MINISTRY OF SCIENTIFIC RESEARCH AND TECHNOLOGICAL INNOVATION

SCIENCES & TECHNOLOGICAL INNOVATIONS BULLETIN

NATIONAL SCIENTIFIC COUNCIL

To the discovering oil palms

Gibert KABANDA visits Thérèse KIRONGOZI's Women's Technology Fablab

Tramadol, a silent killer

Food in Kinshasa: between tradition and modernity

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Editorial

Technological acculturation, a dubious mutation that undermines societal values in the DRC

Professor Pius Mpiana Tshimankinda
The President of NSC,

"We need to develop a hybrid culture that draws inspiration from the world's best practices while preserving the Congolese identity."

Congolese society is at a turning point. From one decade to the next, the country is undergoing profound change, affecting every aspect of life. Technological evolution is inevitable, but it must be carried out in a reasoned way to avoid destructive acculturation. Technological acculturation is a danger to Congolese identity and has a negative impact on society.

Defined as the change in a population's culture brought about by contact with other cultures, acculturation is not synonymous with illiteracy. However, it can have harmful consequences for a society's values and traditions. This is the case in the DRC, where the hasty adoption of technology, particularly in the cell phone sector, has led to a deterioration in behavior and habits. Excessive use of cell phones in the DRC is having a detrimental effect on young people. The culture of excellence and well-being, once deeply rooted in Congolese society, has given way to mediocrity. The unbridled adoption of technology, particularly mobile telephony, has led to a harmful dependency among the younger generation. With libraries and learning centers deserted, constructive exchanges replaced by virtual trivia, education is seriously compromised. Young people are exposed to false information and harmful content, affecting their education and development.

Other countries, such as China, have succeeded in regulating the use of technology to avoid these abuses, and are models to follow. In the DRC, measures are urgently needed to limit the negative impact of technological acculturation. Young people need to be encouraged to engage in more enriching activities, and to preserve the cultural values that make the country so rich.

It's not a question of rejecting technologies out of hand, but of using them responsibly and constructively. We need to develop a hybrid culture that draws inspiration from the world's best practices, while preserving the Congolese identity. Only then will the DRC be able to meet the challenges of the 21st century and offer its citizens a better future. The growing acculturation of Congolese society is a worrying phenomenon which, if left unchecked, could have serious and irreversible consequences for the country's future. Indeed, the blind adoption of foreign cultures is jeopardizing Congolese values and traditions. Music, the media, clothing and many other fields are affected by this tendency to copy indiscriminately. This loss of cultural identity is having a negative impact on Congolese youth. Juvenile delinquency is on the rise, as illustrated by the "Kuluna" phenomenon. These young people, disoriented and without bearings, are turning to violence and crime.

It is therefore urgent to take steps to curb this rampant acculturation. We need to promote Congolese culture in all its richness and diversity. We also need to encourage the education of young people, so that they can take pride in their identity and commit themselves to building a strong, prosperous Congolese society. As the proverb says, "an informed man is worth two". So it's time for the Congolese people to become aware of the danger of acculturation and mobilize to preserve their cultural identity. By adopting a hybrid culture that enriches rather than destroys, Congolese society can forge a promising future for itself. Together, we can build a strong and prosperous Congolese society, proud of its identity and open to the world.

SRTI Minister Gilbert KABANDA with the Xoomen's Technology Fablab" team led by Congolese engineer Ms Thérèse KIRONGOZI.

Activity of the Minister of SRIT

Gilbert KABANDA visits women's Technology Fablab " by Thérèse KIRONGOZI

The Minister of Scientific Research and Technological Innovation, Gibert KABANDA, visited the JOKOL Modern Industry "women's Technology Fabl.ab" of Congolese engineer Ms. Thérèse KIRONGOZI, on April 25, 2024, during an open day organized in Ndjili township.

The Minister of Scientific Research and Technological Innovation has an unshakeable conviction: the Congo has the potential to become a veritable paradise on earth. This vision is not blind optimism, but rather a deep understanding of the country's assets and a determination to exploit them to the full. The Congo abounds in natural resources, from vast tropical forests to fertile soils and abundant mineral resources. Properly managed, these resources can form the basis of a prosperous, sustainable economy. But beyond material wealth, the Congo also possesses invaluable human capital. Its young, dynamic population is eager for progress and development. The Minister is counting on these young people to lead the country towards its destiny. The conviction of this statesman is not based on personal feelings alone. It is based on concrete data and scientific analysis. Studies have demonstrated the Congo's immense potential for economic and social development.

