

# Is Africa “ready” for an integrated bioeconomy approach?

With its abundance of natural resources, Africa appears to be predestined for a type of economy that centres on the use of bio-based resources. However, before a comprehensive approach can be applied, a large number of framework conditions and policies will have to change, Adebayo Abass maintains.

There is an acute shortage of food, feed and energy in Africa despite the availability of vast arable land and agro-climatic conditions conducive to competitive biomass production. Bioeconomy development (as part of the green economy) is a useful approach to advancing sustainable growth of African economies, reducing expenditure on oil imports by improving energy supplies, diversifying the markets for agricultural commodities and increasing rural incomes.

However, there are a number of difficult challenges associated with the development of an integrated bioeconomy. These include infrastructure, resource allocation, imaginary or real ‘land grab’, food insecurity, research capacity, access to technology, lack of any clear policy objectives and sector management problems. Nonetheless, the African scientific community agrees on the need to develop Africa’s scientific capacity to ensure Africa participates and benefits from the growing global bioeconomy. Biomass-based concepts must be adapted to Africa by adopting a new higher order approach to improving the efficiency of biomass supply-demand systems. In pursuit of this objective, Africa needs to take the following actions:

**Improve land allocation arrangements:** The existence of sufficient arable land and the inflow of foreign investment in large-scale agriculture offer opportunities for producing the biomass that Africa needs for food output and moving towards a bioeconomy. But land tenure issues and the reality or fear of ‘land grabbing’ for growing biomass for biofuels threaten progress in this direction. Biofuel production is expanding across Africa amidst concerns that it does not serve Africa’s own energy needs and perceptions that large-scale biofuel crop plantations can lead to land dispossession, deforestation and lower carbon savings. This would result in negative impacts and not benefit rural communities and the

environment. It is estimated that 50 or so biofuel-producing foreign companies already hold over five million hectares of land, with plantations in more than 25 African countries. Spreading ownership and use of large farms for biofuel crops is perceived as competing for food-growing and animal-grazing land, potentially reducing access to food and pushing up local food prices. Innovative approaches to land allocation are now required to spur large-scale production of biomass and processing for both food and bioproducts for use in Africa.

**Resolve the food security scare:** Africa currently grows a number of crops and plant oils that are candidates for bioethanol or biodiesel production – such as cassava, sorghum, maize, sugarcane, palm oil, castor, jatropha curcas and sunflower. Yet most of these crops are also important for food security. The unabated high post-harvest food losses in Africa aggravate food insecurity and further heighten the scare to divert the available meagre foods to non-food uses (see Abass et al. 2014). Consequently, many African governments face a policy dilemma: whether to keep on using crops for food security or promote their cultivation for renewable energy applications. The thinking is generally that producing renewable bioproducts from food security crops (e.g. maize, sorghum and cassava) will impact negatively on the food security and nutrition of resource-poor populations. On the other hand, some African governments argue that increased agriculture commercialisation, along with industrial-scale processing of crops into bioproducts will create new market opportunities for Africans. The demand-pull would then spur the adoption of improved agricultural technologies that can boost productivity and strengthen food security. In view of food security concerns, there appears to be no consensus on the use of food crops to develop Africa’s bioeconomy and certainly no concerted action. The majority of African countries have yet to develop any form of integrated bioeconomy development strategy. Countries such as Nigeria, Ghana, Namibia, Uganda, Ethiopia, South Africa, Kenya, Mozambique, Democratic Republic of Congo, Mali, Congo, Tanzania and Zimbabwe do have some bioeconomy development activities based on various crops and oil plants, but there is no evidence of any significant positive impact on the economy.

**Improve research and development skills:** Integrated bioeconomy development requires significant research exper-



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Simple storage technologies to prevent post-harvest losses.



Photos: A. Abass

Processing high-quality cassava flour for use in bakery products.

tise and human capital to harness productivity and make efficiency gains from biomass production. It entails innovative processing, cascading industrial utilisation and efficient trading and marketing systems. These areas have become a focus of African research endeavours. African scientists have generated scientific knowledge in the cultivation and transformation of specific crops, such as cassava, to produce bioproducts. In collaboration with advanced research centres in Europe and America, African scientists are currently experimenting with a new approach known as the „value web“ (see article on pages 16–18), which is designed to increase biomass utilisation by introducing a stream of technologies and building scientific capacity as opposed to „value chain“ that has less scope. To this end, partnerships are being developed with Brazil, India and the European Union to acquire biofuel technologies. Advances in scientific research capacity and technology transfer in this field are expected to enhance Africa’s ability to engage in integrated bioeconomy development.

**Analyse fossil fuel dependency trends:** Many African countries are net fossil fuel importers. Expenditure on oil can amount to 20 or even 40 per cent of total import expenditures. On the other hand, some countries have developed a petroleum refining infrastructure, while a few others have recently discovered vast reserves of petroleum. Since Africa is not yet a major contributor to greenhouse gas emissions, there is less pressure to mitigate carbon emissions. So dependency on the use of fossil fuels is likely to continue. For the oil-producing countries, the fossil fuel extraction costs are lower than those of biofuel production. The technologies for oil refining are readily available, and the distribution logistics are easier than with biomass-based energy products such as biodiesel, biogas, biofuels or ethanol. Dependency on fossil fuels by oil-producing African countries is likely to increase.

**Improve policies, strengthen markets and build management capacity:** The development of science and technology for biomass production and processing needs to be sup-

ported with the right policies. Under the African Union’s sustainable energy strategy for the continent, it encourages member states to endorse policies, guidelines and regulatory frameworks that promote biofuels. Some African countries (including Nigeria, South Africa, Tanzania and Malawi) already have policies and legislative guidelines for using biofuels in motor vehicles, although most policies lack the necessary integration in legislation. In order to work, they need to be flanked by other policies, mechanisms and infrastructures (such as refineries) to ensure that the bioproducts processed from the crops are channelled into meeting national energy needs.

**To conclude:** As an emerging, multi-sectoral phenomenon, the bioeconomy will require multifaceted and interconnected management approaches to competitive biomass production and transformation – judiciously used for food, feed and renewable energy as part of sustainable and balanced economic growth of Africa. A great deal remains to be done. For an integrated bioeconomy development demands adequate financing, clear objectives and strong leadership to create the necessary policy environment. Multiple expertise and technologies are needed to produce renewable energy and bioproducts while simultaneously achieving food security, creating jobs, generating revenues and reducing both fossil fuel dependency and greenhouse gas emissions.

A combination of local and foreign investment must be harnessed to reduce fuel imports and increase bioproduct exports. Moreover, greater investment in research is needed, with a stronger focus on creating a comprehensive and integrated renewable energy system in Africa. If bioeconomy development is to be broad-based, sustainable and equitable – avoiding adverse impacts on ecosystems and food security – African policy makers will have to articulate how their bioeconomy programmes can be implemented in ways that advance the economies of rural communities.

References: > [www.rural21.com](http://www.rural21.com)