and how best African can be positioned as a frontier continent so that the science from Africa can support the process of the SDGs and help arrive at the right destination.

### Statement from University of Ghana

**By Dr. Ted Annang on behalf of Prof Appeaning-Addo, Director, Institute for Environment and Sanitation Studies**

Dr. Ted Annang's address focused on the Institute for Environment and Sanitation Studies (IESS). In his address, Dr. Annang gave an overview of the mandate of the institute and what the institute



focuses on. He said the rationale for establishing IESS is to train the next generation of scientists that will have the skill and knowledge to innovatively tackle the environmental and sanitation issues in Ghana and beyond. Hence, the institute offers graduate programmes to equip students with the facts, information, and skills to address environmental issues associated with waste management, mining, coastal erosion, deforestation, climate change, pollution, among others. The graduate studies hinge on the relationship between society and the environment. IESS has also established a program in sustainability science in the bid to solve problems with sustainability in the country. The achievement of the SDGs is very important to the institute, hence serves as a platform to advance the SDGs.

**By Prof. G Nkansah, Director Institute of Applied Science and Technology**

Prof. G. Nkansah, Director of the Institute of Applied Science and Technology (IAST) started his speech with a summary of the institute's focus. He mentioned that IAST was nominated to represent the University of Ghana to lead on SDG1 "No poverty" and is currently liaising with five other universities to form a cluster to propagate this agenda among the International Association of Universities (IAU). IAST operates on five key focus areas which are: Energy & Climate Change Mitigation, Natural Resources Management and Sustainable Exploitation, Health and Traditional Medicine, Food Processing Packaging & Agribusiness and Infrastructure Development, Water and Sanitation. He said the institute has included a sixth area which focuses mainly on creating awareness of the SDGs and their achievements. Prof Nkansah stated that the sustainable development agenda, "Transforming our World: The 2030 agenda for sustainable Development" mirrors the IAST's mandate and its key focus areas. The institute has therefore partnered with the SDGs Advisory Unit of the Office of the President to sensitise the general public on the SDGs and tailor activities towards the national agenda. He concluded by saying this Expert Workshop on Science for Implementing the SDGs is timely as it promotes the activities of academia on the SDGs which is in tandem with the activities being championed by the IAST at UG.

## **Statement from University of Sussex**

**By Leina Shi, Head of Global Engagement**

Leina Shi gave a presentation on the international cooperation activities of the University of Sussex. She explained the mandate of the Global Engagement Unit at the University of Sussex. The unit was put together about 18 months ago to raise the University's global reputation and lead on its wide network of partners overseas. The four guiding principles of the University of Sussex are: "Learn to transform", "Research with impact", "Engage for change" and "Build on strengths". The Sussex Sustainability Research Programme is one of four key University-wide research programmes. Ms. Shi expounded on the relationship with the University of Ghana and University of Sussex. University of Ghana and the University of Sussex have an institutional Memorandum of Understanding (to June 2021). There are substantial research connections across the Institute of Development Studies (IDS), Global Studies, Education and Business, and arrangements are in place for undergraduate research training (International JRA) and staff exchange.

Beyond the good number of existing research connections including collaboration in the [Migrating out of Poverty Consortium](#), in Education, and the [IDS Future Agricultures Consortium](#) there appear to be potential opportunities for collaboration not only via the Sussex Sustainability Research Programme (SSRP), but also in medical fields, with overlapping interests in global health security and infectious

disease, and potential for combining social and natural science in future research bids on global challenge topics.

The University of Sussex Vice-Chancellor, Professor Adam Tickell visited the University of Ghana in April 2017. In March 2019, Sussex welcomed a University of Ghana delegation led by Vice-Chancellor, Prof Ebenezer Oduro Owusu. Since 2017, the University of Sussex has operated a strategic fund to cultivate or expand research and teaching collaborations, and to provide a platform for the two Universities to collaborate.

**By Prof. Joseph Alcamo, Director of the Sussex Sustainability Research Programme**

In his remarks, Prof. Joseph Alcamo, the Director of the Sussex Sustainability Research Programme (SSRP), emphasised that the SDGs provide a basic template for development over the coming years, and achieving these goals will require not only political will and major financing but also new knowledge which the academic community around the world needs to provide. Building partnerships to provide this knowledge, such as between the Universities of Ghana and Sussex, is essential to this task and that explains the importance of the topic of this workshop “Science for Implementing the Sustainable Development Goals”. The SSRP, which he represents, is ready to play a key role in this partnership. The aim of the programme is to provide “Science for the SDGs”, with a particular accent on research about the synergies and trade-offs among the goals. Although fairly new, the SSRP has already engaged about a hundred researchers based in Sussex and established partnerships with at least one hundred researchers in 15 low and medium-income countries and the UK. Up to now, however, Ghana is not part of the partnering countries. Therefore the SSRP is particularly interested in establishing a working relationship with colleagues at the University of Ghana. In terms of having joint projects, the institution has some funds for a project on the interactions of SDGs which will be discussed in the upcoming session. He expressed his joy of being at the workshop and wished the team success.

**Keynote Address by Special Advisor on SDGs to the President**

**By Dr Eugene Owusu, Special Advisor to the President on the Sustainable Development Goals**

In the keynote address, Dr. Eugene Owusu congratulated the two institutions, the University of Ghana and Sussex University, for putting together such an all-important programme. He remarked that since the adoption of the SDGs, world leaders were very clear in their minds that it will not be possible for governments to achieve these goals alone. Collaboration and strategic partnerships with all constituencies including the private sector, academia, civil society and communities were fundamental for success. He mentioned that this workshop embodied the spirit of partnership that the global goals envisaged.

He continued to say that the SDGs are not an abstract phenomenon. They represent what, as a country and as a society, we have an obligation to do: “become a country without poverty, without hunger, a country where everyone has good health and quality education; where every person has decent work and where peace and justice thrive.” He emphasised that these are not idealism; these are aspirations that are indeed achievable. Although the challenges of achieving the SDGs may be huge, they are important building blocks that have been put in place in the country to underpin prospects for achieving the goals. He highlighted some examples of what has been done, one of these is the

completion of the voluntary national review report which reveals that there is generally good progress towards the social sector and governance-related goals, including health, education, gender, justice and peace. In contrast, there is a mixed performance on the economic-related goals, including employment, infrastructure and manufacturing. Crucially, progress towards the environment and sanitation goals has been extremely bad.

One thing that is clear to achieve the SDGs is the effort of all segments of society and this includes academia. This workshop on 'Science for Implementing the SDGs' is yet another great effort and contribution to the SDGs enterprise. Science, technology and innovation are intricately-linked and they have become the new currency for development. They provide the basis for new and sustainable approaches and solutions to meet the challenges of sustainable development.

Dr. Owusu shared a few perspectives on how this workshop could contribute to the success of the SDGs.

- Incorporating SDGs into the curriculum of universities to provide students with the requisite knowledge and skill to understand and address the challenges of SDGs.
- Student-faculty interactions should aim at generating new solutions to contemporary challenges of the SDGs by leveraging science and innovation.
- Identifying and unleashing the innovative potential of students by promoting SDG related research topics.
- Facilitating cross-sectoral dialogue and action. Universities must play a significant role in public engagement and participation in addressing the SDGs.
- Building partnerships to share ideas and find solutions and Universities must have policies that are SDG compliant.

In conclusion, Dr. Owusu reiterated that the SDGs are the greatest inheritance that we can leave for the current and future generation. Failure can therefore not be an option. We have the knowledge and the capacity to deliver and with the right set of policies and partnerships in place, we should surely deliver. He recommended that the conversations started in this workshop will be taken to the lecture halls and will ultimately be the oxygen that fuels the work of the universities.