The Minister is aware of the challenges ahead, but is convinced that the will and determination of the Congolese people will enable them to overcome them. His message is clear: the Congo has all the cards in its hand to become a prosperous and radiant country. It's up to the Congolese people to seize this opportunity and build a better future for generations to come.

Far from paying lip service, the Minister of Scientific Research and Innovation backs up his conviction of the Congo's paradisiacal potential with concrete arguments. As Dr Gilbert KABANDA KURHENGA points out, the country abounds in priceless riches. Its abundant natural resources, particularly raw materials, are an undeniable asset for its economic development. But the Congo doesn't stop there. It also boasts precious human capital: young people full of inventiveness and creativity. The success of the first Conclave of Congolese Scientific Genius organized last year, is tangible proof of this. This pool of talent, combined with the country's natural wealth, provides fertile ground for the emergence of a veritable paradise on earth. The Minister of Scientific Research and Innovation is adamant: the Congo has everything it takes to make this dream a reality.

Visite du Ministre de la RSIT Gilbert KABANDA aux Installations de women's Technology Fabl.ab"

With his hand on his heart, Minister KABANDA advocates a radical paradigm shift, taking the example of the world's great powers, which have for ages understood how to place scientific research at the center of all their actions as the central driving force, the bedrock or foundation of multisectoral development in their respective countries.

There's no doubt about it. When all is said and done, Minister KABANDA, who has hammered out all these strong and well-considered words, is not making the Congolese dream through incantations or mere gesticulations.

The Minister KABANDA pres-

ents to the Congolese people as one of the most prominent specimens in Congo today the modern industry JOKOL called "women's Technology Fabl.ab" yesterday a work of the mind or project and today a concrete action 100% Congolese of the Congolese engineer Mrs. Thérèse KIRONGOZI IZAY commonly called Mrs. robot of rolling which regulates the road traffic and ensures the road safety in Kinshasa already very appreciated and awarded in the world.

This is just the tip of the iceberg, in addition to the many other tangible actions associated with this full-scale industrial complex. That's not too strong a word, given the national importance of the project in the near future, which is already creating wealth and numerous direct and indirect jobs for the Congolese workforce.

The number one went to discover this industrial establishment and its bluffing made-in-Congo technological innovation products. It was the occasion of an open day that drew crowds of onlookers to the popular township of Ndjili.

Very moved, the Patron of Research did not hide his full satisfaction at this useful work derived from scientific research by the Congolese and for the Congolese.

Communication Unit of the Minister of SRTI

NSC Activity

Photo of NSC President, Prof. MPIANA TSHIMANKINDA Pius with some researchers from Research Centers and Institutes

Strengthening the capacities of researchers: a success for the CSN

The National Scientific Council (NSC) successfully organized a training session dedicated to researchers from Research Centers and Institutes, from April 24 to 26, 2024 at the RCMG in Kinshasa. This major event brought together five renowned speakers, including Professor Pius MPIANA TSHIMANKINDA, President of the NSC, Professor WUFELA YAK'OKOLINGO André, Professor Benjamin ZOAWE, Maître Freddy IPUKA, Georges MABIALA and Reagen NGOTO..

Professor André WUFELA got the ball rolling. He set the tone for the course by addressing the crucial theme of "Researchers and research professions". He highlighted the essential role of collaboration between researchers, stressing that a true researcher is a tireless worker, devoted to his or her discipline and spending most of his or her time in the laboratory, in the field or in the library, confronting theory with reality.

Professor WUFELA also stressed the importance of scientific publications as a means of disseminating research results and enhancing the value of researchers' work. According to him, these publications give greater visibility to the Research Center and to the researcher himself, conferring scientific recognition and even bringing him material gains.

The PS/NSC's Director of Research, IPUKA BADJE, focused his speech on the "functioning of a Research Institution: role, place and mission of researchers". He defined a research institution as an establishment, laboratory or organization specializing in scientific research, emphasizing its status as a public institution with legal personality.

This training session organized by the NSC was a resounding success in the service of Congolese research, enabling researchers to strengthen their skills and better understand the challenges of their profession.

The involvement of high-level speakers and the quality of the modules on offer helped to make this event an enriching experience for all participants. In organizing this training course, the NSC reaffirmed its crucial role in the development of scientific research in the Democratic Republic of Congo.

By supporting researchers and promoting the dissemination of knowledge, it contributes to the emergence of quality Congolese research, capable of meeting the challenges of the present and preparing a promising future for the country. The speaker emphasized that a research institution is a public structure with legal personality. Referring to the researcher, he reminded the audience that he or she is a creator of knowledge, whose main missions are to.

