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Building Scientific Capacity through Turning Bio-waste into Sustainable Products (Biowaste4SP): Development of appropriate Conversion Technologies applicable in Developing Countries

BY

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- **Introduction on AICAD**
- **Brief presentation on Biowaste4SP Project**
- **Science capacity building in Africa**
- **Acknowledgement**

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About AICAD: History and Mandate

i) The genesis of AICAD dates back in 1998 during TICAD II

ii) One of the TICAD II resolutions was on development of human capacity for poverty reduction in Africa

iii) Governments of Kenya, Tanzania and Uganda in partnership with the Government of Japan established AICAD on 1st August 2000

iv) AICAD was established as the implementing organization to manage Human Capacity Development for Poverty Reduction in Africa

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AICAD Vision, Mission, Governance and Capacity

VISION: To be the leading African institution in building human capacity for poverty reduction

MISSION: To link knowledge to application within communities in order to reduce poverty in Africa

- Research and Development, Training and Extension and Information sharing and Networking

Governance: Governing Board (14 Members; Governments, Universities and Development Partners)

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AICAD Vision, Mission, Governance and Capacity Cont'd

Number of employees: 36 at HQs and Country Offices in Kenya, Tanzania and Uganda

Subscribing member Universities: 18 public universities in Kenya (7), Tanzania (6) and Uganda (5)

Financial Support: Financed by the governments of Kenya, Tanzania, and Uganda, income generation, Development partners and member subscriptions to about US$ 1.8millions

- It is not possible for AICAD to achieve its Mission by playing it alone
- AICAD is inviting partners to collaborate with in this noble Mission of poverty reduction in Africa.

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The Biowaste4SP Project Title: Turning Bio-waste into Sustainable Products : Development of appropriate Conversion Technologies applicable in Developing Countries

- **Acronym: Biowaste4SP**
- **Type of funding scheme: Specific International Cooperation Actions (SICA)**
- **Work Programme topics addressed: KBBE.2012.3.4-01: conversion of bio-waste in developing countries**

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Objective of Biowaste4SP Project

- **To show and demonstrate the technical roadmap – a strategy – for efficient technological utilisation of selected significant biowaste in five African countries**
  - **The biowaste derived from both the industrial and agricultural sectors**
  - **Turning biowaste into a new resource for sustainable products.**
- **The Biowaste4SP Project involves 10 countries; 5 in Africa, 4 in Europe and 1 in Asia 16 Consortium Members**

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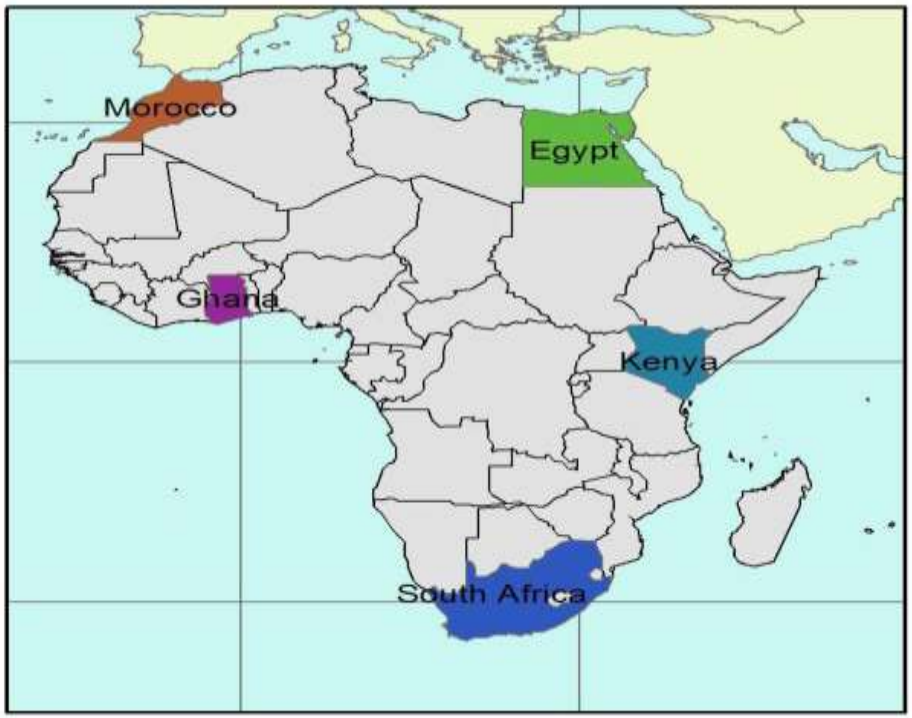
African Countries