## Presentations on Research Themes

Four presentations were delivered on the four themes for the workshop,

- Trade-offs and synergies among the SDGs
- Circular economy and green economy for achieving multiple SDGs
- Urban/peri-urban areas: food systems and sustainability
- The contribution of universities and the research community to SDG planning and implementation

## Trade-offs and synergies among the SDGs

**By Prof Joseph Alcamo**

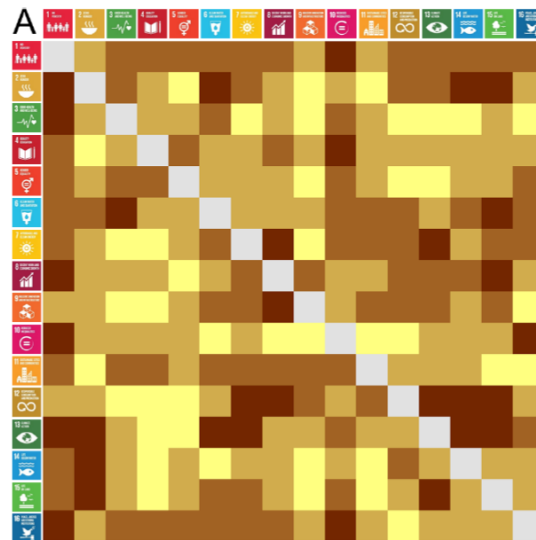
This presentation focused on the interactions among the SDGs. Most of the 17 goals are closely interrelated, leading to trade-offs and synergies among the goals. Trade-offs are conditions by which an action to achieve one goal or target makes it more difficult to achieve another goal or target. For example, industrial-scale projects for growing bioenergy crops help to meet the targets for renewable energy at the expense of targets to protect land and water resources. Synergies, on the other hand, occur when an action to achieve one goal or target helps achieve one or more other goals or targets. An example is sustainable agriculture which can contribute to meeting the zero hunger goal while helping to achieve goals for land, water, and climate.

An important issue is whether and how these interactions are considered in SDG implementation. The approach of almost all countries is to implement the SDGs in a piecemeal fashion, i.e. by handling each goal individually, and to basically ignore the interactions among the goals. However, an *integrative approach* could bring large cost savings, by minimising losses caused by trade-offs. It would also be a more efficient way of implementing the SDGs because it would aim to advance multiple goals with the same action or programme and thereby require fewer resources, with fewer duplications among programmes, and more opportunities for collaboration across sectors.

Although taking an integrative approach would bring clear advantages to governments and other institutions, there are some very difficult questions that first need to be addressed in order to make an integrative approach feasible:

- Which of the numerous synergies and trade-offs among the goals and targets have the biggest potential impact on SDG implementation?
- Do the synergies add up? i.e. which actions to exploit synergies make a significant contribution to achieving the SDGs?
- What kind of governance do we need for exploiting synergies? How can we manage SDG interactions in governments that are sectorally organized?

Prof. Alcamo proposed that the University of Sussex work closely with the University of Ghana to immediately tackle the first of these questions. He proposed doing so by jointly developing a cross-impact matrix of SDG interactions (Figure 1). The matrix shown in Figure 1 depicts a pair-wise comparison of goals, with the darker the colour, the stronger the interaction between goals. The advantage of such matrices are that they transparently depict the relative importance of interactions among SDGs and can be fairly easily developed with different interest groups. They can be used to analyse interactions between either goals or targets.



**Figure 1: Cross-impact matrix for identifying priority trade-offs and synergies.**

SDGs are listed on the left and topsides. Boxes, where they intersect, are colour-coded; light colours indicate a low level of interaction and dark colours a high level. From Scharlemann et al.<sup>1</sup>

The matrix shown in Figure 1 was developed earlier by the SSRP working with a group of experts as part of a study financed by the Rockefeller Foundation.<sup>1</sup> Prof. Alcamo proposed that the Universities of Sussex and Ghana work together to develop such a cross-impact matrix with the objective being to identify priority trade-offs and synergies among the SDGs for Ghana. He asked participants for their advice on whether such a joint project should be launched, and if yes, which part of Ghana should it concentrate on, and which stakeholders should it involve.

Many participants expressed strong support for beginning such a project.

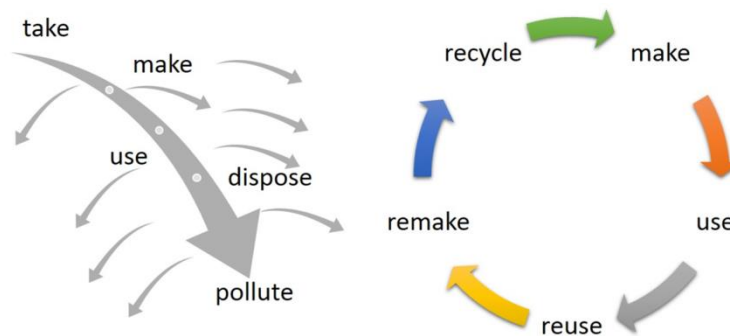
Prof Alcamo concluded by saying that he believed that identifying priority synergies and trade-offs among the SDGs are a key part of implementing the SDGs and that he hoped that the Universities of Sussex and Ghana could soon work together on this important task.

<sup>1</sup> Scharlemann JPW, Mant RC, Balfour N, Brown C, Burgess ND, Guth M, Ingram DJ, Lane R, Martin J, Wicander S, Kapos V. 2016. Global Goals Mapping: The Environment-human Landscape. A contribution, Towards a Sustainable Earth: Environment-human Systems and the UN Global Goals. <https://nerc.ukri.org/research/partnerships/international/overseas/tase/mapping/>

## Circular economy and green economy for achieving multiple SDGs

By Dr. Daniel Nukpezah/ Prof. Daniel Twerefou

Dr Nukpezah gave an overview of circular and green economy and also deliberated some projects and issues in these sectors. He started by saying a circular economy is an economic system aimed at minimising waste and making the most of resources. In a circular system resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing energy and material loop. He continued by defining a green economy which according to UNEP is one that results in “improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities” (UNEP 2010). In its simplest expression, a green economy is low-carbon, resource-efficient, and socially inclusive. In a green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. A traditional linear economy which we are trying to avoid involves the cradle to grave model where we take, make and waste.



**Figure 2: Linear versus circular economy**

To ensure a low carbon future, there is the need to transition from industrial to “ecological civilization”. Some circular economy projects that are being undertaken by the University of Ghana include University of Ghana Plastics Recycling Project (UGPRP), Utilisation of Organic Waste for Urban Agriculture (UOWFUA) and the GRIPE Project a recycling initiative by the private sector. Some potential areas for research in the circular economy proposed in the presentation included:

- Integration/interdependency of industrial systems to promote circularity.
- Mapping the current state of (integration) material and energy exchanges among firms.
- Building internal capacity (training) to facilitate integration.
- Identifying priority areas for integration.
- Integrating, embedding, and implementing material exchanges across industrial systems.

## Agricultural Policy Research in Africa (APRA)

**Analysing Pathways to Inclusive and Sustainable Commercialisation**

By Dr John Thompson, Director of the Future Agricultures Consortium and Deputy Director of the Sussex Sustainability Research Programme

Dr. John Thompson mentioned that this presentation will make a good linkage to the circular economy presentation. This presentation focused on how agriculture can be commercialised and done in a way

that is more pro-poor achieving a number of the SDGs. He described a five-year research programme funded by the UK Department of International Development (DFID) entitled, 'Agricultural Policy Research in Africa' (APRA). The APRA Programme builds on more than a decade of collaborative research coordinated by the Future Agricultures Consortium (FAC), a partnership led by the Institute of Development Studies at the University of Sussex, involving over 100 researchers and communications specialists in Africa and the UK, which has been examining the political economy of agricultural policy processes across Sub-Saharan Africa. The APRA Programme is focusing on analysing and understanding pathways to more inclusive forms of commercial agriculture in 8 countries in Africa, including Ghana. That work is being led by partners in the Institute of Statistical, Social and Economic Research (ISSER) and the University of Ghana, which is also serving as the Regional Hub for West Africa.

Agriculture has not been a big part of the international agenda until recently but is now playing a big role in the SDGs, both positively and negatively. SDG 2 is not just the 'zero hunger' goal, it is also aiming to achieve food security, improve nutrition, increase agricultural productivity and promote sustainable agriculture. This is an ambitious agenda, especially mobilising investment in agriculture which is seen as transformative, particularly for rural populations and economies.

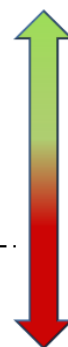
There are quite a few synergies between SDG 2 and other global goals and targets. For example, targets for ending hunger and achieving food security can benefit from progress on both economic (productivity improvement, sustainable consumption and production) and environmental front (sustainable agriculture) achievements. However, trade-offs can occur between the agricultural economy versus sustainability-focused targets. Looking at the linkage between SDG 1 (ending poverty) and SDG 2, there are clear synergies and tradeoffs.

Achievements in SDG 2 can contribute to SDG 1 through enhanced food and nutrition security and income generation. More than half of the extreme poor live in Sub-Saharan Africa. In fact, the number of poor in the region increased by 9 million, with 413 million people living on less than US\$1.90 a day in 2015, more than all the other regions combined. If the trend continues, by 2030, nearly 9 out of 10 extreme poor will be in Sub-Saharan Africa, some 70 per cent of whom reside in rural areas. Therefore, supporting small and medium-scale food producers and farm workers will be essential if we are to achieve a substantial reduction in rural poverty. However, a possible constraint is the potential impact of trade liberalisation, because SMS farmers may be adversely affected by import surges and highly competitive foreign products or food dumping. Therefore, there is no guarantee that 'pro-poor' agricultural development policies will reduce poverty or that poverty-focused policies will necessarily improve food and nutrition security.