- scientific production
- promoting research results
- disseminating scientific information
- training through scientific research

The speaker listed eleven main qualities that a researcher must possess: creativity, honesty, rigor, patience, openness, etc...

The first day was closed by Mr George MABIALA, he Pelagianism detector, the responsible management of research data ».

The second day was devoted to the following topics: introduction to Mendel software, scientific reputation, visibility and marketing of researchers against a backdrop of bibliometric indicators.

It was also marked by a presentation by the Chairman of NSC, Professor Pius MPIANA TSHIMANKINDA, on writing scientific articles in the natural sciences.

He pointed out that the writing of a scientific article is governed by a set of rules called "Instructions to Authors" and that this depends on each journal or newspaper. It contains the following elements: title, authors' names (+affiliations+orcid id), abstract, keywords, introduction, materials & methods, results, discussion, conclusion, acknowledgements and bibliographic references.

The second day of training ended with a capacity-building workshop on best practices for successful PowerPoint presentations, led by Professor Benjamin ZOAWE.

On the final day, trainer George MABIALA spoke on the responsible management of research data and writing a research project. The day also included another highly practical session on "From scientist to entrepreneur».

The President of the CSN, Professor Pius MPIANA TSHIMANKINDA, closed the final day with a presentation on research projects and sources of funding.

At the end of the ceremony, a training certificate was awarded to each participant to mark the end of the researchers' seminar.

The National Scientific Council (NSC) is actively involved in strengthening the capacities of Congolese researchers through the organization of dedicated training sessions. In 2024, a first wave of researchers from the anti-venomous Center (AVC), the National Center for Remote Sensing (NCRS) and AIPS had the privilege of benefiting from these training modules. These training courses, which began on January 10, 2024, enabled researchers from these institutions to acquire new skills and deepen their knowledge in various fields related to scientific research. The NSC, concerned with the development of the Congolese scientific community, has set up a comprehensive training program tailored to the specific needs of researchers.

While researchers from the French Atomic Energy Commission (AEC) have not yet had the opportunity to take part in all the training courses organized by the CSN, it is important to stress that the Council is continuing to expand its program and include new sessions in the coming months. The aim is to reach all Congolese researchers and provide them with the tools they need to excel in their field.

NSC's commitment to the training of researchers is a crucial investment in the future of scientific research in the Democratic Republic of Congo. By equipping researchers with the necessary skills and knowledge, NSC contributes to the emergence of quality research, capable of meeting the country's development challenges.

MAZONO Christian and BELESI Consort/NSC

Interview

NSC President, Prof. MPIANA TSHIMANKINDA Pius: "We need more commitment from women and girls in the direction of mathematical sciences and engineering.»».

The mathematical sciences and engineering for Congolese women and girls, that's the wish of many men of science. MPIANA TSHIMANKINDA Pius, President of the National Scientific Council and Professor of the Faculty of Science at the University of Kinshasa, who is a major player in the implementation of the DRC chapter of ASBL SADC-WISETO, the DRC Organization of SADC Women in Science, Engineering and Technology, shared his understanding and vision of the role of women and girls in the country's scientific emergence.

OL. M.: Could you introduce yourself to our readers ?

Prof P.M. *:I am MPIANA TSHIMANKINDA Pius, University Professor, Doctor of Philosophy at the University of Kinshasa (UNIKIN) since 2003. As a chemist trained in the Department of Chemistry, Faculty of Science and Technology at UNIKIN, I teach a number of courses, in particular Chemistry and Biophysics, in a number of Higher Education and University establishments. I am President of the National Scientific Council and Member of the Congolese Academy of Sciences.*

OL.M.: Professor, as a man of science, what do you think of this opportunity for Congolese women to show what they can do ?

Prof P.M. *: I think it's a golden opportunity to push women in this direction, because you know what generally happens, from an early age, young girls are not oriented towards mathematical sciences, engineering and so on. Many parents prefer to send them to nursing or social sciences, but they have the impression that science and engineering are for men. So we need to change this way of thinking and encourage young*

Photo of NSC President Prof. MPIANA TSHIMANKINDA Pius with some women from ASBL SADC-WISETO

girls, from an early age, to go in this other direction. I'm really happy that there are students here today, because it has to start at elementary school level to change this mentality so that at university, there can be more girls doing mathematics, natural sciences and engineering.

OL. M.: Professor, in a society where women are generally confined to the home, what message do you have for Congolese women and girls about this opportunity with the SADC-WISETO/DRC chapter?

