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CONTRAT N° B2/191/P1/COFFEEBRIDGE

Bridging knowledge to the field:
an evaluation of the agronomic and socio-economic potential of Robusta coffee genetic resources as a cash crop in the Congo Basin

COFFEEBRIDGE

ANNEXE I – SPECIFICATIONS TECHNIQUES

CONTRACT NR B2/191/P1/COFFEEBRIDGE

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an evaluation of the agronomic and socio-economic potential of Robusta coffee genetic resources as a cash crop in the Congo Basin

COFFEEBRIDGE

BIJLAGE I – TECHNISCHE SPECIFICATIES

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ARTICLE 1: DESCRIPTION DU PROJET

1.1: Titre: **Bridging knowledge to the field: an evaluation of the agronomic and socio-economic potential of Robusta coffee genetic resources as a cash crop in the Congo Basin – COFFEEBRIDGE**

1.2: Description détaillée du PROJET

ARTIKEL 1: BESCHRIJVING VAN HET PROJECT

1.1 : Titel: **Bridging knowledge to the field: an evaluation of the agronomic and socio-economic potential of Robusta coffee genetic resources as a cash crop in the Congo Basin - COFFEEBRIDGE**

1.2: Gedetailleerde beschrijving van het PROJECT

THEME

Scientific support to the sustainable exploitation of natural resources

SUMMARY

Coffee is an important cash crop for small coffee farmers in the Global South and is an important commodity worldwide. The ~~political~~ economy of coffee production is influenced by ecology, climate change, biodiversity, soil fertility, and livelihood options. In this project expertise from different disciplines will be integrated; knowledge will be valorized and science-based advice will be provided for the revival of sustainable Robusta coffee production in Tshopo Province (DR Congo), for the conservation of the Congolese genetic diversity of wild Coffea canephora genetic resources and its wild relatives and for the development of a local, sustainable economy in a global context. This project will contribute, directly and indirectly, to the conservation and valorization of coffee genetic resources and several UN Sustainable Development Goals, and strengthen local and international skills in the field of agriculture and food. Although this project is focusing on the Congo Basin and Tshopo Province, in particular, the project will contribute to broader coffee challenges.

The proposed project has five objectives:

1) the local coffee chain, its sociological dimensions and economic relevance will be evaluated by carrying out socio-economic surveys in the Tshopo Province (WP2).
2) the evaluation of the Robusta coffee genetic resources in the DRC, in particular in Tshopo province, for cultivation and breeding by doing a genetic, phenotypic, chemical and organoleptic study of the available genetic resources in the perspective of its valorization. This will contribute to the coffee cultivation locally and globally, characterize new genetic resources and indicate potentially interesting genetic diversity.
3) the evaluation of the existing cropping system and proposing potential optimization of the cropping system by analyzing i.e. macro- and micro-nutrient deficiencies in the coffee leaves in different genetic lines and an agro-ecological evaluation of the current cropping system. This will result in recommendations to improve current agronomic practices and the cropping system in order to arrive at a sustainable and profitable coffee culture, as a cornerstone for the well-being of the local communities.
4) research in the (colonial) Archives will allow to 'recuperate' knowledge on Robusta coffee kept in archives and grey literature, which can give information on the origin and 'genetic' identity of the cultivated Robusta coffee and on the successes and failures of the past.
5) integration of the results in order to formulate a policy advice and tool for the rehabilitation of the Coffee cultivation in Tshopo Province.

SCOPE AND OBJECTIVES OF THE PROPOSAL

Context. Coffee is one of the most important cash crops in the Global South and an important commodity worldwide, generating revenues for millions of households. The average annual export value between 2010 and 2015 is US$20.2 billion for the producing countries; globally the total economic value is US$ 200 billion (Panhuysen & Pierrot 2018). This is based on two species, *Coffea arabica* ('Arabica') and *C. canephora* ('Robusta'), respectively 62% and 38% of the world production (Coffee Market Report 2018). Although the exact impact of global change on coffee production is still under debate (DaMatta et al.2019), severe impact on coffee yield and quality is expected if no adaptation takes place (Läderach et

al.2017; Ovalle-Rivera et al. 2015). In general, climatic suitability for Arabica is predicted to decrease in Meso America and East Africa, Robusta will compensate this decline, mainly in America, Indonesia and Africa (Magrach and Ghazoul 2015; Ovalle-Rivera et al. 2015). Consequently, the share of Robusta is increasing with c. 2% each year. By 2030 Robusta will represent more than 50% of the world product on (Panhuysen &Pierrot 2018). Nevertheless, most research and development are focussing on Arabica.

In 2006 Hein and Gatzweiler estimated the net value of wild Arabica genetic resources in Ethiopia, by comparing the costs and benefits for a 30 years discounting period at a rate of 5% on 1458 million US$. For Robusta no estimates are available, but, as the DR Congo (DRC) house important genetic resources of Robusta and wild relatives of Robusta and Arabica, the value will be millions US$. Ecologically Robusta is, in contrast to Arabica, a lowland species, more resistant to pests and has a higher productivity. Lower organoleptic quality, bean size and pricing are its the most important downsides. The lower cup quality (lack of sweetness and acidity, more saltiness and bitterness) is inherent in the Robusta but also due to less selective harvesting and breeding. In the past selection in coffee was almost solely focussing on productivity and resistance and not on cup quality (Montagnon 2012). Current Robusta's are mainly based on a few historic introductions.

State of the Art. In contrast to Arabica, the research and developmental activities on Robusta, a species with a huge wild diversity in the Congo Basin, lags behind. Moreover, studies are usually performed in a limited number of countries, such as Brazil (Volsi et al. 2019; Martins etal. 2018), Vietnam (Phan 2017), Indonesia (Wijaya et al. 2017), Uganda (Aluka et al. 2016, Aluka 2013,Ngugi & Aluka 2019, Ngugi 2016) and India (Ongole et al 2018). Research and development on Robusta is impeded by the restricted number of studies on the (wild) genetic diversity and **limited access to genetic resources**. The natural distribution area of Robusta extends from Liberia in the West to Uganda in the East.

A recent study including a few accessions from the DRC (Merot-l'Anthoene et al. 2019) illustrates that DRC houses a high intraspecific diversity of Robusta. Bramel et al. (2017) surveyed the principal coffee Collections and counted 11,415 accession for Arabica and only 625 of Robusta. Many of these accessions are duplicates, consequently the exact number of unique genotypes is lower. Moreover, despite their importance for conservation, research and breeding, ex-situ collections of Robusta with documented origin from DRC are mostly lacking (Bramel et al. 2017; Stoffelen pers. obs.). The Robusta collections are composed of material exchanged last century. In the DRC genetic resources collection were created (i.a in Eala and Yangambi) between 1901 and 1960. From 1975 to 1987 important collecting missions were organized in 5 'countries of origin for Robusta', i.e. Ivory Coast, Guinea, Cameroon, Congo-Brazzaville and the Central African Republic, but not in the DRC. The accessions were deposited in Ivory Coast. The collections in Ivory Coast and DRC suffered severely from political instability, war and lack of resources, resulting in the loss of accessions. In this context MeiseBG is, within the FORETS project (FOrmation, Recherche, Environnement dans la TShopo, funded by Belgium in delegated cooperation with the XIth European Development Fund and managed by CIFOR), rehabilitating the coffee collection of the INERA-Yangambi and enriching it with newly collected wild accessions from the Congo Basin. In parallel MeiseBG is doing **research** on population diversity and dynamics of wild Robusta and gene flow between wild and cultivated Robusta in the Congo Basin (FWO-Grant G090917N). The **crop system** of Robusta is, in contrast to Arabica, traditionally known as "sun coffee" in monocultures without shade trees. While for Latin America many studies are illustrating the negative impact of diminishing the number of shade trees on biodiversity, only a few are giving attention to the negative impact on non-biological value. Toledo & Moguel (2012) highlight the non-biological value of shade coffee. Although the production per ha of shadow coffee is in general lower, shading has a positive impact on ecosystem services and socio-economic benefits for farmers (Jha et al. 2014). Moreover, it makes coffee more climate resilient and sustainable (Vaast et al. 2016) and increases its cup quality. Recent research on Robusta under shade trees in India (Nesper et al. 2019) highlight the importance of the diversification of shade trees. This is in line with research, mainly on Arabica, showing that plantations under shade trees have a more robust growth and production pattern (e.g. Muschler 2001). Differentiation and introduction of indigenous useful trees can increase cup quality, soil fertility, income, sustainability, biodiversity, pest management and climate resilience (Jha et al. 2014). This review is also illustrating that an integrated approach for the evaluation of the crop system is essential and that higher yield in sun plantations is not always representing higher revenues and benefits for the farmers. Méndez et al. (2010) illustrates that small individual coffee farms are integrating (agro-)biodiversity and benefits from in-farm diversity (e.g. food, fuel and medicine) with cash revenues

generated by coffee. The real benefits of crop systems can only be evaluated on the basis of an integrated approach where different disciplines such as soil science, agro-ecology, socio-economy and life sciences are integrating their expertise. Coffee is a perennial crop which could allow to find a third way in between biodiversity conservation and rural development in the DRC.

Importance of the project. In Uganda, Rwanda and Burundi coffee is an **important**, if not the most important **export product** and source of foreign revenues. In the DRC coffee was an important export product until the 1980's, with 800000 metric tons per year of which 80% was Robusta. In 2015 the coffee export was only 10000 metric tons, of which only 20% was Robusta (Kambale Kisumba 2015). This is illustrating its potential and the need for a sound understand how this can be reversed. Congolese authorities and the World Bank have identified Robusta and Arabica as an **important cash crop and a tool for achieving the UN developmental goals** in the DRC. In several provinces the Congolese government and international organisations, such as NGOs, the Common Fund for Commodities and the World Bank, are investing in the **rehabilitation of the coffee value chain and plantations**. In addition, small farmers and private investors are interested in the relaunch of the Robusta cultivation in the Tshopo Province. **Coffee cultivation in the DRC is, however, fraught with a complicated history** (colonisation, decolonisation and instability) and **with a lack of knowledge transfer** between the actors. Moreover, Robusta, a perennial crop, have to be seen in the context of livelihoods and wellbeing of local populations. Nevertheless, the revival of the highland Arabica in the Eastern RDC last decade illustrates that the relaunch of coffee can be successful and a tool for development (see also ICO Annual Review 2018). In a relatively short period various traders invested again in the region. However, a revival is only sustainable if local research infrastructure, capacity and genetic resources are available. The success of Robusta in Brazil, India, Vietnam and Uganda was always accompanied by the development of local capacity in research as the adaptation to local situation is essential. The proposed project responds to the lack of research and transfer of knowledge, limited collaboration between different actors and a request by local farmer associations, governmental bodies and entrepreneurs, asking for help to initiation a coffee chain in the Tshopo Province. The project will identify opportunities and pitfalls of the relaunch of the coffee chain in the region, straighten local capacities and provide a baseline for the development of coffee research locally.