APRA researchers have refined a framework developed by Future Agricultures to examine the changing livelihood trajectories of rural people who have been engaging in different forms of commercial agriculture in different contexts (Figure 3). The framework is being used to analyse how some households have been able to move from '*hanging in*' or, in the worst cases, '*dropping out*' of productive agriculture (and therefore requiring social protection or other safety nets to support them) to situations where they are able to intensify their production, specialise in particular products and, in some instances, diversify into non-farm economic activities. Many of the households who have been able to '*step up*', '*step out*' or '*step in*' are pursuing different market-based agricultural pathways out of poverty.

## Analysing 5 Livelihood Trajectories through Agricultural Commercialisation

1. **'Stepping in'** – returning / moving into commercial agriculture from a non-farm base, rise of medium-scale farmers
2. **'Stepping out'** – accumulating, diversifying and creating alternative, non-farm economic activities
3. **'Stepping up'** – improving and investing in existing agricultural activities and engaging in the market
- 
4. **'Hanging in'** – maintaining subsistence level
5. **'Dropping out'** – moving away or slipping into destitution due to shocks and stresses



[www.future-agricultures.org/apra](http://www.future-agricultures.org/apra)



**Figure 3. Analysing livelihood trajectories**

The objectives of APRA are to produce new evidence on the dynamics of these livelihood trajectories to inform policies and to make investments in commercial agriculture more effective and inclusive. The research is also seeking to provide a better understanding of the political economy shaping agricultural commercialisation policy processes in the region.

The programme is based on 3 Work Streams (WS), each using mixed methods.

- **WS1 - Panel studies of different commercialisation types and people's 'selection choices' over 2 waves.** Analysing livelihood outcomes resulting from engagement with the different commercialisation types. Focusing on outcome indicators: commercialisation choices; reducing poverty and inequality; women's empowerment; labour and employment; and food and nutrition security.
- **WS2 – Longitudinal studies of inclusive pathways to agricultural commercialisation in different agrarian contexts.** Analysing how different pathways of agricultural commercialisation evolve over time from a wider historical assessment of the dynamics of agrarian change. Examining how these changes influence the livelihood trajectories of rural men and women in different contexts. Focusing on: processes of 'stepping up' and 'stepping out'.
- **WS3 – Comparative policy studies to fill evidence gaps:**
  1. Business investment in agricultural commercialisation
  2. Growth corridors and commercialisation
  3. Rise of medium-scale investor farmers ('stepping up' & 'stepping in')
  4. The new mechanisation agenda
  5. Livestock commercialisation in pastoralist areas
  6. Young people and agricultural commercialisation



## Contribution of Universities and the Research Community to SDG Planning and Implementation

By Prof. Chris Gordon

Prof. Gordon presented an overview of what has been going on in the University of Ghana in connection with the SDGs based on research, strategy objectives of the University and other administrative work. He stated that universities need SDGs to create demand, to have good universities and generate new funding streams, collaborate with partners and it also improves the internationalisations of universities. Universities also contribute to SDGs not as much as they could but there are a few areas such the human resource need especially those with the SDG world view, research on understanding the SDGs, and universities are also a neutral place where people can discuss the SDGs without political connotation.

An analysis of the SDG-related research University of Ghana was carried out. Firstly, 400 SDG specific keywords which have been created by a group of universities in Australia were used (Figure 4). These keywords were used to search for PhD theses that have been done in a 10-year period from 2006-2016. The analysis showed that three main areas of water, food and health are areas where the University produces most of its SDG-related research. The area that was not well represented is energy and this is where more effort can be put into or left for other institutions with strengths in this area to handle.



Figure 4: SDGs and the University of Ghana

Publications from three colleges (College of Basic and Applied Sciences, College of Health Sciences and College of Humanities) in the university was also analysed. SDGs 3, 5 and 11 were dominant i.e. having the largest number of publications (>50). The strategic plan of the university was another criteria used in the study. The University of Ghana has nine priorities each with key indicators. Research institutes were also analysed for the dominant SDGs that they are working on. Combining all these areas that were analysed the results showed that the University was focused on SDGs 4, 8 and 10.

Prof. Gordon recommended that for the University of Ghana to effectively help in the achievement of the SDGs, it will have to put more effort into the other goals of the SDGs because there are

interlinkages between the SDGs. Universities should research the SDGs itself, as already known the tier 3 of the indicators of the goals have not been defined yet and there need to be more research put into them to be able to define them. Linkages, synergies and trade-offs will need further research to be carried out on to enable a good understanding of the interactions of the SDGs. Technology and innovation, on the other hand, is also significant in achieving the goals. Universities must actively support the national and local implementation of the SDGs. There needs to be coordination between research institutions both nationally and internationally. Finally, research from universities must be transdisciplinary and there is a need to change the way we teach and learn.

## Open Discussions

### Questions and Answers

**Question:** What are some research topics in the area of circular economy in Ghana?

**Answer:** The integration of economies can be looked at from the perspectives of both Ghana and the UK which will then determine which key areas of the circular economy need to be focused on for research.

**Question:** In the APRA Project are there opportunities to work with the School of Agriculture and other units in the University of Ghana?

**Answer:** The School of Agriculture is welcomed to participate in the project and the other participants on the project at the University of Ghana can be contacted to get in touch with the School.

**Questions:** How can Ghana industrialise in an efficient way with the limitations that the country has?

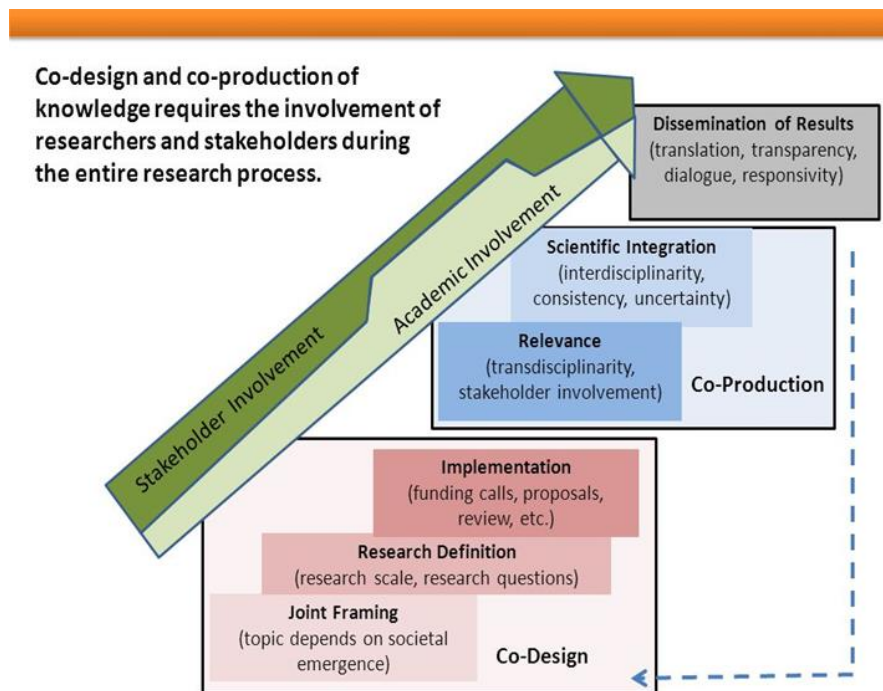
**Answer:** Ghana can effectively industrialise since Ghana is yet to industrialise it can learn from the mistakes of other countries that have gone through the various phases of industrialisation. An example of effective industrialisation is eco-industrial parks. There are models which can be followed to deliver effective industrialisation. Ghana may not have to go through the traditional way of industrialisation. Technology and innovation can be one of the ways that Ghana can use industrialisation. Ghana, however, has a long way in achieving an effective green economy.

**Question:** What will be the research questions involved in the project proposed by Prof. Alcamo to identify priority SDG interactions in Ghana?

**Answer:** The methodologies for identifying priority trade-offs and synergies among SDGs are in an early stage of development. The cross-impact matrix method which Prof. Alcamo talked about is one method used for this task. This may seem like a simple method, but there are actually many methodological questions that need to be explored, e.g. what is the influence of scale and stakeholder-group on the results of the matrix? Therefore, major research questions of a project to develop such a matrix in Ghana would be: how do various factors influence results from a cross-impact matrix when it is used to identify priority SDG interactions? How can current methods to develop cross-impact matrices be improved so that assumptions are more transparent and the results more useful for policymaking?