Prof P.M. : *As you know, women make up the numerical majority in our country. And if we want science and technology to develop, we have to encourage women to get involved. So, the message I can send to Congolese girls and women is that they should get involved and commit themselves, because they have all the same capacities as men, and that women's associations should encourage young girls to take up mathematics, natural sciences and engineering.*

OL.M. : We thank you Professor Pius MPIANA.

Prof P.M. : *I'm the one who's delighted, Mr. Journalist.*

Interview conducted by Guy ILUNGA KABAMBA/Olympus Media

Echoes of Research Institutes

ATSRC organizes a scientific morning on the use of LIBS in pollution characterization.

The Applied Sciences and Technologies Research Center (ASTRC) organized a scientific morning on the use of LIBS in pollution characterization, on April 9, 2024 in the IGC conference room.

This scientific event was hosted by Professor Jean Noël MPUTU, General Manager of ASTRC/Professor. According to him, the ceremony focused mainly on a very important spectrometry device that can have an impact on technology. : « LIBS ».

LIBS is a laser-induced plasma atomic absorption spectroscopy or laser-induced optical emission spectrometry technique.

The latter can be used to analyze all the elements of the periodic table, i.e. the chemical composition of a material.

This spectrometric device enables a scientist to obtain a qualitative and quantitative analysis of the elemental chemical composition of a material. The technique relies on the interaction of a pulsed laser with the material to be analyzed.

The speaker demonstrated that this device can be used in all areas of life, in a variety of scientific applications such as analysis, measurement, detection, control, protection and safety.

It's worth pointing out that the speaker focused more on his use in mining areas. His in-depth studies led him to draw this scientific conclusion in order to provide a better analysis, control, protection and safety of the minerals exploited in the DRC and the Congolese population.

The Scientific Director of CRSAT, KABONGO KANINDA, presented a ASTRC project in line with this theme, entitled: "Use of laser-induced plasma spectrometry (LIBS) for rapid characterization of soil pollution at KOLWEZI in the province of LUALABA.

This project involves the acquisition of a LIBS instrument for the Mining Environmental Protection Department (MEPD), to improve its capacity to carry out mine inspections in the field and protect the Congolese population in mining areas.

From the above, this topic was found very interesting by the and other scientific executives who took part in this high-caliber seminar.

The speaker suggested that the scientific community should acquire a great deal of these in order to boost science in all its diversity and bring all its scientific benefits to the country.

The seminar was attended by a number of scientists and company executives from the country's various scientific fields.

ATITUNGU SANGOL Dieudonné/ASTRC

Regeneration of lead and NiCd batteries in the DRC: a pillar of the circular economy

The regeneration of lead (Gel, AGM, VLRA, Dry, Open, Sealed...) and NiCd batteries in the DRC is a strategic tool for promoting a circular economy and supporting the ecological transition. It reduces the environmental impact of extracting and processing the raw materials used to manufacture new batteries, strengthens territorial resilience by making local use of existing resources, and paves the way for the development of the lithium-ion battery industry in the DRC, by anticipating the life-cycle management of these batteries.

This approach is part of a global vision of sustainable development for the battery sector in the DRC, ahead of the boom in electric vehicles and the future regeneration of lithium-ion batteries manufactured in Africa.

The development of electric vehicles powered by regenerative batteries is a way of delaying environmental collapse (by delaying waste) and a solution for ecological and territorial resilience (i.e., a solution adapted to the available resources that make up the 80% of end-of-life batteries that are regenerable).

Ahead of its actual start-up in 2024, ESWD Sarl is pursuing its research and development program in the field of electric vehicles, with a particular focus on territorial resilience.

A project to convert the three-wheeled vehicles available in Kinshasa into electric vehicles using regenerative lead batteries is currently under development.

These electric vehicles will be equipped with an on-board autonomous recharging system, which is currently under study (design of an energy generator using components and materials available on our territory).

Pending the manufacture of Lithium-Ion batteries in the DRC, the company will be able to make available electric vehicles with improved range and even total autonomy, thanks to an on-board recharging system and regeneration systems that will help reduce the production of industrial waste on our territory by doubling or even tripling the lifespan of the batteries used.

Battery regeneration consists of injecting variable and modulable sequential frequencies into the battery for a period of time that depends on the battery's capacity and level of sulphation.

A battery recharging and regeneration center will optimize the network of electric vehicles in the area (City of Kinshasa or Provinces of the DRC) by replacing batteries that become non-regenerable (and are then sent for recycling) with regenerable batteries.

