

LES ACTIONS DE LA DGCD

DE ACTIVITEITEN VAN DE DGOS

DGDC'S ACTIVITIES

LAS ACTIVIDADES DEL DGCD

Prize of the Belgian Development Cooperation

The Prize of the Belgian Development Cooperation Prize is an annual incentive prize - financed by the Belgian Development Cooperation (DGDC) and organized by the Royal Museum for Central Africa - for students and young researchers, from Belgium or developing countries. The prize is awarded to scientific works that contribute significantly to knowledge that can be applied to development in the South. Sustainable development is to be their principal aim and poverty alleviation a priority. The prizes are attributed to Master's theses, Ph D theses, or publications in scientific journals.

From the edition 2010 onwards, the Prize is organized around a central theme. For 2010 this theme was "Biodiversity and Environment for Improved Livelihoods".

The prize consists of a line of credit which can be used for the continuation of research activities or for career development (participation in seminars, training, ...) and amounts per laureate to:

1. EURO 5.000 in the category of the students linked to a Belgian university
2. EURO 5.000 in the category of the students linked to a university from a partner country
3. EURO 15.000 in the category of the young researchers linked to a university/research institute in a partner country

The prize is granted to maximum 3 laureates (1 per category).

In the framework of this year's Prize, the works of 4 Belgians and 6 students and researchers from the South have been nominated among a large number of applications. The nominees from the South were invited to Belgium on this occasion. All nominees had to present their work orally in front of a jury, who then selected one prize-winner in each category.

The prize-winners for 2010 are:

- in the category of the students linked to a Belgian university: Sarah Haesaert, with her Master's thesis "Applied ethnobotany: identification, use and the socio-economic importance of wild edible plants among the Turumbu (Democratic Republic of Congo, Tshopo district)
- in the category of the students linked to a university of a partner country: Joseph Macharia, with his Master's thesis, "Status and the potential of stingless bees (*Apidae: Meliponinae*) for forest conservation and income generation: case study of Kakamega forest"
- in the category of the researchers linked to a university/research institute in a partner country: Mohamed Omar Said Mohamed, with his Ph D thesis « Are peri-urban mangrove forests viable? Effects of sewage pollution and wood exploitation on the structure and development of the mangroves of Mombasa (Kenya)".

Four abstracts regarding the accomplishment of the nominees from Kenya and Belgium awarded in 2010 are presented below.

“Are Peri-Urban Mangrove Forests Viable? Effects of Sewage Pollution and Wood Exploitation on the Structure and Development of the Mangroves of Mombasa (Kenya)”

Mohamed Omar Said Mohamed¹

Mangrove forests are one of Kenya's important ecosystems. They provide the local population – especially the poorest segment – with food (fish, molluscs and shellfish) and wood (firewood, charcoal and other wood products), and they protect the coastal belt. Moreover, mangroves are characterized by a great biodiversity.

¹Mohamed Omar Said Mohamed, 1974, Kenyan, Master in Ecological Marine Management, Vrije Universiteit Brussel & Universiteit Antwerpen, Belgium, 2003. Doctor of Sciences, Vrije Universiteit Brussel & Université Libre de Bruxelles, Belgium, 2008.

In this work the negative influence of heavy population pressure on the peri-urban mangrove forests of Tudor Creek in Mombasa is evaluated in a soundly-underpinned and scientific way. Firstly, there is pollution caused by the dumping of sewage. The discharging of domestic waste water does contribute nutrients to the ecosystem, but rarely in the composition required for the optimal functioning of the ecosystem. For instance, it has been observed that the mangroves' healthy aerobic-anaerobic composting system is turned into a fully anaerobic system in which nutrients circulate much more slowly and are retained in the sediment. Secondly, overexploitation of the mangrove ecosystem results in a reduced yield in wood products as well as a drastic reduction of biodiversity: unregulated felling causes gaps in the tree canopy and seeds cannot travel from one place to another.

Yet despite the observed degradation of the mangrove system this study ends on a positive note, setting out potential solutions that take into account the existing situation – that is, the heavy population pressure. At present the mangrove ecosystem is for the most part public property, and so everyone can exploit it as he chooses. This study argues for the putting in place of an integrated adaptable system that is based on a comprehensive knowledge of the ecosystem. Everyone – and certainly the poorest section of the population – should have his due in this system too, but in a sustainable way, so that the mangrove ecosystem remains a major source of food and wood products in the future.