**Question:** Explain further what transdisciplinary research is.

**Answer:** Transdisciplinary research has to start from the ground up. It starts with the people who need a question solved. It involves co-design and co-production with the stakeholder. The diagram illustrates the idea of co-design and co-production in transdisciplinary research.



Slide from G. Klepper's presentation at Planet Under Pressure

\*SDSN Australia/Pacific (2017): Getting started with the SDGs in universities: A guide for universities, higher education institutions, and the academic sector. Australia, New Zealand and Pacific Edition. Sustainable Development Solutions Network – Australia/Pacific, Melbourne.

## Group Discussions

In this session, participants were put in two groups to discuss themes for the workshop.

### Circular economy and green economy for achieving multiple SDGs

#### 1. What are the current designs and scenarios for a circular/green economy? (Ghana/UK)

- There is currently a lack of policy or intentional practice in Ghana however, there is a gradual shift in the waste management sector. Zoomlion and Jekora are examples of enterprises providing some incentives for behavioural change.
- Ghana's one district one factory policy is a short to medium-term opportunity to recreate a new business model, especially for a green economy.
- E-waste, plastics recycling etc provide new thinking towards a circular economy and there seem to be a policy thinking emerging around the management of these materials.
- Thinking towards sustainable consumption and production - public procurement, tourism, food systems within a ten-year UN initiative that promotes a circular economy through life-cycle assessment.

#### 2. How would a circular/green economy support multiple SDGs?

- Critical policy integration with intentionality at the policy-making level.
- SDGs 2, 6, 4, 9,13, 16, 17 (we could further explore other linkages).
- Resource efficiency, environmental impact, and human well being.
- We need to approach this from an interdisciplinary and multi-sectoral way.

#### 3. What are priorities for ushering in such an economy in Ghana, the UK, and elsewhere?

- Waste management is a key priority that can be looked at and the potential benefits of a circular economy in this sector. Employment, resource efficiency and environmental restoration and agriculture are some benefits that can be derived.

#### 4. How can research support the development of a circular/green economy?

- Cost-benefit analysis - but in a broader way that mutes the usual economic imperative.
- Socio-cultural reorientation towards a circular economy (media-behavioural change)
- Explore and establish possible or potential tradeoffs.
- Community initiatives through citizen science to help communities derive their own data to establish priorities.
- Place-based assessment of circular economy practices on a regional level (West Africa) to see who is doing what.

#### 5. What are the outlines of a joint project on the circular economy and green economy for achieving multiple SDGs in Ghana and the UK at different scales of time, space and governance?

- Do a best practice comparison or exploration research between universities.
- Value justification/opportunity for a movement towards a circular economy.

- Get communities exposed to the SDGs and create community-based monitoring and implementation mechanisms (community ownership at the micro-level).
- Universities are sites for social experiments and so lessons should be scaled up. Legon and Brighton can focus on engaging with communities and applying sustainability principles on our campus for cross-campus learning.

## Trade-offs and synergies among the SDGs

### 1. What are examples of trade-offs and synergies among the SDGs, and how do they occur?

#### Trade-offs

- Certain kinds of crop production and fishing aiming to achieve the zero hunger goal may inadvertently result in environmental degradation.
- Industrial-scale crop production aiming at reducing poverty may instead enhance food insecurity.
- The exploitation of mineral resources may result in food insecurity, environmental degradation and degradation of water quality.

#### Synergies

- Education may enable the use of advanced technologies to improve food security.
- Education may also help address environmental challenges.
- Introduction of clean cookstoves could contribute to a lessening of wood extraction from wooded areas surrounding villages, and would definitely reduce the serious threat to the health of women and children from smoky cookstoves.
- Following the principles of integrated water resource management would contribute to achieving water, food, and other goals.

### 2. Which actions maximize synergies among the SDGs?

- Collaboration and coordination among institutions.
- Education on the SDGs at all levels.
- Use of technologies e.g. ICT/improved modern sanitation methods.

### 3. How can we reduce institutional barriers that militate against coordinated action?

- Improved collaboration between MDAs and other relevant stakeholders (Governmental and Non-Governmental Organisations).

### 4. What are the outlines of a joint project for identifying the most important trade-offs and synergies in Ghana and the UK at different scales of time, space and governance?

*Develop a cross-impact matrix to identify priority trade-offs and synergies among a subset of goals or targets in Ghana. This would involve the following tasks:*

- Carry out a statistical analysis of time series of SDG indicators in Ghana in order to rank the importance of indicators and determine the subset of most important SDG targets for Ghana. Use this subset of important targets to develop a cross-impact matrix or matrices.
- Decide on whether to develop the cross-impact matrix or matrices for “national conditions” or for one or more “ecological zones” in Ghana (e.g. coastal zone, savanna zone).
- Develop cross-impact matrices for current conditions but also for various *future conditions* under various socio-economic scenarios.

## **Urban/Peri-urban areas: food systems and sustainability**

- 1. How does/can food production in urban and peri-urban areas contribute to the SDG for ending hunger?**
  - Producing food and nutrition security, income generation, employment and poverty reduction.
  - Creation of urban green spaces.
  - Regulation of water use for irrigation.
  - Policy on land-use systems in the peri-urban areas.
  - Enforcement on agrochemical use.
- 2. What are the trade-offs and synergies between goals for food production in these areas and goals for water, land conservation, and health?**
  - Contribute to food security but has implication for health due to the use of polluted water and unsafe use of agro-chemicals.
  - Crop production, livestock production, and household and industrial processing can result in sanitation issues which affect human health.
  - Food production promotes, social capital and community cohesion.
  - Computing use of land with other uses.
  - Food production affects the ecosystem (ecosystem degradation, biodiversity loss, pollution and climate change).
- 3. How can the nexus approach to research on water, energy and food as well as water, disaster risk reduction and responsible consumption contribute to sustainable solutions for cities?**
  - Responsible consumption of food and water and disaster risk reduction will lead to the sustainable use of water, energy and food. This will, however, require education, technology and policy intervention.
- 4. What are the outlines of a joint project for identifying the trade-offs and synergies between goals for food production in these areas and goals for water, land conservation, and health in Ghana and the UK at different scales of time, space and governance?**

- Using action research through engagement with local communities to find solutions to problems associated with food, water and energy.
- Documenting innovative practices being used by communities and sharing them with other communities.

## **Contribution of universities and the research community to SDG planning and implementation**

### **1. What are priorities for research at the University of Sussex, University of Ghana, and elsewhere to support the SDGs?**

- The University of Ghana has defined some priority research pillars which are broad enough to provide some direction and could have some synergies within the SDGs. They predate the SDGs, but could be realigned:
  - a. Malaria-Research;
  - b. Enhancing Food Production and Processing and Research,
  - c. Trans-disciplinary Research into Climate change Adaptation,
  - d. Development Policy, Poverty, and M&E Center.
- Sussex has some identified research themes: Neuroscience, a program for quantum research, sustainability research, and humanities lab. (4 programs). These could also be looked at.

### **2. How can this research be better linked to internal and external policy processes?**

- Demand-driven research, but needs to respond to policy environment and opportunities. Policies are time-sensitive (election cycles) so it is important to work in the policy arena with a strategic eye on the changing phases and to respond accordingly.
- Develop policy influence pathways that map out key actors for influence (this could be seen as a component of a possible broader project such as the current ARUA).
- Monitoring and evaluation is a critical research area to derive the requisite data to inform policy.
- Good governance and how it impacts the delivery of the SDGs (mapping good practice in different contexts).

### **3. As examples are universities in Ghana and the UK internalising the SDGs in their operations?**

- Sussex is driving an agenda towards a sustainable campus. Getting serious about internalising. Different committees looking at performance and relation to SDGs and the second one looking at zero emissions and overall sustainability practice/ranking. There are university-wide key performance targets.
- UG not there yet in times of internalisation (sustainability); however, there are a few initiatives that have ignited a communal consciousness. Overall most of the current efforts are ad-hoc and needs harmonisation into a coherent policy.

### **4. Can the Commonwealth provide a platform for encouraging this research, supporting co-design of research by academics and stakeholders, and disseminating research results on the SDGs?**

- The Commonwealth provides different opportunities that we could possibly explore to our advantage as research institutions.
- We need to also look at smaller consortia to see what opportunities are there.

## 5. What are the outlines of a joint project for identifying the contribution of universities and the research community to SDG planning and implementation in Ghana and the UK?