During the preparatory phase of setting up a lithium-ion battery manufacturing industry in the DRC and Africa, African players and their partners can also invest in the regeneration of lead-acid and NiCd batteries as part of a circular economy, for reasons such as the following :

1. Many renewable energy systems still use NiCd, AGM, liquid lead-acid or sealed and gel batteries (which can be regenerated) ;
2. Many energy storage applications still use these types of batteries, which can be regenerated several times before recycling ;
3. The regeneration of these batteries also contributes to the achievement of the SDGs (Sustainable Development Goals) through the creation of new local jobs and the resilience of territories where these batteries constitute a raw material for the production of clean energies with a reduction in the kgs of CO_2 equivalent produced by the manufacture of new batteries or the recycling of degraded batteries (i.e. decarbonization);
4. Regeneration delays the industrial waste stage and doubles or even triples battery life through preventive or curative treatment;
5. Recycling lead-acid batteries is a highly complex process, due to the very different materials involved (metallic lead, lead paste, sulfuric acid, polypropylene) and the hazardous nature of certain components. After the various recycling phases, the refined lead is used again to supply battery manufacturing plants, while the polypropylene is sold to plastic recyclers;
6. The regeneration process is part of the proper management of the risks posed by used lead batteries, which constitute hazardous waste for both health and the environment. Training in lead-related risks and the systematic use of collective and individual protective equipment are among the legal obligations in this business, which delays the pollution associated with recycling and the new manufacture of batteries.

Even during the implementation phase of the new lithium-ion battery manufacturing industries, preventive and curative regeneration of lead-acid batteries will be required in the areas where mining, ore-to-metal processing, lithium-ion battery manufacturing and electric vehicle production take place.

Indeed, all these industries will initially use locally available lead-acid batteries for various handling and transport jobs,

among others. For an electric tractor used in a mining operation, a traction battery sold at €3,000 (U$3,300) can be regenerated locally at €1,500 (U$1,650).

Battery regeneration offers the following advantages:

1. Savings of 50 to 60% compared with buying a new battery ;
2. A reduction in the production of hazardous industrial waste in regions lacking a suitable environmental structure (lead and acid waste.) ;
3. The creation of new jobs as part of a circular economy that respects the environment (we reduce the cost of purchasing and importing, restore and reuse the battery, and sell it at 50 or 60% less than a new one);
4. Reducing local carbon footprints and greenhouse gas emissions :

regenerating a lead-acid battery is 50 times less carbon-intensive than manufacturing a battery in kg of CO2 equivalent (according to Be Energy's 2020 carbon assessment).

The advantages of battery regeneration present an opportunity to materialize the Vision of the President of the DRC, Félix Antoine TSHISEKEDI TSHILOMBO within the framework of the DRC's Master Plan for Industrialization (Creation of jobs and wealth, promotion of a circular economy at the service of ecological transition).

We close with some good news about the sustainability of the Lithium-Ion battery industry to be set up in the DRC:

Our key partner, Be Energy from France, has been awarded a 2021 ADEME (Agence pour le Développement et la Maitrise de l'Énergie) prize for its Regen Pulse project, which aims to develop a regeneration process for NiMH and Lithium-Ion batteries.

We are also continuing our R&D work to develop regeneration processes and equipment « Made in Congo ».

Here's the answer to questions about the end-of-life of our future Lithium-Ion batteries 'made in Africa'.

Regeneration adapted to this type of battery will restore around 90% of the battery's initial capacity.

Here are a few innovations mentioned by Be Energy in relation to the use and end-of-life of these batteries (Lithium-Ion and NiMH) :

- Some of the materials used in these batteries (Lithium, Cobalt, etc.) are considered critical.,
- Recycling of these batteries (NiMH and Lithium-Ion) is less developed than for lead-acid batteries.

And as in the case of lead-acid batteries, the regeneration of lithium-ion batteries in the DRC will have a major environmental and socio-economic impact:

- The creation of a circular economy
- Hazardous waste reduction
- CO2 reduction linked to the manufacture of new batteries (and the recycling of end-of-life batteries)
- Increasing local resilience to battery imports.

Reflection of our Researchers

Tramadol, a silent killer

Tamadol is an opioid analgesic used to treat moderate to severe pain. Its mechanism of action involves modulation of opioid receptors and regulation of neurotransmitters such as serotonin and noradrenaline. When combined with alcohol, tramadol can potentiate the depressant effects on the central nervous system, which can affect sexual function and lead to impotence.

To combat tramadol misuse, a multidisciplinary approach is essential. This may include educating patients about the risks of tramadol abuse and the importance of adhering to prescribed doses, as well as close monitoring of prescriptions by healthcare professionals. Detoxification and rehabilitation programs may also be necessary for those addicted to tramadol.