Country

- Egypt
- Ghana
- Kenya
- Morocco
- South Africa

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European and Asian Countries

Denmark 

Italy 

Sweden 

Turkey 

Malaysia 

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Partners in Biowaste4SP

1 Danish Technological Institute DTI Research Denmark
2 Swedish Environmental Research Institute IVL Research Sweden
3 TÜBİTAK Marmara Research Center TUBITAK Research Turkey
4 SIRIM Berhad SIRIM Research Malaysia
5 Council for Scientific and Industrial Research, Institute of Industrial Research (CSIR-IIR) CSIR-GH Research Ghana
6 Council for Scientific and Industrial Research CSIR-ZA Research South Africa
7 Agricultural Research Centre ARC Research Egypt
8 University of Siena UNISI University Italy
9 Hassan II Institute of Agronomy and Veterinary Medicine IAV Research Morocco

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Partners in Biowaste4SP Cont,d

10 Danish Technical University DTU University Denmark
11 Ethekwini Municipality ETM Public South Africa
12 Myagri Group of Companies MYAGRI SME Malaysia
13 BioVelop AB BV SME Sweden
14 Moroccan Association for Solid Waste AMADES NGO Morocco
15 African Institute for Capacity Development AICAD Research Kenya
16 World Association of Industrial and Technological research Organizations WAITRO NGO Malaysia

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Some Statistics about Africa

- Africa is the world's second largest continent, and one of the world's fastest growing markets.

- Africa is the world's second-largest and second most populous continent, after Asia: 30.2 million km² including adjacent islands, accounting for almost 15% of the World's human population with over one billion people led by Nigeria (135mil), Egypt (80mil), Ethiopia (76mil), Congo-Kinshasa (65mil) and South Africa (44mil).

- Africa covers about 5% of the earth's total surface area and 20% of the total land area and an estimated 2,000 languages spoken across the continent.

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What is Biowaste

Biowaste is :- "**Animal and Vegetable wastes arising from households, commerce and food industries"** (according to Eurostat**).**

- A significant part of biowaste in Africa is food waste and waste from agriculture.
- Food waste is a significant biowaste resource from food industries in Africa accounting for more than 20-40% of the production.

- The causes of food waste in low-income countries are mainly connected to financial, managerial and technical limitations in harvesting techniques, poor storage and cooling facilities in difficult climatic conditions, infrastructure, packaging and marketing systems.

- Given that many smallholder farmers in developing countries live on the margins of food insecurity, a reduction in food losses or better utilization of generated food waste could have an immediate and significant impact on their livelihoods.

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Replacement of Fossil fuel with Biomass

- To replace **fossil fuel with renewable fuels and energy**
- To replace fossil chemicals with **biomass based chemicals and materials**

The Bio-Refinery

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What is Bio- refinery

- **Integrated and combined processes for the conversion of biomass** into a variety of **food, feed, chemicals, biomaterials, and energy – at** the same time **maximising the value of the biomass and minimising the secondary waste**

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knowledge on biowaste composition.

In order to utilize biowaste in the best possible way, one has to know the chemical composition:

1) The biowaste contents of carbohydrates for it to be considered and evaluated as potential for fermentation substrates for bio-energy carriers, chemicals, and food/feed ingredient (e.g. amino acids).
2) The biowaste ash contents, which are potential plant nutrients as in fertilizer and
3) Biowaste proteins, which are important ingredients in food and feed applications as well as fertilizer.