### Potential projects and activities:

- Explore readiness and map out good practices for universities, to get a set of barriers and enablers to create an SDG-ready university. There could be institutional research to characterize a sustainable university campus.
- A small aspect of the research community seems to be looking at SDG issues and there is a need for a more purposeful mobilisation of the research communities in the two universities.
- As an activity for UG, we could do a retrospective mapping of the UG research themes to the SDGs targets and indicators.
- Institutional best practice learning especially at the administrative levels (training and building capacities for the right personnel to play roles in SDG implementation and planning).

## Plenary Session

This session was moderated by Prof. Alcamo. Participants were put into two groups to deliberate on the themes given.

## Open Discussions

Prof. Twerefou opened up the discussions by suggesting that both economic and social aspects of the circular or green economy should be addressed. He continued to say that local research on the green economy should be explored and further research conducted to build on it. More effort should be put into regional-level research especially concerning best practices.

He stated that concerning the trade-off and synergies when it comes to the institutional components, digital technology may help reduce some institutional barriers. For example, if there is some form of information to be communicated to farmers, some digital means such as the internet can be used to quickly get information to users.

A question was raised by Prof. Alcamo about which stakeholders should be involved in the cross-impact matrix analysis of SDG interactions. The response from the group was: policymakers, opinion leaders, academics and farmers. There are also representative organisations that can be invited such as farmers groups, religious groups and district authorities.

Another question posed, was, what should be the time interval of scenarios used as part of the cross-impact matrix project? The suggestion was for time intervals of five years or more. Also referring to the cross-impact matrix project, the point was made that other methodologies could be used to complement the matrix analysis. For example, statistical analyses of SDG indicators from Ghana could be used to establish causal relationships. Regarding the problem of analysing thousands of possible



interactions among SDG targets in the cross-impact matrix, it was suggested that new techniques used at ISSER for crunching big data sets might be very helpful. Dr. Crentsil could contribute here.

What will be the research goals for this theme (urban/peri-urban areas: food systems and sustainability) be? To answer that, the group agreed that most of the research ideas from this theme will emerge from consultations with communities and stakeholders. There will be topics that will be focused on, but the actual research questions will be in consultation with stakeholders. What then will be the motivation for going to the stakeholders in the communities? The motivation is to find out innovative ideas and where these innovations are taking place in these environments and to see where there more sustainable practices taking place. Looking at urban farming in Ghana it is mostly linked to land tenure systems, it will be good to look at that element as a research question or topic.

## **Closing Remarks**

**By Prof J. Alcamo**

Prof Alcamo expressed his strong opinion that it has been a very interesting and important meeting and heartily thanked participants for taking the time out to be at this workshop. He also expressed his thanks for the excellent organisation of the meeting. He was very impressed by the excellent presentations and was especially honoured to have had the chance to discuss many important issues regarding the SDGs with colleagues from various departments and institutions of the University of Ghana. He said that some good concrete steps were taken towards cooperative projects and promised to work with colleagues in Sussex and Ghana on immediate follow-up so that we can begin working together on science for the SDGs.

<b>Acronyms</b>	<b>Names</b>
UG	University of Ghana
UoS	University of Sussex
MA	Millicent Amekugbe
JA	Joseph Alcamo
BM	Robert Manteaw
CG	Chris Gordon
MH	Mammie Hutchful
LS	Leina Shi
JT	John Thompson
AC	Aba Crentsil
ISSER	the Institute of Statistical, Social and Economics Research
ORID	Office of Research, Innovation and Development
SSRP	Sussex Sustainability Research Program

## Annexes

### Annexe 1: Programme

**Expert Workshop on Science for Implementing the Sustainable Development Goals**  
**Co-organised by University of Ghana and University of Sussex**  
**Venue: African Regent Hotel, Accra. Ghana**  
**Date: June 25<sup>th</sup>, 2019.**

Time	Activity
9:00 – 9:30	<b>Arrival and Registration</b>
9:30 – 10:30	<b>Introductory Session:</b> <ul style="list-style-type: none"> <li>• Introduction of participants</li> <li>• Discussion on workshop agenda, the process, format and approaches</li> <li>• Welcome Remarks Vice-Chancellor, University of Ghana (Prof E.O. Owusu) <ul style="list-style-type: none"> <li>○ Address by Director UNU-INRA (Dr Fatima Denton)</li> <li>○ Address by Director IESS (Prof K. Appeaning-Addo)</li> <li>○ Address by Director IAST (Prof G. Nkansah)</li> <li>○ Statement from Sussex (Prof J.Alcamo)</li> <li>○ Keynote Address by Special Advisor on SDGs (Dr Eugene Owusu)</li> <li>○ Group Photograph</li> </ul> </li> </ul>
10.30 - 11:00	<b>Cocoa Break</b>
11:00 -12:00	<b>Short Presentations on the Research Themes (10 mins each)</b> <ul style="list-style-type: none"> <li>○ Trade-offs and synergies among the SDGs (Alcamo)</li> <li>○ Circular economy and green economy for achieving multiple SDGs (Nukpezah/Twerefou)</li> <li>○ Urban/Peri-urban areas: food systems and sustainability (Thompson)</li> </ul>

Time	Activity
	<ul style="list-style-type: none"> <li>○ The contribution of universities and the research community to SDG planning and implementation (Gordon)</li> <li>• Group discussion on the direction that could lead to projects</li> <li>• Participants expectations and questions</li> <li>• Formation of small break-out groups by theme</li> </ul>
12:00 -13:00	<b>Break out Session One</b> <ul style="list-style-type: none"> <li>• Groups discuss and create concept notes using the agreed template</li> </ul>
13:00- 14:00	<b>Lunch Break</b>
14:00 -15:30	<b>Break out Session Two</b> <ul style="list-style-type: none"> <li>• Groups to create concept notes using an agreed template</li> </ul>
15:30:16:00	<b>Cocoa Break</b>
16:00 – 17:15	<b>Plenary Session for the discussion of initial concepts (15 mins each)</b> <ul style="list-style-type: none"> <li>• Trade-offs and synergies among the SDGs</li> <li>• Circular economy and green economy for achieving multiple SDGs</li> <li>• Urban/peri-urban areas: food systems and sustainability</li> <li>• The contribution of universities and the research community to SDG planning and implementation</li> </ul>
17:15: 17:30	<b>Way Forward on Outputs (responsibilities and Timelines) and Wrap-up</b> <ul style="list-style-type: none"> <li>• Joint workshop report;</li> <li>• A policy brief on the role of academia in SDG implementation;</li> <li>• Plans for identifying joint research projects;</li> <li>• Plans for jointly developing funding proposals;</li> <li>• Plans for student and faculty exchanges.</li> </ul>
17:30	<ul style="list-style-type: none"> <li>• Wrap-up and End of Day</li> </ul>
<b>POOLSIDE EVENING RECEPTION</b>	

## Annexe 2: Photo Gallery



**Dr Aba Obrumah Crentsil introducing herself**



**A cross-section of invited guests at the high table**



**Address by Director of IAST Prof Nkansah**



**Presentation on overview of the University of Sussex by Leina Shi**



**Keynote address by Dr. Eugene Owusu**



**Presentation on trade-offs and synergies of SDGs by Prof. Joseph Alcamo**



**Cross-section of attentive participants**



**Question and answer session**



**Group discussions on trade-offs and synergies of SDGs**



**Group discussions on circular economy and green economy for achieving multiple SDGs**



**Plenary discussion session**

### Annexe 3: Biographies of Participants

**Robert (Bob) Manteaw** is a Research Fellow at the Center for Climate Change and Sustainability Studies. Dr. Manteaw's teaching, research and practice interests are in Environmental Learning, Climate Adaptation Planning, Sustainable Development Governance and Knowledge Brokerage processes for Socio-Ecological Systems Resilience. Dr. Bob Manteaw has worked in Public Policy (government), the private sector, NGO and academia and has a rich blend of interrelated experiences in environment and development processes. He previously worked as the Director of Research, Innovation and Development for Zoomlion Ghana where he championed the creation of Material Recovery and Eco-Industrial Parks across Ghana as an actualisation of the circular and green economy concepts in local communities in Ghana.

**Daniel K. Twerefou** is an Associate Professor in the Department of Economics, University of Ghana, Legon. He obtained his BSc. and MSc. from the Russian Friendship University and PhD from the *Moscow State University of Instrument Engineering and Computer Science*, Moscow, Russia. He has taught several courses and consulted for a number of local and international organisations including, Ministry of Finance, EPA-Ghana, World Bank, UNECA, ILO, AFDB. He is a member of the European Association of Environment and Resource Economists and the African Economic Research Consortium. He has to his credit over 40 published papers and about 50 technical reports.