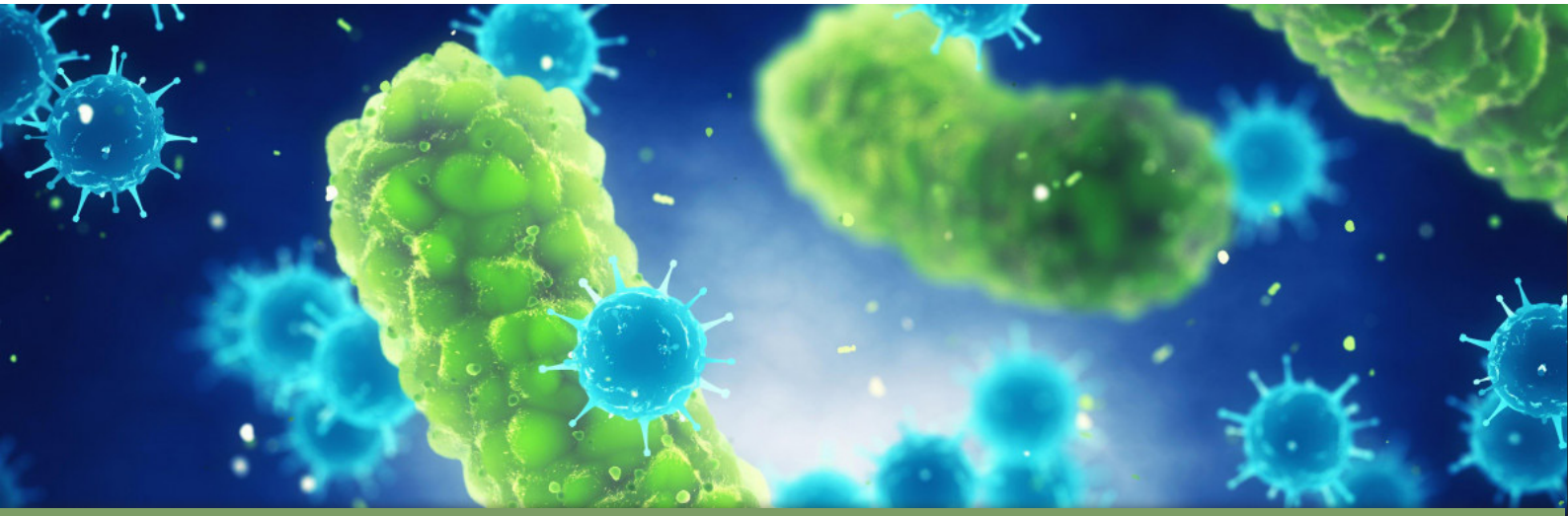
There are several alternatives to tramadol for the treatment

of pain, including other opioid analgesics such as morphine or oxycodone, as well as non-opioid analgesics such as paracetamol or non-steroidal anti-inflammatory drugs (NSAIDs). However, the choice of medication will depend on the nature and severity of the pain, as well as the patient's medical history.

Prescribing tramadol should be reserved for qualified healthcare professionals, such as physicians, who are trained to correctly assess patients' analgesic needs and to monitor potential adverse effects, including the risk of abuse.

Excessive use of tramadol is often seen in remote areas with no road infrastructure, where people have to carry heavy loads over long distances by bicycle. This can lead to chronic pain requiring relief from analgesics such as tramadol. To reduce this dependence, it is essential to improve accessibility by investing in transport infrastructure, to raise local awareness of the dangers of tramadol abuse and of the alternatives available, to promote healthy lifestyles and to train local healthcare professionals in the rational prescription of analgesics. Strengthening local health services to provide quality care and appropriate alternatives to tramadol would also help to improve the quality of life in these remote areas.

Professor NGBOLUA KOTO-TE-NYIWA
PhD Scientific Advisor (NSC/MSRTI)



Bacterial resistance to antibiotics and control strategies

Bacterial resistance to antibiotics represents a major challenge to global public health, reducing the effectiveness of treatment and increasing the morbidity and mortality associated with infections. This resistance is mainly due to the excessive and inappropriate use of antibiotics in human and animal medicine, and in agriculture.