Opportunity for collaborations. In the proposed project we will bring together different expertises (in Belgium and DRC) in order to evaluate the potential of Robusta for the development of rural areas in the Tshopo Province (DRC). We bridge the gap between collections (archives, herbarium, gene core collections) and science-based knowledge from different disciplines (genetic, phenology, chemical components and organoleptic) on the one hand and the coffee cultivation in the Congo Basin on the other hand. Different research groups collaborate and evaluate the genetic, chemical, agronomic and organoleptic characteristics of wild and cultivated Robusta diversity in the Congo Basin, in the perspective of its valorization. This is framed in a historical, sociological and economic context, by doing a research in the archives and field surveys in the Tshopo Province. With research on historic sources we intend to elucidate the origin and distribution of cultivated Robusta by Lucien Linden, a Belgian horticulturist. This introduction is important for the coffee cultivation as it is the basis of most Robusta cultivated worldwide.

Aim: Expertise from different disciplines will be integrated, knowledge will be valorized and a science-based advice will be provided for the revival of a sustainable Robusta production in the Tshopo Province (DRC), for the conservation of the Congolese genetic diversity of wild Robusta and wild relatives and for the development of a local, sustainable economy in a global context. The project contributes, directly and indirectly, to the conservation and valorization of coffee genetic resources and UN Sustainable Development Goals, and straighten local and international skills in agriculture and food. Although the project is focussing on the Tshopo Province, it will contribute to the global coffee challenges as well.

METHODOLOGY

Project organisation (WP1). The project is organized in 6 work packages. The first work package aims to coordinate, streamline and enhance the interaction between work package 2-5, the partners, BELSPO, the steering committee and the stakeholders. WP 6 will integrate the results of WP 2-5 in a policy document. **Socio-economic surveys (WP2).** Data accumulation to implement the socio-

economic WP draws on rural sociological research methods: this entails designing a culturally sensitive research protocol, identifying a sample of knowledgeable respondents and then carrying out in-depth interviews with individuals. Data are organized, processed and analyzed while sharing findings with other WPs. Concerning feasibility, the recruitment of the right Congolese assistants to do the interviews and then decode the data is a likely challenge but investment is coaching and training them should facilitate the process. The economic value is assessed with a method (VCA4D)developed[1] in the framework for the EU-DG International Cooperation and Development (Directorate Planet and Prosperity, EU-DEVCO C1), already successfully used in the DRC, Colombia,Sierra Léone Rwanda,Tanzania, and Mali. In addition the green coffee beans are evaluated by comparing cup quality of locally produced green coffee to the pricing in the international market and other necessities for the international market.

Field sampling method (WP3 & 4). WP3 & 4 are depending from concise documentation and sampling. Each sample is linked to an individual plant a voucher is deposited in the herbarium in Yangambi and duplicated in Meise. A unique universal identifier is attributed to each voucher. Sample description follows the coffee descriptor manual (IPGRI 1996).

Chemical fingerprinting, soil-analyses and geno- and pheno-typification use leaf samples from mature but not aged leaves from the same individuals, this makes it possible to synchronise the sampling effort. Sampled trees are labelled in the field so that the same trees can sampled again later (e.g. for coffee beans). Coffee beans for organoleptic and chemical analyses of green beans are sampled on the same trees and documentation will follow the same scheme. Soil samples are linked to site identificator and sampled trees. This allows to integrate (e.g. analyses of correlations between different parameters) and share the data easily. The first sampling is done in the first year in a collaboration between local master students, Belgian PhD students and experienced local (H.Mavar & B.Dhed'a) and Belgian researchers (F.Vandelook & P.Stoffelen). When necessary the sampling is repeated in the second and third year. The fourth year no new sampling is planned in order to be able to analyse the samples within the duration of the project.

Genetic analyses (WP3.1). For the SSR analyses we use the microsatellite primers specifically designed by Poncet et al. (2007) and Hendre et al. (2008) to analyse Robusta populations that are amplified and subsequently genotyped. The fragment size-based SSR approach is complementary to the GBS technique that generates several Mbp of SNPs. A set of GBS-based SNPs is subsequently selected to generate a multiplex amplicon sequencing to obtain at least 500 SNPs included in short fragments of maximum 200bp to also cover highly degraded material such as herbarium samples (used as a historical reference). Using assay approach, allows us to genotype in a low cost and time-efficient high-throughput screening assay approach. General population genetic indices are calculated such as number of alleles per locus (Na), gene diversity, observed (Ho) and expected heterozygosity (He), gene diversity, and allelic richness (AR) using Genetix 4.0 and SPaGeDi 1.5. Population structure within the germplasm collection is investigated with a multivariate method that identifies and designates clusters of related individuals: DAPC (discriminant analysis of principal components). A Bayesian clustering algorithm as implemented in Structure 2.3, is used to estimate the number of genetic clusters. Both SSRs and GBS derived SNP data are examined using statistical methods. Obtained results from SNP and SSR data analysis are compared to obtain a reliable estimate of the genetic variation within the collection and compared to the wild accessions. Janssens and Vandelook are already partners in European, BRAIN & FWO-projects using these techniques (for tropical trees, bananas and robusta coffee).

Pheno-typification (WP3.2).

Pheno-typification and sample description follow the coffee descriptor manual (IPGRI 1996). Values for 34 qualitative and 20 quantitative descriptors are recorded for up to three plants per accession and analysed using UPGMA (unweighted pair group method with arithmetic mean) clustering and ordination techniques to differentiate phenotypic entities.

Chemical profiling & fingerprinting (WP3.3). The metabolomics study use liquid chromatography coupled to high resolution mass spectrometry (LC-HRMS, QTOF), a powerful analytic tool allowing identification of metabolite pathways following robust experimental conditions. The analysis is performed at the Analytical Platform of the Faculty of Pharmacy-ULB, research unit RD3-Pharmacognosy, Bioanalysis and Drug Discovery, includes all required instruments (LC-HRMS, namely a LC-ESI-QTOF) and the know-how. In untargeted metabolomics, we investigate without a priori known compounds that are present and make the data analysis a key point. For this purpose, research consortium such as W4M (Workflow for Metabolomics, http://workflow4metabolomics.org) proposes open-source web interface, editing data analysis workflow for several spectrometric methods including LC-HRMS data.

This tool allows supervised and unsupervised statistical analyses after data pre-processing (alignment, normalization…) on a Galaxy server. The in silico platform allows to identify determinants for the clustering of samples provided by different experimental conditions. We use W4M platform with success to compare the Coffee leave metabolome (Souard et al, 2018). In mass spectrometry, determinants are characterized by retention time, mass/charge ratio and abundance that are factors essential to further identify metabolites of interest.

Organoleptic assessment (WP3.4). To identify the potential and differences of the genetic lines used, the coffee beans are picked and dried in an standardized way. At least two different seasons are assessed in order to have a more nuanced evaluation of bean quality. After collecting, the sample is optically/physically assessed on site (defect counting & screening) to check if striking differences are seen (e.g. quantify the insect damage, green seeds/black seeds). Afterwards good quality and defect beans are separated from each other; the coffee is bagged and coded according to a pre-established procedure. This part of the work is done by local partners. The Coffeelab Independent provide manuals and give trainings (H. Mavar will be trained and will supervise the work locally). The good quality bean is sent to an test panel; the different samples are assessed (blind tasting tests) by a team of experts with expertise in the evaluation of Robusta and compared to commercial reference samples of graded quality Robusta. Results are summarized in a report and the commercial potential of different genetic lines is evaluated.

Data analyses of combined datasets (WP3.5). Different statistical techniques (clustering, ordination, Mantel tests) are applied using R software to match phenotypic, molecular genetic, chemical and organoleptic data and to differentiate groups of accessions with superior characteristics for cultivation or breeding. Matching all data enables a better understanding of the differences found in the different genetic lines, and to set research and exploration priorities in the future. It helps to evaluate the potential of the different genetic lines and their potential for breeding and cultivation. A group component analysis of the multiblock data facilitates the systematic analysis of metabolic changes in plants linked these different factors acting at the same time. We follow a combination of multi-omics data (genomics, metabolomics) and a statistical approach. As well the ULB as the Meise research group do have experience with the analyses of complex datasets: e.g. on coffee (Souard et al, 2018) and bananas (Janssens et al. 2016)

Methods and analyses for agro-ecology and soil-fertility (WP4). A survey is executed to characterize and assess the current coffee systems under forest, home gardens and old plantations. Sampling sites will be selected in concertation with WP2 &3. *Tasks: 4.1: Assess and inventory the shading trees and NTFP's that surround the available coffee trees.* Ca. 100 variable area plots are used to inventory coffee, Non Timber Forest Products (NTFP's) and surrounding shade trees, determine the species and measure a.o. tree diameter, height, canopy closure, … (Vanderhaegen et al. 2015). The coffee genotype are assessed in concertation with WP3. *4.2: Assessment of farming system and local use of shade tree species and NTFP's.*

The local use and preference of the inventoried shade trees and NTFP's are assessed through interviews at household level and at the plot sites. This activity are carried out in close collaboration with the surveys under WP2. *4.3: Soil fertility and impact on coffee health and productivity.* A soil analysis is carried out at the above mentioned plots (ca. 100 locations) and leaf samples are collected from 500 coffee trees. Coffee leaves are sampled in a systematic way (De Bauw et al. 2016). A picture is taken from each sampled leaf.