“Soil Surface Lowering Due to Soil Erosion in Villages near Lake Victoria, Uganda”

Annelies De Meyer²

As part of a joint project between the K.U.Leuven and the Kawanda Agricultural Research Institute in Uganda, Annelies De Meyer spent three months in the field studying the pollution of Lake Victoria caused by soil erosion in the surrounding villages. In this study area she has identified the places that are susceptible to soil erosion, and has gathered quantitative data about lake-wards sediment flux from the villages on the edge of the lake.

An estimate was made of the level and speed of soil erosion in households and on paths and roads. It appears, for example, that households are responsible for 56% of the total soil loss. Paths and roads are also a major source of sediment transport, together accounting for 22%. Soil erosion was mapped and an analysis made of the connectivity in sediment flux to Lake Victoria. Annelies De Meyer also took an active part in discussions with the local farming and fishing populations on measures to stem the erosion problem. In some places planting grasses may offer a solution, but on paths and roads, for example, other methods must be found.

This work has great relevance to development. The study of soil erosion in villages and settlements and the devising of appropriate ways to reduce it are crucial to the whole population. Erosion is highly detrimental to agricultural yields and the sediment that is transported to the lake causes great problems for the environment and biodiversity. And among other things it also causes a greatly reduced fish catch. This study is also entirely in keeping with the theme of the prize: “Biodiversity and environment for a better life”.

²Annelies De Meyer, 1985, Belgian, Bio-engineer in Land and Forest Management, K.U.Leuven, Belgium 2008. de.meyer.annelies@gmail.com

“Productie en houtkwaliteit van limba (*Terminalia superba* Engl. & Diels) uit aanplantingen in het Luki-reservaat, Bas-Congo, DRC”

(Production and Wood Quality of Limba (*Terminalia superba* Engl. & Diels) from Plantations in the Luki Reserve, Lower Congo, Democratic Republic of Congo)

Wannes Hubau³

The Law on Belgian International Cooperation of 19th May 1999 assesses the relevance of development on the basis of six principles: strengthening institutional and management capabilities; social and economic impact; technical and financial viability; effectiveness of the planned implementation procedure; focus on equality between men and women; and respect for protection and safeguarding of the environment.

Wannes Hubau's study scores on five out of these six basic principles (only the fourth is less apparent). This the Belgian researcher has achieved by putting himself in the local researcher's situation both mentally and physically.

Hubau began with a thorough study of the literature on the topic but the set-up of his research was also meticulously documented.

The overexploitation of forests in the Democratic Republic of Congo has been a matter of concern from as early as the 1950s. In order to maintain wood stocks at an acceptable level the Colonial State decided on large-scale artificial regeneration in and around the specially-created Luki Reserve.

The studied plantations, which cover an area of 11,000 hectares and are now sixty years old, are one of the oldest documented limba plantings in the Democratic Republic of Congo. They have a high scientific value and so attract the attention of both Congolese and international researchers. Both the local population and project developers must be convinced of the value of this high-potential species. The use of indigenous species, of which limba is one, also has the advantage of their being adapted to habitat and climate.

Felling a species at the optimum moment can contribute to a more sustainable management of natural resources. This research has, moreover, an exemplary function, showing the local population that well managed plantations can ensure an extra source of income. The results of this thesis are encouraging for this tree species, for it can become a valuable resource in a short space of time. Its potential for use as a veneer wood is also promising. In summary it can be stated that new limba plantations are recommended in local reforestation projects.

³Wannes Hubau, 1985, Belgian, Bio-engineer in Land and Forest Management, Universiteit Gent, Belgium, 2008. wannes.hubau@UGent.be

“Analyse systématique des contraintes en culture bananière au Rwanda”

(System Analysis of Pressures in Banana Cultivation in Rwanda)

Julie Van Damme

For millions of people in Rwanda and the whole African Great Lakes area bananas are the most important food crop. They are mainly cultivated by small-scale farmers. The majority of the bananas they grow are not the yellow dessert type but cooking bananas. Also grown are beer bananas, whose juice can be drunk fresh but which are mostly used for brewing beer.