To take up this challenge, research must focus on several aspects. Understanding bacterial resistance mechanisms is crucial to developing new therapeutic strategies, including the identification of new molecular targets and the development of drugs specifically targeting these resistance mechanisms.Bacterial resistance to antibiotics is the result of various molecular mechanisms, such as modification of antibiotic targets, production of antibiotic-inactivating enzymes, modification of cell membranes limiting antibiotic entry, active pumping of antibiotics out of the cell, and formation of protective biofilms. These mechanisms can be acquired through genetic mutation or the acquisition of resistance genes, making the treatment of bacterial infections increasingly difficult.

Plant biodiversity offers a rich source of bioactive compounds that could be exploited in the development of new medicines. Many plants produce natural chemicals with antibacterial, antifungal and antiviral properties. For example, some plants produce phytoalexins to defend against fungal and bacterial infections.

Research into plant-based medicines could thus offer opportunities to develop new antibiotics or antibiotic adjuvants to combat bacterial resistance. However, it is crucial to conduct such research responsibly, taking into account biodiversity conservation and ensuring equitable benefit-sharing with communities holding traditional knowledge on the use of medicinal plants.

To solve the problem of bacterial resistance to antibiotics, the state must implement comprehensive measures, including raising awareness and educating the public and healthcare professionals about rational antibiotic prescribing, strictly regulating the sale and use of antibiotics, promoting research to develop new antibiotics, promotion of sustainable agricultural practices, international collaboration to develop global strategies, investment in medicinal plant research, promotion of vaccination, and engagement with local communities to ensure equitable benefit sharing and promote the sustainable use of medicinal plants.

NGBOLUA KOTO-TE-NYIWA, Ordinary Professor and Scientific Advisor, NSC.

Insalubrity in Kinshasa: RDO points the finger at poor waste management

Numerous cases of flooding have been reported in several communes of the provincial city of Kinshasa, mainly on new arterial roads that have been tarred and modernized (with gutters). Every time it rains, these unfortunate and overflow-

ing floods claim human lives and cause enormous material damage in the Congolese capital.

This situation has not left the experts at the Roads and drainage office(RDO) indifferent, as they criticize the inappropriate behavior of many citizens when it comes to disposing of waste and household refuse. According to RDO officials, uncivilized behavior is the root cause not only of insalubrity in Kinshasa, but also of numerous floods in the city. The problem is a bad culture of waste management. For RDO, it's also a field of innovation for many Congolese to solve this thorny problem which is destroying and soiling the Kinshasa environment.

Kinshasa's sewage system, inherited from the colonial era, is in an advanced state of disrepair. Almost all the underground sewers are blocked, and the few that are still operational are pitifully clogged with garbage and household refuse.

Speaking to our confrères, the General Manager of the Office des voiries et drainage (RDO) said that flooding in the city was due to the population's lack of civic-mindedness, while mentioning many other causes.

The population, he added, uses the gutters, which are supposed to drain water, as their dumping ground for rubbish.

Il a aussi évoqué la question de l'exode rural qui jusque-là ne subit pas des innovations.

«Kinshasa, once a city of 500,000 inhabitants, now boasts over 15,000,000. In order to have a piece of land for everyone, green spaces have become almost non-existent. As a result, the water runoff coefficient has increased» without proper piping planned by dedicated services.

He went on to point out that anarchic construction also contributes to flooding. According to many observers, the DRC needs to innovate, but also to combat environmental incivism. Innovations are what Congolese researchers and entrepreneurs are all about. Insalubrity kills the environment.

Papa YAKOBO and ASUKA/NSC

Food in Kinshasa: between tradition and modernity

Food is everything that has to do with the provision of nourishment to enable a living organism to function. Today, it is considered the third medicine, after traditional medicine and alternative medicines such as naturopathy and homeopathy, which use natural means to prevent or alleviate various health problems.

According to the famous Greek physician Hippocrates of Kos, who made many pleas for healthy eating and went so far as to say: « Let your food be your only medicine ».

A balanced, healthy diet

A qualitatively and quantitatively balanced diet provides a good quantity and variety of foods. It is encouraged for all living beings in order to cover the body's nutritional requirements. These are the average quantity of nutrients required daily to ensure the body's development, tissue renewal, maintenance of a good state of physical and mental health, and physical activity in keeping with its living conditions. Nutrients come naturally from the plant kingdom, including lycophytes, filicophytes, equisetophytes, ginkgopytes, coniferophytes and anglosperms, as well as from the animal kingdom, including vertebrates and invertebrates.

As technology evolves, people tend to rely on the new products offered by the agri-food industry. This industry, known as the IAA, offers consumers a whole range of food products from agriculture or fishing, sometimes derived from genetically modified organisms (GMOs).