The leaf samples are assessed for most macro- and micro-nutrients by ICP-MS and for C and N by dry combustion in a CN analyser (n-500). *4.4. An on-station trial is established to assess the impact of the most promising shade tree species on the most promising Robusta lines.* These plots is managed to assess the impact of differences in shade, shade tree species, coffee variety and fertilization on coffee productivity.

The management of these plots is done in collaboration with INERA. Density, growth and productivity is assessed on a yearly basis.

Study of the historic sources on coffee (WP5). This WP combines multiple methodological perspectives, such as archive prospection, close reading of archival sources and contemporary literature and network analysis. In addition, digitizing and presenting online contemporary research reports and publications. **Science based Tool (WP6).** In this WP the obtained research results are further integrated based on the available literature and the data collected in this project. To assess the impacts of different land uses – and the anticipated changes - on biodiversity, carbon storage, local value and income modeling is carried out. The ICRAF developed tool FALLOW is tested in this central DRC context (Noordwijk et al. 2008). Special attention is given to different coffee development scenarios in both land

sharing and a land sparing strategies. Trade-offs of the different growing systems is analysed and reported.

DATA AND DATA MANAGEMENT PLAN

MeiseBG has an institutional data management plan for its **collections data and images**, that enables open access to its data under the CC license by (attribution) and sa (share alike). The collection data are published to GBIF. The images of the specimens are freely accessible *via* the portal of the running BRAIN project Natural Heritage : http://www.naturalheritage.be/search (ongoing BRAIN project) and available on www.botanicalcollections.be and on the GBIF-portal (www.gbif.org). For long term preservation the high resolution images are kept at VIAA: https://viaa.be/en following the recommendation of the European Open Science Cloud (EOSC). Voucher of the study will be deposited in the herbarium and made available under these conditions. For the data and media produced within the project the intention is to apply the same approach. For the **research data produced** that are not directly linked to collections, MeiseBG has asked access to the https://dmponline.be/ tool where the Belgian universities are already subscribed. The intention is to have within the first months of the project a project specific data management plan defined together with the partners for their respective data included in the project. It is also to stress that most partners of the consortium or their governmental authority representatives are involved as member or as expert to the CIS-CFS Open Access comity coordinated by BELSPO and dealing with Data Management and Open Access in Belgium and formulate the concerted response to the European Union and other regulatory bodies. For long term preservation and access of data and publications not fit for GBIF or image archiving at VIAA, the aim is to post them with the appropriate license to Zenodo https://zenodo.org/ where they remain accessible and reusable by third parties. The network partners engage to share the data needed for the implementation of the project between the partners and involved parties such as BELSPO and the follow up committee.
Wherever **personnel data** would be involved, all partners have a designated DPO (Data Protection Officer) which can be consulted if there is a doubt on the respect of the GDPR (General Data Protection Regulation). The consortium members are very familiar with the Nagoya Protocol on Genetic Resources that will be respected for the biological samples in this project.
The works which are to be digitized will be made public accessible online, with the aim of facilitating scientific research. The majority of the publications digitized concern scientific publications from discontinued government agencies or research institutions. Some of the publications are already in the public domain (cf. rights holders who died more than 70 years ago). Each work will have the necessary source references and copyrights statement using https://rightsstatements.org/en/. However, the material also contains works in which the rights holders cannot be identified (orphan works). In order to make the scientific heritage accessible, these works will also be made public. The project partners will make the necessary efforts to locate the copyright holders and document their status in the Orphan Works Registry (https://euipo.europa.eu/ohimportal/nl/web/observatory/orphan-works-db) if the right holders are not found. The works will be digitized with care, using professional material (scanners and cameras) available to the project partners. Sustainable preservation of the digital files is guaranteed within the existing digital infrastructure of the partners involved.

ARTICLE 2: TACHES DU PROJET
Les tâches spécifiques du PROJET sont les suivantes :

ARTIKEL 2: PROJECTTAKEN
De specifieke taken van het PROJECT zijn de volgende:

The project is ambitious and brings together very different disciplines collaborating with each other; therefore meetings will be organized regularly where all participants are invited. Interaction and collaboration between the different partners is essential and are planned at key moments. As the meeting and workshops are key moments in the work plan for the delivery and communication we mention them here. *Month 1:* internal kick-off meeting: explaining the administrative procedures to all partners and preparation of the first workshop; discussing methods of sampling and fieldwork. *Month 2:* Workshop 1: the project and the context of the project is presented and discussed with the following up/steering committee and stakeholders of the robusta coffee chain. *Month 12, 24 & 36:* Intermediary meeting with partners and following-up committee. Presentation of the results and validation of the report. Discuss and plan the next steps. *Month 48:* Final workshop, open to scholars, stakeholders from

governmental bodies, NGO's and the private sector. The partners present the results and key-institutions/persons are invited.

Workplan, deliverables, valorisation per work package

WP1: Management and coordination of the project.
Coordination: MeiseBG, P.Stoffelen.

Aim: This WP aims to coordinate the implementation of the project as outlined in the work plan and align the different WP's. PS will ensure the follow-up of the progress of the project, the adherence of the partners to administrative guidelines of the programme as required by BELSPO and so guarantee the timely delivery of the project's outputs. Furthermore this WP will ensure a proper communication flow between the funding agency, the partners of the project, the follow-up committee and with the international contacts. Finally WP1 will identify means to fund following up projets. Workshops and meetings will be organised in the framework of this project.

Task: 1.1 Project Coordination.
Task 1.2 Networking.
Task 1.3 Project Reporting.
Task 1.4 Valorisation and communication.
Expected output: reports for BELSPO, workshops, press communications, contacts with stakeholders, etc.

WP2: Socio-economic evaluation of Robusta in the Tshopo Province: its status and potential (focus on Yangambi/Kisangani region).
Coordination: RMCA T.Tréfon & ERAIFT B.Michel; *Collaborators:* ERAIFT/UNIKIS 2 students.

Aim: It is a two-fold socio-economic and governance WP. This would involve (i) carrying out in-depth sociological analysis of potential beneficiaries' perception of a new economic activity, (ii) understanding how investment in coffee would impact other livelihood activities and the resulting environmental implications, (iii) studying the governance framework of coffee production in terms of institutional interactions, social advantages and disadvantages, a thorough stakeholder analysis all along the commodity chain from production to commercialization.

Role of the Partners: TT & BM: organisation, training and analyses; 2 local students: field surveys & analyses of the data.

Task: 2.1: Practice of coffee growing in the area: inventory of old and current plantations; evaluation of endogenous know-how; perception by local/indigenous people; temporal evolution;

Task 2.2: Territorial control and land appropriation: local actors of land governance; modes of access to land; systems of social management of village lands, agricultural properties: lineages and successions; land conflicts and their modes of resolution;

Task 2.3: Coffee growing and other economic activities: hierarchy of agricultural activities; channels of production and marketing of commodities; interactions between producers and consumers; local market and coffee export;

Task 2.4: Relations between farmers and state institutions: agricultural practice and taxation, legislation on coffee growing; institutional support to peasant agriculture; strengths and obstacles to agricultural practice;

Task2.5: Age and gender in coffee growing and related activities: age groups; children; the place of women; social organization in the coffee sector;

Task2.6: Investment and income in coffee growing: investors; access to inputs and credit; the facilities and difficulties; transport and trade of coffee; practice of coffee growing and well-being.

Expected result & Output: 2 local masters (ERAIFT); scientific publications in international journal and communication on international conferences. *Valorisation:* see WP6

WP3: Characterization of wild and cultivated Robusta diversity in the Congo Basin (DRC).
WP3.1: Genetic analyses.
Coordination: MeiseBG, S.Janssens; *Collaborators*: MeiseBG, F.Vandelook & PhD student; UNIKIS, Master student; INERA-Yangambi, technician.

Aim. Early 20th century Robusta was introduced as a crop for the Congo Basin, genetic material of the species was spread throughout the tropical regions. Since then, world wide Robusta plantations were set up, from the 1930 a reference collection of Robusta was created in Yangambi (DRC). As the history of the introduction of Robusta and its sourcing is very important our genetic analyses are, up to now, not well understood but very important for a sound interpretation of the wild and cultivated genetic diversity, the study is complemented with a historical research on different archives (WP5). In part 1 of WP3, we aim to genetically screen the current Robusta collection at Yangambi using modern molecular techniques and compare it to wild collected material and commercial grown Robusta. The genetic passport data and subsequent population genetic network generated in WP3.1 will act as a framework for data obtained in the other WP's and will allow to carry out trait analyses (WP3.2 & 3.3).

Role of the Partners. SJ will coordinate the molecular genetic analyses (SSR and GBS) and subsequent population genetic and phylogeographic data analyses that will be performed by the selected PhD student. Support in the lab will be provided in kind by one of the lab technicians at MeiseBG.

Task: 3.1.1. Genetic screening of Robusta collection. In order to conduct a thorough genetic screening of the Yangambi coffee collection, a complemented approach will be applied in which SSRs and GBS are combined;

Task 3.1.2. Data analysis. Analyses on the genetic diversity of the Yangambi Robusta collection (landraces and elite varieties).

Expected result & output: 1. Assessed genotype of each of the Robusta cultivars present on the Yangambi coffee research plantation. 2. Estimation of the Robusta cultivar composition throughout time 3. Evaluation of the genetic connection between wild *C. canephora* populations and their cultivated counterparts in Yangambi. 4. Population genetic network that can be used as framework for the other work packages.

WP3.2: Trait analyses.
Coordination: MeiseBG, F.Vandelook & P.Stoffelen; *collaborator:* PhD student; UNIKIS, student & INERA-Yangambi, agronomist.

Aim: Morphologic characterisation & description of the different genetic lines. Characterisation of existing and newly introduced genetic lines will be based on descriptors developed by the International Plant Genetic Resources Institute (IPGRI 1996). These descriptors enable an easy and quick discrimination between phenotypes, but they also provide critical information for proper management of accessions.