Bananas are harvested throughout the year, their permanent foliage protects the steep slopes against erosion and the banana plant waste is returned to the soil. Bananas are therefore very important, not only in enabling the farmers to feed their families but also in terms of income and the sustainability of their exploitation. A high percentage of cultivated land is therefore planted with bananas, usually mixed with beans and other crops. Recent years have seen a significant drop in banana yields, however, largely due to disease and insects. Researchers attempt to solve this by way of improved and more specially adapted cultivating methods and/or improved plant material.

In densely populated Rwanda the government has also addressed the issue of how to use the small amount of steep and often poor land available to feed the more than ten million people. It was decided to divide the land into agricultural production zones. Farmers were then asked to concentrate on the crop that was chosen for their zone – potatoes in the north-west, for example, manioc in the south and bananas in the south-east. This “agricultural specialization” is intended to modernize farming and so increase production. For instance, the government aims to replace the majority of beer bananas with cooking bananas. In some areas farmers are no longer allowed to cultivate beans in the banana fields, as it is thought that this would reduce the yield.

As a student at the Université Catholique de Louvain, Van Damme examined what farmers, agriculture advisors, researchers and policy makers saw as the most important problems and possibilities for these banana systems. This she did working jointly with national and international researchers from the CIALCA consortium, which is supported by the Belgian Directorate-General for Development Cooperation (www.cialca.org).

In her interviews the author observed that farmers did not always agree with the government's view. The agriculture advisors had great difficulty in convincing the farmers of the usefulness of government policy, which runs counter to years of tradition. Other problems are poor access to the market, more variable rainy seasons with longer dry seasons, limited possibilities for industrial processing of (beer) bananas and a limited capacity to rapidly reproduce new and better banana varieties and to make these available to the farmer.

Julie Van Damme's research makes it very clear that solutions for small-scale farmers can only work sustainably if there is technical coherence throughout the scheme and when a support base is established that extends from farmer to policy-maker. Within CIALCA the results of her research are used to develop solutions that best fit the priorities of both farmers and policy-makers.

⁴Julie Van Damme, 1985, Belgian, Bio-engineer, Agricultural Sciences, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, 2008.
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Projet Interuniversitaire Ciblé (PIC)

La mosaïque africaine du manioc

Espoir Bisimwa, Godefroid Monde, Jean Walangululu & Claude Bragard

La mosaïque du manioc est une maladie virale qui s'attaque aux plantes de manioc en Afrique et, dans une moindre mesure, en Asie. Les virus qui provoquent cette maladie appartiennent à la famille des *Geminiviridae*, une famille de virus dévastateurs, capables de provoquer des épidémies à large échelle.

Contexte

De la même manière, le virus de la mosaïque africaine du manioc (*African Cassava Mosaic Virus - ACMV*) et, plus virulent encore, le virus de la mosaïque est-africaine du manioc (*East African Cassava Mosaic Virus - EACMV*) sont associés à la maladie. Ces virus sont disséminés et transmis d'une manière très efficace par un minuscule insecte, une mouche blanche appelée *Bemisia*.

La mosaïque, en cas de forte infestation, peut provoquer des pertes de rendement catastrophiques. L'impact de la maladie est important dans les pays où le manioc constitue une base essentielle de l'alimentation. L'épidémie initiée en Ouganda est aujourd'hui présente au Kivu en République démocratique du Congo ainsi qu'au Burundi...

Le manioc est, avec la banane plantain, l'aliment de base pour plus de la moitié de la population de la République démocratique du Congo. Il est cultivé dans toutes les provinces. Comme dans toutes les régions productrices de manioc en Afrique, la mosaïque africaine constitue une des contraintes majeures à la production, capable de provoquer des pertes de l'ordre de 25 à 95% selon les conditions écologiques, les souches du virus en présence, le niveau de résistance/susceptibilité des variétés utilisées,...

Au cours de la décennie écoulée, une pandémie de mosaïque a balayé l'Afrique de l'Est, au départ de l'Ouganda (Ouganda, Kenya, Tanzanie). L'analyse des souches a révélé l'existence d'un complexe de deux principales espèces virales, l'ACMV et l'EACMV, dont la souche ougandaise (EACMV-Ugv) est signalée comme étant la plus virulente. La présence simultanée et le synergisme entre les différentes espèces provoquent des symptômes et des pertes de rendements encore plus sévères. L'objectif de ce projet est de comprendre la dynamique de la maladie, dans une région où elle a été très peu étudiée, pour développer les outils de contrôle de cette pandémie.