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Main biowaste resources in Africa

- **Sugars based biowaste (industrial food waste)**
  - Banana (whole fruit) biowaste
  - Sweet potato biowaste
  - Cassava (Manioc) biowaste
  - Coffee biowaste
  - Rice bran
  - Rice straw
- **Nutrient based biowaste**
  - Municipal solid waste
  - Manure
  - Rice straw
  - Cassava leaves

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Biowaste4SP Target products in Africa:

- Feed and food (protein and amino acids)
- Energy (biogas and bioethanol)
- Fertilizer (bio-fertilizer)
- Value-added products (lactic acid and health care products)

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Process integration:

Sugar based Feed-stocks

+

Nutrient based Feed-stocks

Integration of Processes

Integration of Processes

Feed

Energy

Fertilizer

Value added Products

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Achievements of Biowaste4SP Project

No.	Title
1	A protocol for chemical analysis of identified biomass to be used in the project
2	Methods for the selection and storage of biowaste feedstock
3	A protocol for chemical analysis of identified nutrient-based biowaste to be used in the project
4	Methods for the selection of relevant biowaste samples to be used for biogas and bio-fertilizer
5	Dissemination and Communication Strategy Document, Website, Project Database and Intranet
6	Project Operations Manual
7	Kick-off workshop
8	First Steering Committee meeting
9	Management report 1

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Achievements of Biowaste4SP Project cont'd

- Country Reports on preliminary survey of suitable biowaste streams in the five African countries.
- Detailed analysis of some of these biowaste streams is being undertaken in Denmark by three Ph.D. and one post-doc from African partners.
- The basic model for the sustainability of a bio-refinery concept using African biowaste has been developed by the University of Sienna and will be tested and implemented on selected biowaste streams in collaboration with the post-doc from AICAD
- The results of these sustainability studies will lead to various policy options that can be used by African governments.

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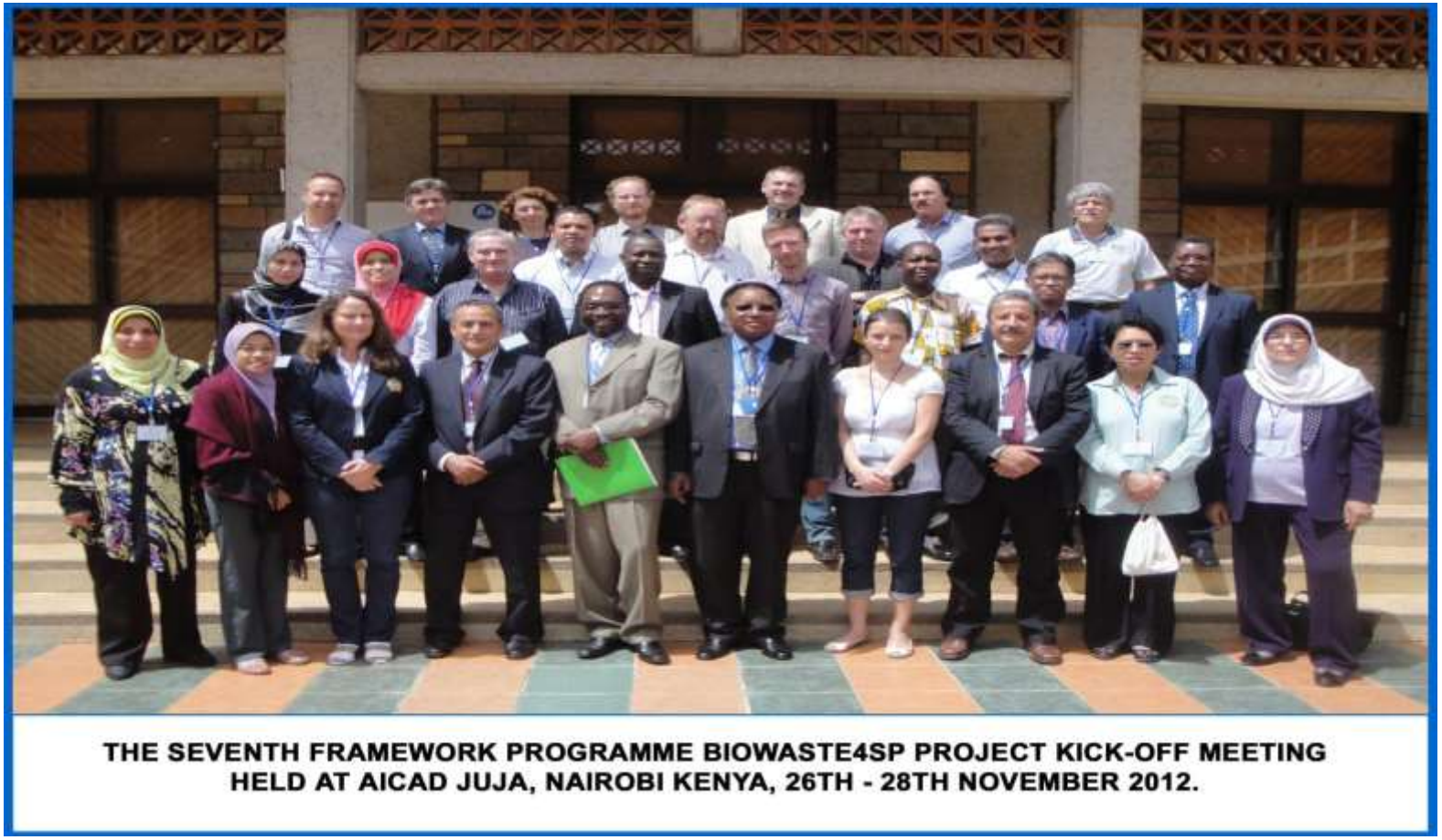