Role of the Partners: FV and PS will provide assistance with initiation and optimization of the descriptor lists. PhD student will supervise recording of descriptors and provide assistance with analysis and interpretation. UNIKIS student and INERA Yangambi agronomist will record descriptors.

Task: 3.2.1 Optimization of the descriptor list and development of a database with descriptor information.

Task 3.2.2 Completion of the descriptor list for all accessions currently in collection and for newly collected wild coffee accessions.

Task 3.2.3 Analysis and summarizing of the descriptor lists.

Timeline:
Month 1: Optimization of the descriptor list and development of a working protocol; Month 2-6 Completion of descriptor lists for all accessions in collection and entry in database; Month 7-8 Analyses and evaluation of descriptor lists, plus sustainable implementation of the use of descriptors in collection management.

Expected result & output: 1. Assessed the phenotype of the accessions in the collection and newly localised wild accessions; 2. a list of traits that can be linked to genetic and chemical characterisation (WP3.5); 3. a well developed database that facilitates and optimises collection management.

WP3.3: Chemical fingerprinting - metabolomics.
Coordination: ULB-Pharm, C.Stévigny, Fl.Souard & C.Delporte; *collaborators*: ULB, ~~Master~~Postdoc; UNIKIS: H.Mavar and/or Student.

Aim: Recently a close collaboration between MeiseBG and the ULB enabled to develop untargeted and targeted metabolomics studies on leaves of different *Coffea* species using original techniques (see 3.1). We now proposed to further develop these techniques for Robusta and perform in parallel an untargeted metabolomics study on the green and roasted robusta beans and on the leaves of Robusta.

Role of the Partners: CS and CD will provide assistance with the analysis preparation and thinking and data interpretation of metabolomics studies. The master will perform sample preparation, analysis and data treatment. PhD student will supervise recording of descriptors and provide assistance with analysis and interpretation.

Tasks: 3.3.1: Sample preparation (ground, chemical extraction) and sample analysis by LC-HRMS; 3.3.2: data processing for metabolomics, statistical analysis (chemometrics).

Timeline: WP3.3 will start the second year as samples will be collected during year 1. This WP will last 1.5 year. The Master will perform the sample preparation (on leaves, green beans and roasted beans) during the 4-6 first months of the WP, and then LC-HRMS will be performed in parallel or right after all sample preparation. The full LC-HRMS analysis will last 1-2 months. Then data treatment and interpretation of the LC-HRMS analysis will be performed during the last 6 months as this part is the longest. Finally and in parallel to data treatment on W4M. Expected result & output: In this part of WP3, we will highlight the main chemical compounds that differentiate the different Robusta samples. Based on the genetic, organoleptic, soil-fertility and agro-ecological data, it will be possible to link the chemical fingerprint to other data. This will help to find the conditions and genetic lines that are more favourable for Robusta cultivation.

WP3.4: Organoleptic evaluation.
Coordination: MeiseBG, P.Stoffelen; *Collaborators*: CoffeeLab Independant (as a subcontractor), R.Van den Bruel, professional coffee tasters; INERA-Yangambi, technician & UNIKIS, H. Mavar and student.

Aim: organoleptic characterisation of the selected genetic lines of coffee used in the Tshopo Province. the sampling will be done in such a way that it will be possible to compare the results with the genetic, phenotypic and chemical characteristics of the genetic lines as well as with the agronomic and soil characteristics of the sourced plants. The organoleptic characteristics are also very important to assess the market price and its position on the world wide coffee market.*Role of the Partners*: PS: coordination between the different partners involved in the WP; RVdB. organize the organoleptic assessments by qualified experts of the Robusta samples of the different sites, genetic line and cultivation systems and writing the report of the assessments, advice on sampling and interpretation of the test results; HM coordination and following up of the sampling by local collaborators in the field & training of the local collaborators (UNIKIS & INERA).

Task: 3.4.1: Preparation and processing of the coffee samples.

Tasks: 3.4.1 & 3.4.2: Evaluation 'workshops': the different samples will be assessed (blind tasting tests) by a team of experts with expertise in the evaluation of Robusta and compared to commercial reference samples of graded quality Robusta.

Task 3.4.3: The result of activity 1 & 2 will be summarized in a report and the commercial potential of the different genetic lines will be evaluated.

Expected result & output: This organoleptic assessment will allow to assess the current and potential quality of the locally produced coffee in relation to genetic, soil and agrosystem characteristic and see how it can be positioned in the global coffee market. This information will be very important in the assessment of the potential of coffee as a cash crop in the Tshopo and the development of local economy (WP6). The visual assessment will allow to give advice on pre- and post-harvest treatments and identify pests and estimate the potential production. The results will be integrated and analysed with the other data assembled in WP3.1, WP3.2, WP3.3 and WP4 (see WP3.5 & WP6).

*WP3.5: Integration of data and analysis***.**
Coordinator: F.Vandelook *Collaborators:* All partners of WP3 involved in the different tasks in the WP; PhD student.

Aim: Coordination and streamlining of the different tasks within WP3 and integrating the results. The genetic, chemical, phenotypic and organoleptic data will be integrated and analysed. Although there are several publications analysing and comparing different genetic lines or origins of Arabica and/or Robusta a study at this scale integrating data generated by 4 different disciplines (genetic, phenotypic, organoleptic and chemical) is unprecedented for coffee. Moreover linking these data sets to soil-fertility data and agro-ecological characteristics opens the pathway to trace interesting genetic variation with Robusta for cultivation and breeding. Studies focusing on the valorisation of genetic diversity of wild Robusta in the Tshopo region are still non-existent.

Expected result & output: The organoleptic workshops and the final workshop will be an occasion to make the project known to different stakeholders (coffee sector, governmental and non-governmental bodies); communication/activity for broad public by Meise Botanic Garden.

Scientific output: one PhD and one well-trained local scientist; at least three peer-reviewed publications in scientific journals; two publications in other journals (*e.g.* C&CI Mag); 3 oral presentation on international conferences (*i.a* SCA and ASIC-International Scientific Colloquium on Coffee); poster presentations on local and international conferences; well-documented and characterized reference collection for Robusta in Yangambi; a database with an overview of all results/data. *Valorisation:* Different genetic lines will be characterized. Data will allow to select particular genetic lines for cultivation and/or breeding in the Tshopo province, the DRC or abroad. By collaborating with players in the coffee chain (in Belgium and the DRC), they will be informed about the potential of Congolese genetic resources.

WP4: Agroforestry and soil fertility.
Coordination: B.Verbist & R.Merckx; *collaborators*: KUL: PhD-student, INERA-Yangambi, technician, UNIKIS, student. *Aim:* The current coffee-crop-shade tree systems will be evaluated from an agro-ecological point of view and the soil fertility will be assessed.

Task 4.1: Assess and inventory the shading trees and NTFP's that surround the available coffee trees.The amount and relative frequency of coffee, shade trees and NTFP's will be quantified. The impact of shading on coffee production will be assessed.

Task 4.2: A typology will be developed for the different farming systems that have coffee as a component. This will give an insight what type of farmers give priority to coffee and in combination with what other NTFP's, crops or tree crops.

Task 4.3: Soil fertility and impact on coffee health and productivity. Insight is obtained in the current nutrient status (macro- & micro nutrients) and deficiencies on a wide range of soils and growth conditions. Based on the leaf pictures the basis is provided for a local guide book on rapid assessment of nutrient deficiencies of coffee.

Task 4.4. An on-station trial will be established to assess the impact of the most promising shade tree species on the most promising Robusta lines. Because these trials with perennials take a long time – results will be preliminary, but these trials will provide a valuable baseline and reference data for subsequent research. *Valorisation:* a PhD-thesis, one well-trained local scientist, A1-scientific articles, at least two communications on international congresses, a local guide book on rapid assessment of nutrient deficiencies of coffee.

WP5: The discovery and introduction of Robusta Coffee as a colonial crops (1880-1940?), a research on historic sources/archives. *Coordination*: M.Amara (Arch) & Y.Segers (KUL-Hist); *Collaborator:* Master in history KUL/ARCH and technical assistents.

Aim: The successful introduction of Robusta coffee in the early 20th century as an alternative crop for Arabica coffee, plagued by the coffee rust, can be seen as an important milestone in the adaptation of coffee cultivation to a quickly emerging and devastating pest. Although that it is widely accepted that Lucien Linden had an important role in the introduction of Robusta coffee and that he sourced it from the Congo, this history is not elucidated and many questions remain unanswered, e.g. how this exploration and introduction was organized, what is the exact origin of the cultivated genetic resources, which networks connected researchers traders in Belgian Congo and other colonial territories in Africa and Asia, etc. A better insight in the introduction and diffusion history of Robusta Coffee and relevant international scientific networks, can help to answer actual questions in the context of in-situ and ex-situ conservation and for breeding towards a more climate resilient coffee cultivation, as the actual culture of coffee is based on a very restricted genetic base mainly from the Congo Basin.

Task: 5.1: Historical research. It consists of two consecutive and complementary phases. This comprises the prospecting of (archival) sources with regard to the introduction, diffusion and further scientific valorization of Robusta coffee in the Belgian Congo and other colonies in Africa and Asia (1880-1960). Priority sources are the Archives of REPCO and INEAC, State Archives, Brussels (for instance Station de selection et d'expérimentation du caféier in Yangambi and Division du Caféier et du Cacaoyer, 1927-1960; plantation of Lula, 1911-1960). With special attention to results of coffee research stations in Yangambi and Lula and the botanic garden of Eala. Other archives: Meise Botanic Garden (information on botanical collection and collectors: e.g. Laurent, Luja, Goossens etc.) and the Africa Museum, Tervuren (e.g. personal archives of Félix Fuchs, Jean Lebrun, Floribert Jurion). But also published sources such as articles published in journals such as Bulletin agricole du Congo belge (1910-1960), Bulletin du Comptoir de Vente des Cafés du Congo (1947-1960), L'Agronomie tropicale. Organe Mensuel de la Société d'Etudes d'Agriculture Tropicale, 1909-1912 and publications, such as Leplae E., *Comment on cultive au Congo belge 52 000 hectares de café*, Leuven, 1935.