**Dan Nukpezah** is a Research Fellow with the Institute for Environment and Sanitation Studies (IESS), University of Ghana. He obtained his MBA from Blekinge Institute of Technology (Sweden) and PhD in Environmental Science from the Brandenburg University of Technology, Cottbus, Germany in 2010. His areas of interest are in freshwater protection at the catchment scale; environmental governance and sustainability & industrial ecology. He supervises graduate students and also teaches courses at the graduate level including Environmental Law, Water Resource Management, Corporate Environmental Management and Industrial Ecology. Daniel is a strong advocate for the circular economy in Ghana and a steering committee member of the circular economy club, Accra

**John Baptist D. Jatoe**, is a Senior Lecturer in the Department of Agricultural Economics & Agribusiness, University of Ghana, Legon. He holds B.Sc. (Agriculture) and MPhil. (Agricultural Economics) from the University of Ghana, and PhD in Agricultural Economics and Business from the University of Guelph. His graduate-level teaching concentrates on resource and environmental economics. John's research efforts span the adoption and impact of technologies in agriculture, resource allocation, agri-environmental policy, growth-poverty-inequality nexus, sustainable agriculture, and climate change adaptation. His research interests are also in the interrelationships among these themes and the implications for policies to address poverty and inequality.

**Aba Obrumah Crentsil** is a Research Fellow with the Institute of Statistical, Social and Economic Research (ISSER) at the University of Ghana. Her research focuses on the interactions between populations and their environments, evaluation planning, urban planning and how to accommodate research in above fields by using planning supporting systems such as geographic information systems (GIS) and other computer-aided planning tools. Aba also has over 8 years' experience in conducting both quantitative and qualitative research.

**Ted Yemoh Annang** is a Senior Research Fellow with the Institute for Environment and Sanitation Studies (IESS) at the University of Ghana, with a rich teaching and research experience. He is an environmental resource management specialist with over 20 years' experience in aquatic and terrestrial botany and their interactions with their environments. He has expertise in Waste management and environmental sanitation, and environment and social impact assessment. He has developed skills in local community engagement and mobilisation and has been involved in several community-based developmental and projects.

**Benedicta Fosu Mensah** is a Senior Research Fellow with the Institute for Environment and Sanitation Studies, University of Ghana. She is an Agricultural and Natural Resources scientist technically competent in applying the latest research methods and tools in modelling environmental issues, food crops production and soil pollution. She has 9 years' experience in research, teaching, workshop facilitation, student supervision and mentoring. Dr Fosu-Mensah authored several peer-reviewed journal publications and co-authored a number of book chapters. Her research interest areas are climate change impact assessment, environmental quality assessment (environmental pollution), site-specific nutrient management, Land-use / land-cover change, climate change adaptation, poverty and sanitation.

**Jemima Yakah Amoah** is a lecturer in the Agricultural Extension Department at the University of Ghana, Legon. She has teaching and research experience in Development Communication; Extension Programme Development and Implementation; Climate Change and Smallholder Adaptation; Use of ICT in Agriculture; Sustainable Value Chain Development and Innovation Studies. She has worked with teams in multi-stakeholder project facilitation. She is a member of the Association of International Agricultural and Extension Education (AIAEE), and Ghana Science Association (GSA). Prior to academia, Jemima worked with United Parcel Service, Cummins Power Generation, The Home Depot, and CitiBank, in the United States

**Samuel Adjei-Nsiah** is an Associate Professor and Head, Forest and Horticultural Crops Research Centre, Kade, University of Ghana. Samuel is a trained Agronomist with a PhD in Production Ecology and Resource Conservation, with several years of experience in integrated soil fertility management in smallholder farming systems in Ghana. Present research area includes smallholder agricultural development with a focus on intensification of grain legume production and food security. He has coordinated several donor-funded research projects including N2 Africa Project of the International Institute of Tropical Agriculture; DFID-ESRC Growth Research Program- Integrated Assessment of the Maize Yield Gap in Sub-Saharan Africa: Towards Innovation and Enabling Policies; and Global Crop Yield Gap and Water Productivity Atlas Project.

**Hayford Mensah Ayerakwa** is a Lecturer at the University of Ghana Learning Centres under the School of Continuing and Distance Education, College of Education. He doubles as the Head of the University of Ghana Learning Centre in Cape Coast. He holds a PhD in Social and Economic Geography from Lund University, Sweden. His research interests include urban agriculture and food security, multi-spatial livelihoods, rural-urban food linkages, service quality, learning outcomes, community mobilization, and e-counselling.

**Cynthia Gadegbeku** is a Senior Lecturer at the Department of Family and Consumer Sciences. She holds a Bachelor of Education (B.Ed) Degree in Home Economics; a Diploma in Biology; an M.Phil. Degree in Agricultural Extension and a PhD in International and Rural Development. She has 16 years of teaching experience at both the undergraduate and graduate levels, at the University of

Ghana, Legon. Her area of expertise is in Research and Development (R & D), Family Resource Management, Consumer Education and Extension Services to rural and urban communities. Her teaching, research and advocacy have addressed cultural, nutrition, reproductive health, youth and gender issues. She is interested in cultural, gender and reproductive health issues and training of rural people in income-generating activities.

**Nicole Sharon Affrifah** (BSc, MPhil (Ghana), PhD (Georgia)) Lecturer, Department of Food Process Engineering. My research interests include introducing elements of convenience and modernity into traditional processing techniques used by artisanal food processors. These processes are typically labour and energy-intensive and are not adapted to the efficient use of raw materials or natural resources. My personal experience from working in the food industry emphasised the general lack of awareness or denial of the environmental impact of food processing activities, and how to minimise these negative effects. I am interested in modernising these processes to be more sustainable, reduce drudgery and improve efficiency whilst maintaining desired and characteristic effects on food quality and safety.

**Daniel A. Darko** is a Research Fellow with the Institute for Environment and Sanitation Studies (IESS) at the University of Ghana. He holds a PhD in soil science with a specialisation in soil physics and conservation. His research interests are in the areas of pollutant control in soil, surface and underground water sources, carbon and nutrient dynamics and remediation of contaminated soils. Dan has over 6 years' experience in the use of computer models in research on contaminant transport in soils.

**Peter Narh** is a sustainability social scientist, and a Research Fellow at the Institute of African Studies, University of Ghana, Legon. He holds a PhD in Development Studies, from the University of Bayreuth in Germany. His research and teaching interests lie in understanding pathways of citizen science and conservation infrastructure for natural resource conservation and sustainability in Africa. Currently, he is conducting research on these themes in the sugarcane growing regions in Kenya and Ghana. His research and teaching draw on the integration of social, cultural, and natural science perspectives as well as mixed and multiple methodologies.

**Chris Gordon** is the CDKN Country Engagement Lead for Ghana, and the focal point for the University of Ghana, Cape Town and Nairobi African Research Universities Alliance (ARUA) on Climate Change and Development. He has a PhD from King's College, University of London (1995), in Human Environmental Science. Prof Gordon has published extensively and is an invited expert on several institutional bodies, project reviews and think-tank groups including; IPBES (Coordinating Lead Author), IPCC (Reviewer), (GEF Project Evaluator), National Research Foundation of South Africa, and for UN Environment.

**Joseph Alcamo** is Professor and Director of Sussex Sustainability Research Programme and former Chief Scientist of the United Nations Environment Programme. In 1998, Alcamo was awarded the Max Planck Research Prize for physics and geoscience, in honour of his contributions to global modelling, and the use of global models in international policy. He was named as a Special Advisor to the UNFCCC Executive Secretary in 2014 during the negotiations of the Paris Agreement. Alcamo has published numerous articles and books about environmental subjects, many of them focusing on the modelling of environmental changes and the effects of global warming

**Leina Shi** is the Head of Global Engagement and she is responsible to lead the University of Sussex's strategic international partnerships, transnational education and global mobility strategy. Leina is leading teams to provide global mobility opportunities across the University and develop



and implement innovative projects and programmes to support the University's international income generation and strategic development. Leina holds an MBA in Higher Education Management from the UCL Institute of Education. She has native language skills in both English and Mandarin Chinese.

**John Thompson** is the Deputy Director of Sussex Sustainability Research Programme, Director of the Future Agricultures Consortium (FAC) and a Senior Research Fellow at the Institute of Development Studies (IDS), UK. He has worked on power, policy and sustainability issues in food and agriculture, water resource management and rural development for nearly 30 years, in both developing and industrialised countries. Previously, he served as Director of the Sustainable Agriculture and Rural Livelihoods Programme of the International Institute for Environment and Development (IIED), London, and Director of Research and Development of Just Food, New York City. Thompson has authored more than 60 peer-reviewed articles, technical papers and reports, and is author and co-editor of several books.