THE SEVENTH FRAMEWORK PROGRAMME BIOWASTE4SP PROJECT KICK-OFF MEETING HELD AT AICAD JUJA, NAIROBI KENYA, 26TH - 28TH NOVEMBER 2012.

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Contributions of Biowaste4SP Project to Scientific capacity development in Africa

- Training of African scientists/researchers at Ph.D. Level

- By partnering with EU countries (advanced in scientific capabilities), African countries gain the opportunity to improve their standards

- Influencing policy changes in partner African countries with regards to approaches to biowaste management :-
  - Viewing biowaste as a resource
  - Viewing biowaste as a reusable resource for wide range of purposes

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Contributions of Biowaste4SP Project to Scientific capacity development in Africa Cont'd

- Creation of research and investment opportunities amongst partner countries in Europe, Asia and Africa on Biowaste management
- Bringing in to the fore the reality of diversifying partnership in solving a common challenge scientifically across Europe, Asia and Africa for better quality of life
- Putting into use the research capacity generated through application of technologies developed on biowaste management

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Contributions of Biowaste4SP Project to Scientific capacity development in Africa Cont'd

- Strengthening scientific capabilities of local partners by providing strong base on the development and retention of high-quality skills
- By partnering with EU countries (advanced in scientific capabilities), African countries gain the opportunity to improve their standards
- Influencing policy changes in partner African countries with regards to approaches to biowaste management :-
  - Viewing biowaste as a resource
  - Viewing biowaste as a reusable resource for wide range of purposes

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Contributions of Biowaste4SP Project to Scientific capacity development in Africa Cont'd

- Strengthening scientific capabilities through the infrastructures to be developed through the implementation of Biowasst4SP Project in the partners countries
- Building scientific capacity for local innovations and economic development in the partner countries through knowledge and technology dissemination
- Establishing a platform to joint approach to building scientific capabilities between funders and beneficiaries
- Improving Europe-Africa-Asia multiple partnerships and networking in research and innovation for tackling economic and social challenges

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AKNOWLEDGEMENTS

- Thank the ISC for the invitation to the Seminar on the Global Science Collaboration
- "The Biowaste4SP" project is supported under the 7th Framework Research Programme of the European Union under Grant number 312111"
- AICAD is grateful for the support provided by the governments of Kenya, Tanzania & Uganda and development partners which enabled the institute to implement its programmes successfully.

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AICAD: Website: http://www.aicad-taku.or.ke

THANK YOU