Task 5.2: *Digitizing and making documents available online:* A selection of these digitized sources will be published on the websites of the Botanic Garden Meise and the Center for Agrarian History (CAG, www.hetvirtueleland.be).

Task 5.3: Study of the collected information. Based on the collected archival sources and publications, the exploration initiatives of botanists and scientists such as Lucien Linden and Edouard Luja in Congo Free State will be studied and analyzed in detail and this for the first time. In addition, the further distribution of Robusta coffee in Belgian Congo will be examined and the scientific initiatives with regard to selection/breeding and production. A third point of attention is the further spread of Robusta to other colonies in Africa and Asia such as Ivory Coast, Uganda and especially Java where the robusta culture became a huge success. Which networks existed? Who participated and who did not (inclusion and exclusion)? etc.

Task 5.4. Publication of results.

Expected results: a detailed overview of research initiatives and results concerning Robusta coffee selection/breeding in Congo Free State and Belgian Congo (1880s-1960),- publicly accessible database with digitized contemporary research reports and publications on selection/breeding and

production of Robusta coffee in the Congo Free State and Belgian Congo (1880s-1960), a better understanding of the introduction and distribution of Robusta coffee in Congo and the exchange with other colonies in Africa and Asia, insight into the historical development of research regarding selection, cultivation methods and production of Robusta coffee in Congo, and A better understanding of the functioning of national and international networks between researchers and coffee planters.
Output: minimum 50 scanned research reports and publications, published on the websites of the partners, at least one scientific article in an international peer-reviewed journal (such as The Journal of African History, Agricultural History, Historia Agraria), final project report and presentations of research results during workshop or international congress.

WP 6: A path towards the valorization of wild genetic resources: the significance and potential of Robusta in the Congo Basin–. *Coordination*: KULeuven B.Verbist; *Collaborateurs*: RMCA T.Trefon, ERAIFT B.Michel, CoffeeIndependent R.Van den Bruel. *Aim:* Report writing and advice for policy.

Task 6.1: Rapid land tenure assessment. (RMCA & KUL-FNL). Past research, e.g. in the VLIR-UOS funded DEFI project, and the PhD research of Pieter Moonen learnt that land tenure is key in the decisions that are taken by farmers and the subsequent land use scenarios. Land tenure is not mapped yet in DRC, as it is seen as something sensitive and expensive. The recent decrees in community forestry nevertheless opens the door for changes in this field. A guide for rapid land tenure assessment is developed in this work package, based on the results of WP2 & 4.

Task 6.2 Value chain analysis. (KUL-FNL & ERAIFT). The current value chain for coffee in DRC is assessed for the other provinces in DRC based on the available literature and the data collected in this project. The biggest bottlenecks and opportunities are documented (Fitter & Kaplinksy 2001). As Chairman of the African Fine Coffee Association, Baudouin Michel has a robust access and permanent access to all stakeholders of the DRC Coffee Value Chain.

Task 6.3 Scenario tools (KUL-FNL). The impact of different land use and coffee development strategies on ecosystem services and farmer income will be explored at household and landscape scale.
Valorisation: Lessons learnt for policy makers will be put in policy briefs and tool, a report and a scientific article that documents opportunities and challenges of reviving the Robusta cultivation. The connection with - and development of - value chains will be reported. The impact of different land use strategies on ecosystem services and farmer income will be explored at household and landscape scale.

ARTICLE 3: CALENDRIER DES TACHES DU PROJET
3.1: Le commencement et l'achèvement des tâches décrites à l'article 2 de la présente annexe correspondent respectivement au DEBUT OPERATIONNEL et au TERME OPERATIONNEL.

3.2: Les délais d'exécution des tâches sont les suivants :

ARTIKEL 3: TIJDSCHEMA VAN DE PROJECTTAKEN
3.1: De aanvang en het einde van de taken omschreven in artikel 2 van deze bijlage, stemmen respectievelijk overeen met de AANVANG DER WERKZAAMHEDEN en de BEEINDIGING DER WERKZAAMHEDEN.

3.2: De uitvoeringstermijnen van de taken zijn de volgende:

Task 3.5: Integration of data and analysis	37	48			6							2									8
WP 4:			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**36**	**0**	**12**	**12**	**12**	**6**	**6**	**0**	**0**	**48**	**132**
4.1 Assess and inventory the shading trees and NTFP's that surround the available coffee trees.	1	24															1			12	**13**
4.2. Assessment of farming system and local use of shade tree species and Non-Timber Forest Products (NTFP's)	1	36									12						1			24	**37**
Task 4.3. Soil fertility and impact on coffee health and productivity	1	12									12						1			12	**25**
4.4. An on-station trial	6	48									12		12	12	12	6	3				**57**
WP 5:			**0**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**18**
Task 5.1: Historical research	10	15					7														**7**
Task 5.2: Digitizing and making publications available online:	13	16					4														**4**
Task 5.3: Study of the collected information	16	27					7														**7**
Task 5.4: Publication of results.	27	35																			**0**
WP 6:			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**4**
Task 6.1: Rapid land tenure assessment	37	45																	1		**1**
Task 6.2: Value chain analysis	38	46																	0		**0**
Task 6.3: Scenario tools	40	48																	3		**3**
TOTAL			**6**	**12**	**48**	**30**	**18**	**30**	**2**	**12**	**36**	**36**	**24**	**24**	**24**	**16**	**6**	**6**	**4**	**48**	**382**

Task 3.5: Integration of data and analysis	1			2	0. 2		0,2	0,2		0,2						4
WP 4:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**3**	**2**	**2**	**0**	**0**	**9**
4.1 Assess and inventory the shading trees and NTFP's that surround the available coffee trees.									0,5			0,5				**1**
4.2. Assessment of farming system and local use of shade tree species and Non-Timber Forest Products (NTFP's)									0,5			0,5				**1**
Task 4.3. Soil fertility and impact on coffee health and productivity									0,5				2			**3**
4.4. An on-station trial									0,5		3	1				**5**
WP 5:	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**8**
Task 5.1: Historical research														2	1	**3**
Task 5.2: Digitizing and making publications available online:														2		**2**
Task 5.3: Study of the collected information															1	**1**
Task 5.4: Publication of results.															2	**2**
WP 6:	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**4**
Task 6.1: Rapid land tenure assessment		1										0				**1**
Task 6.2: Value chain analysis		1	0,5									1				**3**
Task 6.3: Scenario tools		1														**1**
TOTAL	**8**	**3**	**2**	**5**	**6**	**1,0**	**3,2**	**1,2**	**2,0**	**4,2**	**3,0**	**3,0**	**2,0**	**4**	**4**	**51**

WP - Task : Title	Start Month	End Month	Person-months BRAIN-be 2.0																			Person-months other sources																			Months							
			Meise BG - NN	RMCA - T.Tréfon	Meise BG - PhD	ERAIFT - Student econ.	ARCH - Master	ERAIFT - Student socio.	ERAIFT - NN coordinator	ULB - NN	UNIKIS - Student Agr.	UNIKIS - Student sci.	Yangambi - agron	Yangambi - agron	Yangambi - agron	Yangambi - coordinator	UNIKIS - coordinator-ag	UNIKIS - coordinator-Ph	KUL - B. Verbist	KUL - PhD	TOT	Meise - P.Stoffelen	RMCA - T.Tréfon	ERAIFT - B. Michel	Meise - F. Vandelook	Meise - S. Janssens	ULB - C. Stévigny	ULB - C. Delporte	ULB - Fl. Souard	UNIKIS - B. Dheda	UNIKIS - H. Mavar	YANGAMBI - coordin.	KUL - B. Verbist	KUL - R. Merckx	Arch - M. Amara	KUL - Y. Segers	TOT	1-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48
WP 1: Management/coordination of the project			6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5							
Task 1.1: Project Coordination	1	48	2	0	0	0	0	0	0	0	0									0	2	1	0	0	0	0	0	0	0								1							
Task 1.2: Networking	1	48	1																		1	1																1							
Task 1.3: Report Writing	11	48	2																		2	2																2							
Task 1.4: Valorisation and communication	1	48	1																		1	1																1							
WP 2: Socio-economic evaluation			0	12	0	30	0	30	2	0	0	0	0	0	0	0	0	0	0	0	74	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2							
Task 2.1: Practice of coffee growing in the area	7	30		2		5		3	0,3												10																0							
Task 2.2: Territorial control and land appropriation	9	30		2		5		3	0,3												10																0							
Task 2.3: Coffee growing and other economic activities	12	30		2		5		7	0,4												14			1												1							
Task 2.4: Relations between farmers and state institutions	15	40		2		5		3	0,3												10																0							
Task 2.5: Age and gender in coffee growing and related activities	15	40		2		5		3	0,3												10																0							
Task 2.6: Investment and income in coffee growing	15	40		2		5		11	0,4												18			1												1							
WP 3:			0	0	48	0	0	0	0	12	0	36	12	12	12	10	0	6	0	0	148	3	0	0	5	6	1	3	1	0	4	0	0	0	0	0	24							
Task 3.1.1: Genetic screening of Robusta collection					24							4				1					29					3											3							
Task 3.1.2: Data analysis					6							6									12					3											3							
Task 3.2.1: Optimization of the descriptor list and development of a database with descriptor information	7	10			4							6	1	1	1	1					14				1											1							
Task 3.2.2: Completion of the descriptor list for all accessions currently in collection and for newly collected wild coffee accessions	10	16			2							6	6	6	6	6					30				1											1							
Task 3.2.3: Analysis and summarizing of the descriptor lists.	11	18			6							6				1					13				1											1							
Task 3.3.1: Sample preparation (ground, chemical extraction) and sample analysis by LC-HRMS	13	24								6		1						3			10						1	1			1					3							
Task 3.3.2: data processing for metabolomics, statistical analysis (chemometrics)	19	30								6											6							2	1							3							
Task 3.4.1: Preparation and processing of the coffee samples												5	5	5	5	1		3			24										2					2							
Task 3.4.2: Evaluation 'workshops'																					0	1									1					2							
Task 3.4.3: Results are summarized in a report & the commercial potential of the genetic lines are evaluated																					0	1														1							

