Summary of The Study on Cashew By-Products

The "Environmental Study of Waste Management in Cashew Processing" presents current and potential characteristics of cashew by-products in 8 African countries (Benin, Burkina Faso, Côte d'Ivoire, Ghana, Guinea-Bissau, Kenya, Mozambique, Tanzania). The report assesses (i) the negative effects of processing on the environment, (ii) the current waste management practices and business approaches of cashew nut processors in some West and East African countries, and they show some gaps and negative environmental practices in their daily practice as well as best practices and environmental standards of Africa and Asia that help to reduce and put an end to waste management practices, (iii) the untapped economic, energy and environmental potential, and (iv) the analysis by stakeholders dealing in cashew by-products.

In terms of the ***main outcomes*** of the study, first of all, it can be seen that the processing of cashew in Africa is still confronted with **low competitiveness**. The main concerns of processors are focused on the supply of raw cashew nuts: price stability, restrictions and cashew nut export regulations, quality and finances. Overall, in the 8 countries visited, the priority given to by-products is not very high since value added is relatively low. Though the shells account for 70% of the biomass of raw cashew nuts, the waste products are dumped or disposed of, but the **value added by shells is not part of their usual practice**. Almost all the processing plants use the shells **for thermal energy**, mostly as fuel for boilers. The use of shells for thermal energy varies between 5-25% of shells produced. However, the **most effective** overall strategy for value addition to the by-products is the extraction of the CNSL and the co-generation of deoiled shells. The condition is the secure supply of a minimum of 15, 000-20,000 metric tons (Mt) per year to provide the capacity for co-generation of 1.5 MWe. There is an untapped potential for cashew by-products with a total production of raw cashew of close to 1.4 million Mt and against the background that an average of 10% of raw cashew nuts are processed in the countries. All the same, out of a total potential quality of about 1 million Mt of shells/year, currently a quantity estimated at about 100.000 Mt of shells per year is produced in these countries: about 25% is used for value addition (50% for the production of CNSL and the remainder for purposes of thermal energy).

According to projections, there is an untapped potential of 16m $ US, with a turnover of 110 $ US per ton of raw cashew, which remains unexploited in the current situation. The processing of cashew shells can contribute to a positive energy balance varying between 211 and 1.975 GWh, according to the method applied. The processing of cashew shells could contribute to a positive balance sheet for carbon which varies between 58.560 and 548.135 tCO2eq. Furthermore, **small-scale** initiatives and solutions (production of charcoal through shell carbonization, production with steam engines) can be found at some processing units, but their viability and sustainability have not been adequately confirmed since most of the initiatives are coming through Research & Development and they depend on grants. More experiments and trials, including upscaling may be necessary to confirm the profitability analyses of the investments to be made. With regard to policies and institutional frameworks, first of all, an important role and strong involvement of institutional organizations in the promotion of the by-products can be seen. Generally, **legislative frameworks on the environment** are properly defined and institutionally integrated. Some countries are more advanced. Work can be carried out on standardization and professionalization of benchmarks, procedures and measures for environmental control. The **regulatory framework on production and supply of electricity** has not been well established in all the countries. This is particularly so in West African countries and this vacuum constitutes a risk for investment and operation of cogeneration.

The ***specific opportunities*** which have been identified and confirmed in the course of the study include: the use of local CNSL as a **substitute for DDO/LFO** seems to be more profitable than

exporting. The possibility of producing energy from biomass constitutes an opportunity to gradually contribute to the energy deficit by using green energy. The substitution of conventional energy by green energy (electrical or thermal) contributes to the **reduction of carbon emissions**. Most of the countries have added value to biomass and to the production of green energy in their national development policies. The value added to cashew by-products by way of green energy is part of the scheduled nationally determined contributions. Currently, there are **hardly any incentives** to invest in green energy using biomass specifically applied to cashew by-products in African countries, including the use of biomass for thermal purposes. Though the CDM and MCC[1] could be mechanisms for practical financing for ecological investments and offset carbon.

Recommendations have been made to **governments and the quasi-government sector**: (i) In the first place, to **secure the supply of raw cashew nuts** for viable production of the CNSL and for cogeneration, (ii) improve **research** on adaptation of technologies for cashew by-products and for alternative applications (local) of by-products, (iii) facilitate the dissemination of **existing knowledge through sharing** on practices relating to development of by-products, (iv) improve the **investment climate** for the recycling of waste (v) operationalize the **CDM financing instruments** for biomass-energy projects (vi) develop **a consistent vision and strategy** on cashew by-products at the national level (vi) link up the reduction in carbon emissions, which would serve as value-added of cashew by-products to nationally-determined contributions**.**

For **sector organizations** at the national level (and regional): (i) facilitate **exhibitions and discussions** on technologies for processing plants and governmental organizations and stimulate interactions, (ii) provide support for the **reduction of energy emissions** and carbon at the national level and even at the regional level, (iii) (**re)orient national agencies** in the cashew sector to prioritize the processing plants by laying emphasis on by-products as a contribution to their financial stability, (iv) **carry out advocacy for the expansion of these measures on by-products.**

For the **private stakeholder**: (i) **explore** the different solutions available for developing the products, (ii) to be **compliant** with environmental standards, (iii) **deepen the appropriateness** of energy from by-products (iv) start **the collaboration** between the processing plants for an upscaling and regular supply of shells for operations that require more substantial quantities: the extraction of the CNSL and cogeneration. Joint investments or third-party investments can be the next stage. Public-private partnership may be an appropriate framework for investments in the by-products since the outcomes are beneficial to both private and public sectors, and finally, (v) carry out **investments** with a focus on capacity for processing by-products, including the development of technical skills of employees.

For the **African Cashew Alliance (ACA)**: the position of ACA should be that of a **catalyzing agent for change**, by raising awareness and proving support for all on-going initiatives related to by-products – and looking for replication and appropriateness: (i) assist the plants to **comply with** national **regulations,** since lack of control in the area of compliance can become a serious risk factor in future, (ii) develop **a specific policy** on cashew **by-products** with the necessary instruments and facilitation of incentives for members of the ACA, (iii) provide support for sector **associations/organizations in the** countries in order to improve their organizational capacities and develop the capacity of the representatives of processing units. An idea is to have an ACA representative in each country, (iv) prepare the documentation on methods of reducing **environmental impacts**, targeted at processors and environmental authorities, and (v) incorporate the assessment of biomass energy and carbon emissions (reduction) in the evaluation criteria of the **ACA seal**.

[1] CDM : Clean Development Mechanism ; MCC: Millennium Challenge Corporation

The overall conclusion is that there is an untapped potential in developing cashew by-products, in particular, cashew shells for the processing industry and thermal energy, while contributing to energy production and offsetting of carbon emissions.