## Annexe 4: Questions for thematic Areas

### Thematic Group 1.

#### Concepts of the circular economy and green economy for achieving multiple SDGs.

- What are the current designs and scenarios for a circular/green economy?
- How would a circular/green economy support multiple SDGs?
- What are priorities for ushering in such an economy in Ghana, the UK, and elsewhere?
- How can research support the development of a circular/green economy?
- What are the outlines of a joint project on the circular economy and green economy for achieving multiple SDGs in Ghana and the UK at different scales of time, space and governance?

### Thematic Group 2.

#### Trade-offs and synergies among the SDGs.

- What are examples of trade-offs and synergies among the SDGs, and how do they occur?
- Which actions maximise synergies among the SDGs?
- How can we reduce institutional barriers that militate against coordinated action?
- Which methods are available for prioritising trade-offs and synergies at different scales?
- What are the outlines of a joint project for identifying the most important trade-offs and synergies in Ghana and the UK at different scales of time, space and governance?

### Thematic Group 3.

#### Urban/peri-urban areas: food systems and sustainability.

- How does/can food production in urban and peri-urban areas contribute to the SDG for ending hunger?
- What are the trade-offs and synergies between goals for food production in these areas and goals for water, land conservation, and health?
- How can the nexus approach to research on Water, Energy and Food as well as Water, Disaster Risk Reduction and Responsible Consumption contribute to sustainable solutions for cities?
- What are the outlines of a joint project for identifying the trade-offs and synergies between goals for food production in these areas and goals for water, land conservation, and health in Ghana and the UK at different scales of time, space and governance?

### Thematic Group 4.

#### The contribution of universities and the research community to SDG planning and implementation.

- What are priorities for research at the University of Sussex, University of Ghana, and elsewhere to support the SDGs?
- How can this research be better linked to internal and external policy processes?
- As examples are universities in Ghana and the UK internalising the SDGs in their operations?

- Can the Commonwealth provide a platform for encouraging this research, supporting co-design of research by academics and stakeholders, and disseminating research results on the SDGs?
- What are the outlines of a joint project for identifying the contribution of universities and the research community to SDG planning and implementation in Ghana and the UK?

## Annexe 5: List of Participants

	Department/ Institution	Name	Email
1.	Agric Economics	Dr. D. J. B Jatoe	jjatoe@gmail.com
2.	Engineering Sciences	Dr. Sharon Afrifah	nsafrifah@ug.edu.gh
3.	Family and Consumer Sciences	Dr. Cynthia Gadegbeku	cgadegbeku@ug.edu.gh
4.	Ghana News Agency	Patience Gbeze	pgbeze@gmail.com
5.	IAST	Prof. George Oduro Nkansah	gonkansah@ug.edu.gh
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## Annexe 6: Useful Resources

[Links to other useful resources on the topics discussed will be inserted here]

- Future Earth SDG Labs - <https://seedbeds.futureearth.org/sdg-labs/>
- GHANA: Voluntary National Review Report on the Implementation of the 2030 Agenda for Sustainable Development- June 2019 - <https://ghana.un.org/en/19155-ghana-voluntary-national-review-report-implementation-2030-agenda-sustainable-development>
- International Science Council, Guide to SDG Interactions - <https://council.science/publications/a-guide-to-sdg-interactions-from-science-to-implementation>
- SDG Centre for Africa - <https://sdgcafrica.org/>
- Sustainable Development Goals (SDGs) in Ghana: Why they matter & How we can help – <https://www.undp.org/content/dam/unct/ghana/docs/SDGs/UNCT-GH-SDGs-in-Ghana-Avocacy-Messages-2017.pdf>
- Sustainable Development Goals Helpdesk - <https://sdghelpdesk.unescap.org/>
- Sustainable Development Goals Knowledge Hub - <http://sdg.iisd.org/>
- Sustainable Development Goals Knowledge Platform - <https://sustainabledevelopment.un.org/>
- Sustainable Development Solutions Network - <https://www.unsdsn.org/>
- Sussex Sustainability Research Programme - <http://www.sussex.ac.uk/ssrp/>
- UKRI-Rockefeller Global Goals Mapping: The Environment-human Landscape - <https://nerc.ukri.org/research/partnerships/international/tase/mapping/>

## Annexe 7: Speeches During Opening Session

Keynote Address

**KEYNOTE ADDRESS BY DR. EUGENE OWUSU, SPECIAL ADVISOR TO THE PRESIDENT ON THE SDGs  
AT THE EXPERT WORKSHOP ON SCIENCE FOR IMPLEMENTING THE SDGs HELD AT THE AFRICAN  
REGENT HOTEL ON 25<sup>TH</sup> JUNE, 2019**

The Vice-Chancellor, University of Ghana, Professor Ebenezer Oduro Owusu;  
The Director, Institute for Natural Resources in Africa, United Nations University, Dr. Fatima Denton  
The Director, Institute of Environment and Sanitation Studies, University of Ghana, Prof. K.  
Appenteng-Addo  
The Director, Institute of Applied Science and Technology, University of Ghana, Prof. George Oduro  
Nkansah  
The Director of Sussex Sustainability and Research Programme and a representative from Sussex  
University, Prof. Joseph Alcamo  
Distinguished members of the academia,  
Ladies and Gentlemen,

I congratulate the University of Ghana and the University of Sussex for putting together this all-important programme. Thank you for this privilege to share my thoughts as a Guest Speaker.

Right from the adoption of the SDGs, world leaders were very clear in their minds, that it will be impossible for governments alone to achieve the Goals. Collaboration and strategic partnerships with all constituencies including the private sector, academia, civil society and communities were fundamental for success. Today's event embodies the spirit of partnership that the Global Goals envisaged. I cherish the hope that today's workshop will serve as a shining example for many universities and institutions of higher learning in this country and indeed across the globe.

Mr. Chairman, Ladies and Gentlemen, since their adoption, our country has taken up the challenge of the SDGs with great gusto; and it's pleasing to see that we are working tirelessly towards achieving the Goals. I believe we are doing this not because we are a member of the United Nations, or because our President is the co-Chair of the UN Secretary-General's Eminent Group of Advocates for the SDGs. I believe we are doing this because there is broad recognition that the SDGs present us with a great opportunity to transform our country, to bring prosperity to our people and to build the Ghana that We Want; and indeed a Ghana that we can all be proud of.

It bears mention that the SDGs are not an abstract phenomenon. They represent what, as a country and as a society, we have an obligation to do: become a country without poverty, without hunger, a country where everyone has good health and quality education; where every person has a decent work and where peace and justice thrive. This is not idealism; these are aspirations that are indeed achievable. Sixty years after independence and 25 years of stable democracy, it is unacceptable for our people to continue to suffer extreme forms of poverty and hunger; it is not right for our people to die from preventable diseases, and it is improper for our people to suffer inequality and injustice.

Although the challenge of achieving the SDGs may be huge, there are important building blocks that have been put in place in the country to underpin prospects for achieving the Goals.

Permit me to share a few examples:

- The Goals have been integrated into the Consolidated Programme of Economic and Social Development Policies - our overarching national development framework. This is an important first step.
- We've established a robust architecture to support implementation: A High-Level Ministerial Committee established; the Implementation Coordinating Committee; and the Technical Committee.
- Produced an SDGs Baseline Report – important for tracking progress over time.
- Produced an SDGs Budget Baseline report – the extent to which resources are aligned behind SDGs priorities.
- We've adopted SDGs-based Budgeting; the last two national budgets have been prepared through an SDGs lens
- Organised the first SDGs Investment Fair – a marketplace to mobilise impact financing to support bankable SDGs initiatives
- District Assemblies have been tasked to prepare their development plans through an SDGs lens and to ensure that those plans are SDGs compliant.
- We've forged a strong partnership with the private sector, with the result that a CEOs Advisory Group on the SDGs has announced the establishment of an SDGs Delivery Fund (500 million cedis annually, and a Green Fund with a target of 1 billion cedis in 5 years.)
- And importantly, we have finalised our Voluntary National Review Report on implementation of the SDGs, which will be presented at next month's United Nations High-Level Political Forum in New York.

The VNR report has given us a good idea of how well we are doing and where we need accelerated action. The report reveals that there is generally good progress towards the social sector and governance-related goals, including health, education, gender, justice and peace. In contrast, there is mixed performance on the economic-related goals, including employment, infrastructure and manufacturing. And crucially, progress towards the environment and sanitation goals has been abysmal.