Task 3.5: Integration of data and analysis	37	48			6							2									8	1			2	0.2		0,2	0,2		0,2						4
WP 4:			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**36**	**0**	**12**	**12**	**12**	**6**	**6**	**0**	**0**	**48**	**132**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**3**	**2**	**2**	**0**	**0**	**9**
4.1 Assess and inventory the shading trees and NTFP's that surround the available coffee trees.	1	24															1			12	**13**									0,5			0,5				**1**
4.2. Assessment of farming system and local use of shade tree species and Non Timber Forest Products (NTFP's)	1	36									12						1			24	**37**									0,5			0,5				**1**
Task 4.3. Soil fertility and impact on coffee health and productivity	1	12									12						1			12	**25**									0,5				2			**3**
4.4. An on-station trial	6	48									12		12	12	12	6	3				**57**									0,5		3	1				**5**
WP 5:			**0**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**8**
Task 5.1: Historical research	10	15					7														**7**														2	1	**3**
Task 5.2: Digitizing and making publications available online:	13	16					4														**4**														2		**2**
Task 5.3: Study of the collected information	16	27					7														**7**															1	**1**
Task 5.4: Publication of results.	27	35																			**0**															2	**2**
WP 6:			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**3**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**4**
Task 6.1: Rapid land tenure assessment	37	45																	1		**1**		1										0				**1**
Task 6.2: Value chain analysis	38	46																	0		**0**		1	0,5									1				**3**
Task 6.3: Scenario tools	40	48																	3		**3**		1														**1**
TOTAL			**6**	**12**	**48**	**30**	**18**	**30**	**2**	**12**	**36**	**36**	**24**	**24**	**24**	**16**	**6**	**6**	**4**	**48**	**382**	**8**	**3**	**2**	**5**	**6**	**1,0**	**3,2**	**1,2**	**2,0**	**4,2**	**3,0**	**3,0**	**2,0**	**4**	**4**	**51**

ARTICLE 4: COMITE DE SUIVI DU PROJET

Chaque projet est accompagné par un comité de suivi.
Le comité de suivi est composé d'utilisateurs potentiels des résultats de recherche tels que des représentants des instances publiques nationales ou régionales, européennes ou internationales, d'acteurs de la société civile, de scientifiques, de représentants du secteur industriel, … La participation des membres du comité de suivi n'est pas rétribuée.
Ce comité a pour but de suivre activement le projet et de promouvoir la valorisation de la recherche par l'échange et la mise à disposition de données et d'informations, par l'apport de différents avis, par la suggestion de pistes de valorisation, …

L'apport et l'avis du comité de suivi doivent être joints aux rapports d'activités et aux rapports finaux à fournir au SERVICE.
Le RESEAU est tenu de préciser dans le rapport initial, mentionné à l'article 7.1 de la présente annexe, la composition du comité ainsi que le fonctionnement et les objectifs spécifiques du comité (nombre de réunions, mode d'échange d'information, rôle des membres...).
Le cas échéant la composition du comité peut être modifiée en accord avec le GESTIONNAIRE DE PROGRAMME.

ARTIKEL 4: OPVOLGINGSCOMITE VAN HET PROJECT

Elk project wordt begeleid door een opvolgingscomité.
Het opvolgingscomité is samengesteld uit potentiële gebruikers van de onderzoeksresultaten zoals vertegenwoordigers van publieke instanties op nationaal, regionaal, Europees of internationaal niveau, maatschappelijke actoren, wetenschappers, industriële actoren… De eventuele deelnamekosten van de leden van het opvolgingscomité worden niet terugbetaald.
Dit comité heeft als doel de actieve opvolging van het project te verzorgen en de valorisatie van het onderzoek te bevorderen, via o.a. de uitwisseling en het ter beschikking stellen van gegevens en informatie, het geven van adviezen, het aanbrengen van valorisatiepistes …
De inbreng en het advies van het opvolgingscomité dient toegevoegd te worden aan de activiteiten- en eindverslagen die aan de DIENST worden overgebracht.
Het NETWERK dient in het aanvangsverslag waarvan sprake in art. 7.1 van deze bijlage, de samenstelling van het comité, evenals de werking en de specifieke doelstellingen ervan (aantal vergaderingen, wijze van informatie-uitwisseling, rol van de leden...) te specifiëren.
In voorkomend geval kan de samenstelling van het comité gewijzigd worden mits akkoord van de PROGRAMMABEHEERDER.

ARTICLE 5: REPARTITION BUDGETAIRE

5.1: Le budget par PROMOTEUR tel que stipulé à l'article 3.2 du contrat de base est réparti par catégorie comme suit (montants en EUR):

5.1.1: APM – C Stoffelen Piet

	EUR
Personnel / Personeel	**211 500**
Fonctionnement courant / Courante werking	**31 725**
Fonctionnement spécifique / Specifieke werking	**7 500**
Overheads	**12 536**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**30 000**
Coopération internationale / Internationale samenwerking	**79 464**
TOTAL / TOTAAL	**372 725**

ARTIKEL 5: BEGROTINGSUITSPLITSING

5.1: Het budget per PROMOTOR zoals vastgelegd in artikel 3.2 van het basiscontract, wordt als volgt per uitgavencategorie uitgesplitst (bedragen in EUR):

5.1.1: APM – C Stoffelen Piet

5.1.2: AGR – P2 Amara Michaël

	EUR
Personnel / Personeel	**82 500**
Fonctionnement courant / Courante werking	**8 250**
Fonctionnement spécifique / Specifieke werking	**0**
Overheads	**4 538**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**95 288**

5.1.2: ARA – P2 Amara Michaël

	EUR
Personnel / Personeel	**82 500**
Fonctionnement courant / Courante werking	**8 250**
Fonctionnement spécifique / Specifieke werking	**0**
Overheads	**4 538**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**95 288**

5.1.3: KU Leuven – P3 Merckx Roeland

	EUR
Personnel / Personeel	**0**
Fonctionnement courant / Courante werking	**0**
Fonctionnement spécifique / Specifieke werking	**10 000**
Overheads	**500**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**10 500**

5.1.3: KU Leuven – P3 Merckx Roeland

	EUR
Personnel / Personeel	**0**
Fonctionnement courant / Courante werking	**0**
Fonctionnement spécifique / Specifieke werking	**10 000**
Overheads	**500**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**10 500**

5.1.4: KU Leuven – P4 Segers Yves

	EUR
Personnel / Personeel	**0**
Fonctionnement courant / Courante werking	**0**
Fonctionnement spécifique / Specifieke werking	**0**
Overheads	**0**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**0**

5.1.4: KU Leuven – P4 Segers Yves

	EUR
Personnel / Personeel	**0**
Fonctionnement courant / Courante werking	**0**
Fonctionnement spécifique / Specifieke werking	**0**
Overheads	**0**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**0**

5.1.5: ULB – P5 Stevigny Caroline

5.1.5: ULB – P5 Stevigny Caroline

	EUR
Personnel / Personeel	**90 000**
Fonctionnement courant / Courante werking	**9 000**
Fonctionnement spécifique / Specifieke werking	**3 500**
Overheads	**5 125**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**107 625**

5.1.6: MRAC – P6 Tréfon Théodore

5.1.6: KMMA – P6 Tréfon Théodore

	EUR
Personnel / Personeel	**80 000**
Fonctionnement courant / Courante werking	**8 000**
Fonctionnement spécifique / Specifieke werking	**2 500**
Overheads	**4 525**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**10 000**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**105 025**

5.1.7: KU Leuven – P7 Verbist Bruno

5.1.7: KU Leuven – P7 Verbist Bruno

	EUR
Personnel / Personeel	**231 655**
Fonctionnement courant / Courante werking	**23 166**
Fonctionnement spécifique / Specifieke werking	**0**
Overheads	**12 741**
Equipement / Uitrusting	**0**
Sous-traitance / Onderaanneming	**0**
Coopération internationale / Internationale samenwerking	**0**
TOTAL / TOTAAL	**267 562**

5.2: Les transferts budgétaires entre catégories nécessitent un accord écrit du GESTIONNAIRE DE PROGRAMME selon les dispositions de l'article 6.2 du contrat de base.

5.2: De budgetoverdrachten tussen categorieën vereist de schriftelijke goedkeuring van de PROGRAMMABEHEERDER volgens de bepalingen van artikel 6.2 van het basiscontract.

ARTICLE 6: NATURE DES DEPENSES

6.1: Personnel: Le personnel (salarié et/ou non salarié) requis pour l'exécution du PROJET et dont le coût est ou n'est pas prévu à charge du budget stipulé à l'article 3 du présent contrat, est établi comme suit pour chaque INSTITUTION et par PROMOTEUR, en équivalent Homme/Mois (H/M) (en EUR):

ARTIKEL 6: AARD VAN DE UITGAVEN

6.1: Personeel: Het personeel (loontrekkend/niet loontrekkend) dat vereist is voor de uitvoering van het PROJECT en dat al dan niet ten laste valt van de begroting waarvan sprake in artikel 3 van dit contract, wordt als volgt vastgesteld voor elke INSTELLING en per PROMOTOR, uitgedrukt in Man/Maand (M/M) (in EUR):

APM – C Stoffelen Piet

Personnel requis / Vereist Personeel (Catégorie, Specialité) / (Categorie, Spécialiteit)	**Nombre d'H/M à charge du PROJET / Aantal M/M ten laste van het PROJECT**	**Estimation du coût mensuel temps-plein du personnel / Geraamde voltijdse maandelijkse personeelskost**	**Nombre d'H/M non à charge du PROJET / Aantal M/M niet ten laste van het PROJECT**
Master Biological sciences (molecular biology)	48	3 800	0
Master Agricultural sciences (agronomy)	6	4 500	0
Piet Stoffelen: PhD Biological sciences (expert Central Africa Flora & Coffee)	0	-	8
Steven Janssens: PhD Biological sciences ((phylo)genetics and evolution)	0	-	6
Filip Vandelook: PhD biological sciences (ecology and statistic)	0	-	5
TOTAL / TOTAAL	**54**		**19**