Objectifs

Initié en 2003, le projet a pour objectif global d'améliorer la productivité locale du manioc au travers des objectifs suivants:

- quantifier l'impact de la mosaïque du manioc dans la région en fonction des variétés cultivées;
- identifier avec précision les souches virales de la région et leur distribution;
- tester le niveau de résistance des variétés de manioc utilisées localement par les agriculteurs;
- identifier, en collaboration avec les agriculteurs, les pratiques culturales à adopter pour limiter l'impact de la maladie et améliorer le rendement du manioc en milieu paysan.

Localisation et partenaires du projet

Basé à Bukavu, le projet a principalement couvert le Sud Kivu. Il a bénéficié d'une dynamique de collaborations tant au Nord qu'au Sud. Outre l'Unité de Phytopathologie de l'Université catholique de Louvain, l'Unité de Biochimie et de Biologie cellulaire des Facultés universitaires Notre-Dame de la Paix à Namur et la Faculté des Sciences agronomiques de l'Université catholique de Bukavu, partenaires initiaux du projet, plusieurs unités de recherche ont contribué à ce dernier, comme la Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH (Braunschweig, Allemagne), l'Université de Kinshasa, l'Institut Facultaire Agronomique de Yangambi - IFA (RDC), le réseau manioc de l'Institut National pour l'Étude et la Recherche Agronomiques au Congo - INERA (Mvuazi, RDC) et, spécialement, la Station de Mulungu, l'Université du Burundi et l'Institut des Sciences Agronomiques du

Burundi - ISABU (Bujumbura), l'Institut international d'Agriculture tropicale (Namulonge, Ouganda) et le Centre de Recherche international pour les Régions semi-arides (Sadoré, Niger) qui ont participé aux succès et à la formation des acteurs du projet.

Résultats

Après quatre ans, les objectifs initiaux ont été largement atteints. Ainsi, nous avons pu démontrer que l'épidémie virale était bien présente dans le Kivu et, dans une moindre mesure, autour de Kisangani et de Yangambi. Le génome des souches d'ACMV et EACMV détectées dans la région a été partiellement ou totalement séquencé, ce qui a permis de mettre en évidence de nombreuses infections mixtes. Les variétés de manioc utilisées localement ont été patiemment décrites et caractérisées pour leur résistance au virus et aux maladies en général. Le projet a ainsi pu montrer tout l'intérêt des cultures en association, comme celle du haricot avec le manioc, pour le contrôle du virus et de son vecteur.

Le projet a aussi permis la mise en place d'une équipe de recherche sur la mosaïque, aussi bien à Bukavu qu'à Kisangani. Il a largement contribué à la formation des étudiants de deuxième cycle de la Faculté des Sciences agronomiques de l'Université catholique de Bukavu, via leurs travaux pratiques, mémoires et travaux de fin de cycles. Deux thèses de doctorat ont été initiées dans ce domaine. En outre, plusieurs étudiants bioingénieurs africains et belges ont réalisé un travail de recherche au Burundi et en RDC avec l'approche enrichissante d'un travail collégial, en binôme Nord-Sud. Les interactions entre chercheurs et paysans, lors des nombreuses sorties sur le terrain, ont permis un enrichissement et un apprentissage mutuels des compétences.

Enfin, une conférence internationale organisée à Bukavu a rassemblé plus de 100 participants pour la présentation des résultats du projet et des dernières connaissances scientifiques sur le sujet. Dans ce cadre, une table ronde a permis de réunir plusieurs acteurs majeurs (les chercheurs universitaires et des centres de recherche, les ONG, l'inspection de l'agriculture, l'INERA, l'ISABU, la FAO) dans le domaine agricole au Sud-Kivu, dans l'optique d'un contrôle plus efficace de la pandémie.

Conclusion

Au terme de ce projet qui a permis de montrer qu'une collaboration active et efficace sur le plan scientifique pouvait se dérouler, malgré une situation compliquée sur le terrain par l'insécurité au Sud-Kivu, nous tenons à exprimer nos plus vifs remerciements à la CUD et à son personnel, ainsi qu'à celui de nos universités respectives, pour le soutien apporté dans cette aventure qui nous a permis de relever le défi d'étudier ce virus responsable d'une famine préoccupante...

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