We are in the fourth year of implementation and one thing that is clear is that achieving the SDGs will require much more effort than we are currently putting in. All segments of society must scale up their effort, and this includes academia. An independent review of the Voluntary National Review Reports presented at last year's High-Level Political Forum revealed that a lot of work is being done by

academia on the SDGs in different countries. Universities in Australia, Ecuador, Greece and Latvia, for example, have begun incorporating the SDGs into their curricula. This is important for both popularisation and implementation of the Goals over the medium term.

Aside from incorporating the SDGs into educational curricula, the Independent Review also highlighted that some universities held summer schools on the SDGs while others undertook robust research on the Goals. In the Dominican Republic, for example, all the universities in the country have signed an agreement called “Academy for the 2030 Agenda” to commit themselves to the SDGs through teaching, research, and dissemination activities.

Coming home, I do know that some of our universities are actively engaging around the SDGs agenda. I am aware, at least, of the work Prof. Gordon, Prof. Nkansah and many others are doing in the SDGs space. Indeed, research conducted by Nakamura, et. al., titled “Navigating the Structure of Research on the Sustainable Development Goals”, identified Ghana as one of the countries where extensive SDGs-related research, especially on the Goals relating to Good Health, Water and Sanitation and Affordable and Clean Energy are being undertaken. This is truly commendable.

I am also aware of the University of Ghana’s self-assessment report on research response to the SDGs, which showed that most doctoral research focused on SDG 2 (Zero hunger), SDG 3 (Good health and well-being) and SDG 6 (Water and sanitation). I am happy to announce that this forms part of the outcome of the VNR Report which we will be presenting to the world.

Today’s workshop on ‘Science for Implementing the SDGs’ is yet another great effort and contribution to the SDGs enterprise. But permit me to add technology and innovation to the subject of science. Science, technology and innovation are intricately-linked and they have become the new currency for development. They provide the basis for new and sustainable approaches and solutions to meet the challenges of sustainable development.

It is my understanding that one of the expected outcomes of this workshop is a Policy Brief on the role of academia in implementing the SDGs. In concluding this remark, I would like to share with you a few perspectives on how universities could contribute to the success of the SDGs.

- **First**, incorporate the SDGs into the curriculum of the university, and to do so in a smart way – Universities host the largest constituents of future leaders, and most of these people are in their formative stages at the time they enter the university. By incorporating the SDGs into the curricula, we will be providing students with the requisite knowledge and skill to understand and address the challenge of SDGs. In so doing, we will be making the SDGs part of the ‘DNA’ of future leaders.
- **Second**, generate innovative ideas and solutions to the SDGs challenge – it’s been said on many occasions, and it bears repeating that business as usual will not help us achieve the SDGs. We cannot repeat the same things we have been doing for the past 62 years of our independence and expect to achieve different results. The university is the place where great ideas are generated. They drive technological and societal progress through research and



discovery. Student – faculty interactions should therefore be aimed at generating new solutions to contemporary challenges, by leveraging science and innovation.

- **Third:** Closely linked to the second point is the need to identify and unleash the scientific and innovative potential of students and to help them develop and scale up such innovative ideas. Here, universities must encourage and promote SDGs as topics for research, as a way of identifying and nurturing talents.

For example Possible research topic:

1. What are the fundamental imperatives that need to prevail to support prospects for achieving the Goals
  2. Much has been said about the role of the private sector: but what are some of the ‘quick wins’ that can be achieved from the partnership with the private sector? And how can we fully leverage the expertise and capabilities within the private and bring to bear on implementation?
  3. Financing is a key challenge. What are the sources of innovative financing and how can these be tapped to support implementation?
- **Fourth,** contribute to strengthening public engagement and popularisation of the Goals – the university must play a significant role in public engagement and participation in addressing the SDGs. This may be done by initiating and facilitating cross-sectoral dialogue and action; regular engagement with the institutions charged with planning and implementation of the SDGs and providing an evidence-based critique of implementation plans and policies.
  - **Fifth,** build a partnership to share ideas and find solutions – partnership is one of the key tools for achieving the SDGs. No single individual, organisation or institution has all the knowledge, resources and capabilities to realise the SDGs. Through partnerships, we share these ideas, knowledge and resources for the implementation of the Goals. This may be done through regular conferences on the SDGs with other institutions where best practices may be shared and common solutions explored.
  - **And lastly,** policies of universities must be SDGs compliant – We cannot do all that I have said above without the universities themselves ensuring that its governance, operations and daily activities are in compliance with the SDGs. In whatever we do therefore, including the policies and managerial decisions we take, the overarching question should be, how does this contribute to achieving the Goals.  
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I am hopeful that the outcome of today’s workshop will contribute to the body of knowledge on the role of Universities, science and the SDGs and inspire many more institutions of higher education to actively engage on the SDG and to support their successful implementation.

Let me conclude by saying something I have repeated on a number of platforms. The SDGs is the greatest inheritance that we can leave for the current and future generation. Failure cannot,

therefore, be an option. We do have the knowledge and the capacity to deliver; and with the right set of policies and partnerships in place, we should surely deliver. I wish you fruitful deliberations, and I fervently hope that the conversation today will not end here, but will be taken to the lecture halls, and will ultimately form the 'oxygen' that fuels the work of your university.

I thank you

## **Address by Dr. Nkansah, Director IAST University of Ghana**

Good morning,

It is my pleasure to be part of this Expert Workshop on Science for Implementing the Sustainable Development Goals. The Institute of Applied Science and Technology serves as a platform for the transfer of knowledge, technologies and innovations that are developed at the University of Ghana to Industry and the general public which we consider as our partners.

In 2018, the Institute in partnership with industry and some community members initiated a poverty reduction advocacy themed: The Ghana Economic Wellbeing and Inclusion project (GEWIP). Based on the activities of the GEWIP the Institute was nominated to represent the University of Ghana to Lead the SDG goal one (1) “No poverty” and currently liaising with 5 other Universities to form a cluster to propagate this agenda among the International Association of Universities (IAU).

The Institute of Applied Science and Technology operates on five key focus areas which are:

1. Energy & Climate Change Mitigation
2. Natural Resources Management and Sustainable Exploitation
3. Health and Traditional Medicine
4. Food Processing Packaging & Agribusiness and
5. Infrastructure Development, Water and Sanitation

It has included a 6<sup>th</sup> area which focuses mainly on creating awareness on the Sustainable Development goals and its achievements.

The sustainable development goals (SDGs) which advance the Millennium Development Goals are distinct in their content, ambition and attitude. Its agenda strives to balance development thinking around the preservation of the human attitude and natural resources with discourses on social development and equity, and today’s concern with global economic development and growth (France 2015).

With 17 goals, 169 targets and 244 indicators with its distinguishing features including being universal, integrated, transformative and inclusive, the participation of all stakeholders in the implementation process is very crucial. The institute had therefore proposed a practical means of liaising with units of the University of Ghana to contribute by lending their current initiatives and future activities towards the collective support targeted at the 17 SDGs’ This process is believed to develop targets and indicators as well as support for the implementation of each SDG with the aim of achieving

- Technology transfer and assistance
- Capacity building
- Financial Support and funding
- Industrial linkages both international and regional.

In March 2019 the Institute strategised to engage in a UG collaborative work on the SDGs. It has doubled its effort in establishing linkages with industry and sensitising its internal stakeholders on its mandate and on the ongoing activities at various units/departments of the University of Ghana. It has also engaged student and faculty at several fora to discuss their focus areas on the SDGs. These efforts

are to harmonise the various activities that are ongoing independently in the several units of the university.

The UN's agenda, *Transforming our World: The 2030 Agenda for Sustainable Development*, mirrors the IAST's mandate and its key focus areas and has therefore partnered with the Sustainable Development Goals Advisory Unit of the Office of the President to sensitise the general public on the SDGs and tailor our activities towards the national agenda.

In collaboration with the SDG Secretariat of The Office of the President, their SDG raffle dubbed "Yes to the SDGs!" was re-launched on May 2, 2019, at the University of Ghana. This raffle would enable the UG students and the public to broaden their knowledge on the SDG goals with its targets. The IAST championed the raffle at the University of Ghana by interacting with students and the University Community to create awareness on the SDGs. Currently, the Institute is engaged in a discussion with the Office of the special adviser to the President on the SDGs to organise a National Stakeholders Dialogue on the Sustainable Development Goals.

This Expert Workshop on Science for Implementing the Sustainable Development Goals is timely as it promotes the activities of academia on the SDGs which is in tandem with the activities being championed by the Institute of Applied Science & Technology at UG.

**Address by Dr. Fatima Denton, Director UNU-INRA**