AGR / ARA – P2 Amara Michaël

Personnel requis / Vereist Personeel (Catégorie, Specialité) / (Categorie, Spécialiteit)	**Nombre d'H/M à charge du PROJET / Aantal M/M ten laste van het PROJECT**	**Estimation du coût mensuel temps-plein du personnel / Geraamde voltijdse maandelijkse personeelskost**	**Nombre d'H/M non à charge du PROJET / Aantal M/M niet ten laste van het PROJECT**
Master History (colonial archives)	18	4 500	0
Michaël Amara: PhD Documentation, archives and information management (Doctor in contemporary History)	0	-	4
TOTAL / TOTAAL	**18**		**4**

KU Leuven – P3 Merckx Roeland			
Personnel requis / Vereist Personeel (Catégorie, Specialité) / (Categorie, Spécialiteit)	**Nombre d'H/M à charge du PROJET / Aantal M/M ten laste van het PROJECT**	**Estimation du coût mensuel temps-plein du personnel / Geraamde voltijdse maandelijkse personeelskost**	**Nombre d'H/M non à charge du PROJET / Aantal M/M niet ten laste van het PROJECT**
Roel Merckx: PhD Agricultural sciences	0	-	2
TOTAL / TOTAAL	**0**		**2**

KU Leuven – P4: Segers Yves			
Personnel requis / Vereist Personeel (Catégorie, Specialité) / (Categorie, Spécialiteit)	**Nombre d'H/M à charge du PROJET / Aantal M/M ten laste van het PROJECT**	**Estimation du coût mensuel temps-plein du personnel / Geraamde voltijdse maandelijkse personeelskost**	**Nombre d'H/M non à charge du PROJET / Aantal M/M niet ten laste van het PROJECT**
Yves Segers: PhD History (Agrarian History)	0	-	4
TOTAL / TOTAAL	**0**		**4**

ULB – P5: Stevigny Caroline			
Personnel requis / Vereist Personeel (Catégorie, Specialité) / (Categorie, Spécialiteit)	**Nombre d'H/M à charge du PROJET / Aantal M/M ten laste van het PROJECT**	**Estimation du coût mensuel temps-plein du personnel / Geraamde voltijdse maandelijkse personeelskost**	**Nombre d'H/M non à charge du PROJET / Aantal M/M niet ten laste van het PROJECT**
PhD Medical and health sciences (Analystical chemistry/Food analysis	12	7 500	0
Caroline Stevigny: PhD Biological sciences (Pharmacology, organic chemistry, phytochemistry)	0	-	1
Cédric Delporte: PhD Medical and health sciences (Pharmacognosy Bioanalysis and Drug discovery)	0	-	3
Florence Souard: PhD Biological sciences (Chemometric with expertise on coffee leaves	0	-	1
TOTAL / TOTAAL	**12**		**5**

MRAC / KMMA – P6: Tréfon Théodore

Personnel requis / Vereist Personeel (Catégorie, Specialité) / (Categorie, Spécialiteit)	**Nombre d'H/M à charge du PROJET / Aantal M/M ten laste van het PROJECT**	**Estimation du coût mensuel temps-plein du personnel / Geraamde voltijdse maandelijkse personeelskost**	**Nombre d'H/M non à charge du PROJET / Aantal M/M niet ten laste van het PROJECT**

Théodore Trefon: PhD Political science (research and project management)	12	6 600	7
TOTAL / TOTAAL	**12**		**7**

KU Leuven – P7: Verbist Bruno

Personnel requis / Vereist Personeel (Catégorie, Specialité) / (Categorie, Spécialiteit)	Nombre d'H/M à charge du PROJET / Aantal M/M ten laste van het PROJECT	Estimation du coût mensuel temps-plein du personnel / Geraamde voltijdse maandelijkse personeelskost	Nombre d'H/M non à charge du PROJET / Aantal M/M niet ten laste van het PROJECT
Master Agricultural sciences (agronomy & soil sciences)	48	3 800	0
Bruno Verbist: PhD Agricultural sciences (Natural Resources Management)	4	11 600	7
TOTAL / TOTAAL	**52**		**7**

Le coût mensuel maximal du personnel est, le cas échéant, TVA incluse.

De maximale maandelijkse personeelskost is, in voorkomend geval, inclusief BTW.

6.2: Fonctionnement: les frais de fonctionnement courant sont déterminés forfaitairement.
Les frais de fonctionnement spécifique directement liés à l'exécution du PROJET sont établis comme suit pour chaque INSTITUTION et par PROMOTEUR (en EUR):

6.2: Werking: de courante werkingskosten worden forfaitair bepaald.
De specifieke werkingskosten direct verbonden aan de uitvoering van het PROJECT worden als volgt vastgesteld voor elke INSTELLING en per PROMOTOR (in EUR):

APM – C Stoffelen Piet

Nature du fonctionnement spécifique / Aard van de specifieke werking	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
Genetic analyses	7 500
TOTAL / TOTAAL	**7 500**

AGR / ARA – P2 Amara Michaël

Nature du fonctionnement spécifique / Aard van de specifieke werking	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

KU Leuven – P3 Merckx Roeland

Nature du fonctionnement spécifique / Aard van de specifieke werking	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
Analyses of soil samples and leave samples	10 000
TOTAL / TOTAAL	**10 000**

KU Leuven – P4: Segers Yves

Nature du fonctionnement spécifique / Aard van de specifieke werking	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

ULB – P5: Stevigny Caroline

Nature du fonctionnement spécifique / Aard van de specifieke werking	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
Access to the analytical platform: mass spectometry analysis and maintenance of the apparatus	3 500
TOTAL / TOTAAL	**3 500**

MRAC / KMMA – P6: Tréfon Théodore

Nature du fonctionnement spécifique / Aard van de specifieke werking	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
Field surveys	2 500
TOTAL / TOTAAL	**2 500**

KU Leuven – P7: Verbist Bruno

Nature du fonctionnement spécifique / Aard van de specifieke werking	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

6.3: Equipement: L'équipement nécessaire à l'exécution du PROJET et dont l'acquisition est prévue à charge du budget stipulé à l'article 3 du présent contrat, est établi comme suit pour chaque INSTITUTION et par PROMOTEUR (en EUR):

6.3: Uitrusting: De uitrusting die noodzakelijk is voor de uitvoering van het PROJECT en die aangeschaft zal worden ten laste van de begroting waarvan sprake in artikel 3 van dit contract, wordt als volgt vastgesteld voor elke INSTELLING en per PROMOTOR (in EUR):

APM – C Stoffelen Piet

Nature de l'équipement / Aard van de uitrusting	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

AGR / ARA – P2 Amara Michaël

Nature de l'équipement / Aard van de uitrusting	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

KU Leuven – P3 Merckx Roeland

Nature de l'équipement / Aard van de uitrusting	Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

KU Leuven – P4: Segers Yves	
Nature de l'équipement / Aard van de uitrusting	**Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)**
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

ULB – P5: Stevigny Caroline	
Nature de l'équipement / Aard van de uitrusting	**Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)**
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

MRAC / KMMA – P6: Tréfon Théodore	
Nature de l'équipement / Aard van de uitrusting	**Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)**
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

KU Leuven – P7: Verbist Bruno	
Nature de l'équipement / Aard van de uitrusting	**Coût estimé / Geraamde kostprijs (TVA incluse / BTW inbegrepen)**
NÉANT / NIHIL	0
TOTAL / TOTAAL	**0**

6.4: Sous-traitance: La sous-traitance nécessaire à l'exécution du PROJET et à charge du budget stipulé à l'article 3 du présent contrat, est établie comme suit pour chaque INSTITUTION et par PROMOTEUR:

6.4: Onderaanneming: De onderaanneming die noodzakelijk is voor de uitvoering van het PROJECT en die ten laste is van de begroting waarvan sprake in artikel 3 van dit contract, wordt als volgt vastgesteld voor elke INSTELLING en per PROMOTOR:

APM – C Stoffelen Piet	
Nature de la sous-traitance / Aard van de onderaanneming	**Organoleptic evaluation of Robusta coffee**
Informations complètes concernant le sous-traitant Volledige gegevens van de onderaannemer	CoffeeLab Independent
Nombre H/M / Aantal M/M	
Montant estimé des prestations à fournir / Het geraamde bedrag voor de te leveren prestaties	**30 000**

AGR / ARA – P2 Amara Michaël	
Nature de la sous-traitance / Aard van de onderaanneming	**NÉANT / NIHIL**

KU Leuven – P3 Merckx Roeland	
Nature de la sous-traitance / Aard van de onderaanneming	**NÉANT / NIHIL**

KU Leuven – P4: Segers Yves	
Nature de la sous-traitance / Aard van de onderaanneming	**NÉANT / NIHIL**

ULB – P5: Stevigny Caroline	
Nature de la sous-traitance / Aard van de onderaanneming	**NÉANT / NIHIL**

MRAC / KMMA – P6: Tréfon Théodore	
Nature de la sous-traitance / Aard van de onderaanneming	**Evaluation of the economic potential of Congolese Robusta coffee on the world market**
Informations complètes concernant le sous-traitant Volledige gegevens van de onderaannemer	CoffeeLab Independent
Nombre H/M / Aantal M/M	
Montant estimé des prestations à fournir / Het geraamde bedrag voor de te leveren prestaties	**10 000**

KU Leuven – P7: Verbist Bruno	
Nature de la sous-traitance / Aard van de onderaanneming	**NÉANT / NIHIL**

6.5 Coopération internationale

6.5 Internationale samenwerking

University of Kisangani – I1: Dhed'a Djailo Benoit	
Informations complètes concernant le partenaire international / Volledige gegevens van de internationale partner	University of Kisangani/ Faculty of Sciences Biotechnological sciences / Genetic resources, plant breeding and biotechnology 2012 Kisangani, DRC www.unikis.ac.cd
Budget	**34 650**

INERA – I2: Mbuya Kankolongo Amand

INERA

Informations complètes concernant le partenaire international / Volledige gegevens van de internationale partner	Direction General Centre de recherche Yangambi RD Congo https://inera-rdc.org/
Budget	**22 176**

ERAIFT – I3: Michel Baudouin	
Informations complètes concernant le partenaire international / Volledige gegevens van de internationale partner	ERAIFT Direction Campus de l'Université de Kinshasa Commune de Lemba BP 15.373 Kinshasa RDC http://www.eraift-rdc.org/
Budget	**22 638**

ARTICLE 7: RAPPORTS

Nonobstant les dispositions de l'article 2.2 de l'annexe II, le RESEAU fournit au GESTIONNAIRE DE PROGRAMME, par l'entremise de son COORDINATEUR, les rapports suivants pour approbation:

7.1: Rapport initial: Le rapport initial est remis dans les trois mois à dater du DEBUT OPERATIONNEL. Il comprend:

- une description de l'état de la connaissance, dans le domaine du projet, au sein du RESEAU,
- une liste nominative du personnel qui participe au PROJET et qui est à charge ou à disposition du PROJET,
- une liste des équipements mis à la disposition du PROJET,
- une liste des conventions et contrats, en ce compris ceux de valorisation des résultats, qui lient les INSTITUTIONS, ou qui sont en voie de conclusion, dans le domaine de recherche du PROJET. Les éventuels brevets dont disposent les INSTITUTIONS sont également mentionnés. Cette liste comporte au moins l'intitulé et l'objet des contrats, conventions et brevets, leur durée et leur incidence financière, ainsi que l'identité des contractants et déposants, et ce sans préjudice de l'article 13 de l'Annexe II.
- les membres du comité de suivi du PROJET
- la convention interne au RESEAU, telle que décrite à l'article 4.2 du contrat.

Nonobstant les dispositions de l'article 4.7 de l'annexe II, toute modification de l'information fournie dans le rapport initial est signalée dans le rapport d'activités transmis au terme de l'année au cours duquel ce changement survient.

ARTIKEL 7: VERSLAGEN

Onverminderd de bepalingen van artikel 2.2 van bijlage II, legt het NETWERK, door toedoen van zijn COORDINATOR, de volgende verslagen ter goedkeuring voor aan de PROGRAMMABEHEERDER:

7.1: Aanvangsverslag: Het aanvangsverslag wordt binnen de drie maanden na de AANVANG VAN DE WERKZAAMHEDEN ingediend. Het omvat:

- een beschrijving van de stand van de kennis van het NETWERK in het domein van het project,
- een nominatieve lijst van het personeel dat aan het PROJECT deelneemt ten laste of ter beschikking van het PROJECT,
- een lijst van de uitrusting ter beschikking gesteld voor het project,
- een lijst van contracten en overeenkomsten, met inbegrip van die voor de valorisatie van de resultaten, die de INSTELLINGEN binden in het onderzoeksdomein van het PROJECT, alsook de contracten die binnenkort gesloten worden en de octrooien waarover de INSTELLINGEN eventueel beschikken. In deze informatie staan minstens de titel en het voorwerp van de contracten, overeenkomsten en octrooien, de duur en de financiële weerslag ervan alsmede de identiteit van de contracterende partijen en de octrooiaanvragers, en dit zonder afbreuk te doen aan art. 13 van Bijlage II,
- de leden van het opvolgingscomité
- de interne overeenkomst van het NETWERK, zoals vermeld in artikel 4.2 van het contract.

Onverminderd de bepalingen van artikel 4.7 van bijlage II, wordt iedere wijziging van gegevens uit het aanvangsverslag in het activiteitenverslag aangegeven, op het einde van het jaar waarin de wijziging plaatsvond.

7.2: Rapports d'activités périodiques
Les directives concernant le contenu et la forme des rapports sont transmises par le GESTIONNAIRE DE PROGRAMME au RESEAU.

Les rapports sont remis annuellement.

Ces rapports présentent l'état d'avancement et les acquis des recherches ainsi que les prévisions pour l'année suivante. Ces informations se réfèrent explicitement aux tâches et au calendrier du PROJET définis aux articles 2 et 3 de la présente annexe. Ils fournissent également, le cas échéant, toute modification des données reprises dans le rapport initial de même que la liste des publications et des missions réalisées au cours de l'année écoulée.

7.3: Rapport final: Ce rapport est remis avant le TERME OPERATIONNEL ou, le cas échéant, dans les deux mois qui suivent la date à laquelle il est mis fin au contrat conformément aux dispositions de l'article 15 de l'annexe II. Il donne une description complète du PROJET, des résultats obtenus et de leurs éventuelles applications scientifiques et technologiques et indique la mesure dans laquelle les objectifs fixés ont été atteints.

Conjointement au rapport final, le RESEAU, fournit, via le COORDINATEUR, une fiche (maximum 2 pages) décrivant les résultats du projet, les conclusions éventuelles et les indications nécessaires pour la gestion en matière de diffusion et de valorisation. Ce document est rédigé en néerlandais, francais, ainsi qu'en anglais.

Les directives concernant le contenu et la forme des rapports sont transmises par le GESTIONNAIRE DE PROGRAMME au RESEAU.

7.4: Rapport destiné à l'évaluation externe du PROJET:

Si le SERVICE le juge utile, il peut demander au RESEAU, conformément à l'article 2.5 de l'annexe II, un rapport d'activités destiné à une évaluation externe du PROJET.

Les directives exactes portant sur le contenu et la forme du rapport, ainsi que la date pour laquelle le cas échéant ce rapport doit être remis, sont transmises par le GESTIONNAIRE DE PROGRAMME au RESEAU.

7.5: Rapport de valorisation: Le RESEAU s'engage, par l'entremise de son COORDINATEUR, à fournir au GESTIONNAIRE DE PROGRAMME, à chaque fois que la demande lui en sera faite, un rapport en vue de soutenir scientifiquement des actions de valorisation et support ayant trait au PROGRAMME. Les modalités concernant la remise de tels documents seront déterminées par le

7.2: Periodieke activiteitenverslagen
De richtlijnen met betrekking tot de inhoud en de vorm van de verslagen wordt door de PROGRAMMABEHEERDER aan het NETWERK doorgegeven.

De activiteitenverslagen worden jaarlijks ingediend.

De verslagen geven een overzicht van de voortgang en de resultaten van het PROJECT, alsmede de vooruitzichten voor het volgende jaar. Deze informatie verwijst uitdrukkelijk naar de taken en het tijdschema van het PROJECT omschreven in artikels 2 en 3 van deze bijlage. Zij geven ook, in voorkomend geval, iedere wijziging van gegevens uit het aanvangsverslag, alsmede de lijst van publicaties en dienstreizen aan, die zich voordeden tijdens het afgelopen jaar.

7.3: Eindverslag: Dit verslag wordt voor de BEEINDIGING DER WERKZAAMHEDEN bezorgd of, in voorkomend geval, binnen de twee maanden die volgen op de datum waarop het contract beëindigd wordt conform de bepalingen van artikel 15 van bijlage II. Dit verslag geeft een volledige beschrijving van het PROJECT, de behaalde resultaten en hun eventuele wetenschappelijke en technologische toepassingen en geeft aan in hoeverre de doelstellingen bereikt werden.
Samen met het eindverslag dient het NETWERK, via de COORDINATOR, een fiche in (maximum 2 bladzijden) waarin de projectresultaten, de eventuele besluiten en de aanbevelingen voor het beleid inzake de verspreiding en de valorisatie ervan worden beschreven. Dit document wordt opgesteld in het Nederlands, het Frans en in het Engels.
De richtlijnen met betrekking tot de inhoud en de vorm van de verslagen worden door de PROGRAMMABEHEERDER aan het NETWERK doorgegeven.

7.4: Verslag bestemd voor de externe evaluatie van het PROJECT:
Indien de DIENST dit nuttig acht dan kan aan het NETWERK, zoals bepaald in artikel 2.5 van bijlage II, een activiteitenverslag worden gevraagd bestemd voor een externe evaluatie van het PROJECT.
De exacte richtlijnen met betrekking tot de inhoud en vorm van dit verslag, evenals de datum waarop dit verslag desgevallend moet worden ingediend, worden door de PROGRAMMABEHEERDER aan het NETWERK doorgegeven.

7.5: Valorisatieverslag: Het NETWERK, door toedoen van zijn COORDINATOR, verbindt er zich toe, de PROGRAMMABEHEERDER telkens als die erom verzoekt een verslag te bezorgen, om zo valorisatie- en dienstverlenende acties met betrekking tot het PROGRAMMA wetenschappelijk te ondersteunen. De manier waarop deze documenten moeten worden

GESTIONNAIRE DE PROGRAMME.

7.6: Sur la base du calendrier des tâches établi à l'article 2 de la présente annexe, les rapports suivants doivent être remis aux dates suivantes:

voorgesteld en ingediend, wordt vastgelegd door de PROGRAMMABEHEERDER.

7.6: Op basis van het tijdschema voor de taken in artikel 2 van deze bijlage, dienen de volgende verslagen op de volgende data te worden ingeleverd:

RAPPORTS / VERSLAGEN	**Date de remise / Datum van afgifte**
Rapport initial / Aanvangsverslag	15/03/2020
Rapports d'activités / Activiteitenverslagen	15/03/2021, 15/03/2022, 15/03/2023
Rapport final / Eindverslag	15/03/2024

Cette annexe comprend 7 articles.

Fait à Bruxelles en 7 exemplaires, le .....

Deze bijlage bevat 7 artikels.

Gedaan te Brussel, in 7 exemplaren op ……

POUR LE RESEAU:

VOOR HET NETWERK:

Code	**Nom / Naam**	**Institution / Instelling**	**Signature / Handtekening**
C	Stoffelen Piet	APM	
P2	Amara Michaël	AGR / ARA	
P3	Merckx Roeland	KU Leuven	
P4	Segers Yves	KU Leuven	
P5	Stevigny Caroline	ULB	
P6	Tréfon Théodore	MRAC / KMMA	
P7	Verbist Bruno	KU Leuven	

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