At present, in the DRC and precisely in Kinshasa, a large proportion of the population is tending to change its eating habits, particularly as a result of the influence of daily mass media advertising. This alarming finding could be justified

by ignorance of the benefits of a healthy diet, and socio-cultural and environmental pressure.

By trying to copy Western eating habits, good eating habits are abandoned in favor of bad eating habits.

The people of Kinshasa are attracted by fast food products such as chawarma, tacos, ice cream, etc., and they don't care much about eating foods that are too fatty, too salty or even too sweet. Added to this is the consumption of sugary and energy drinks.

However, these foods bring empty calories to the human organism, because they don't nourish our bodies, but rather overload them with sugars. They are also incriminated in the genesis of a number of degenerative pathologies, including atherosclerosis, cancer, autoimmune diseases and fatty diabetes.

Human enzymes (oxidoreductase, transferase, hydrolase, lyase, isomerase and ligase) have also been shown to be unsuitable for some of today's foods, with a serious risk of impairing the normal functioning of the body.

Recommandations

The Congolese population, particularly those living in Kinshasa, are advised to eat a healthy and balanced diet, giving preference to organic or "BIO" foods such as vegetables, fruit, eggs, milk and meat produced without pesticides, herbicides and synthetic or artificial fertilizers.

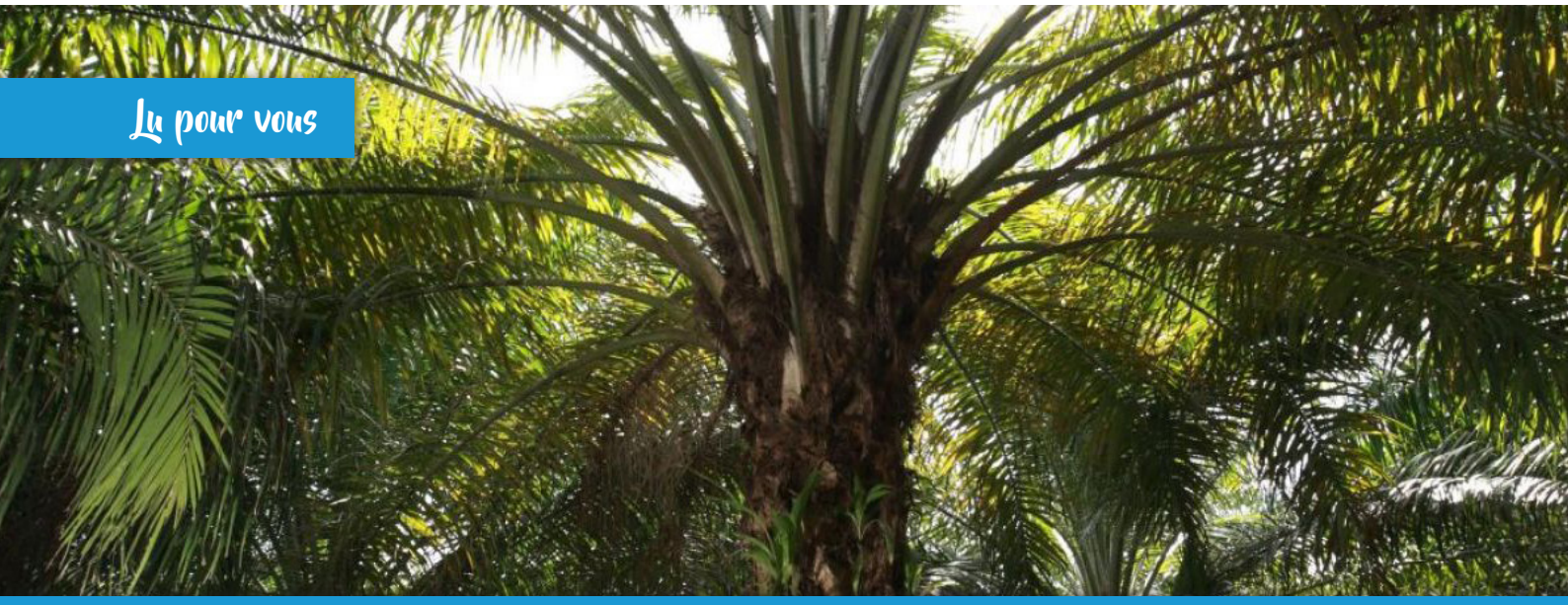
Particular emphasis is placed on the consumption of fruit and vegetables, which play a protective role for the body by providing sufficient vitamins and minerals. These elements promote health, strengthen the immune system and prevent disease.

Foods from the food industry should be eaten in moderation, and should not become a habit, especially for pre-school children, as some of them act on the nervous system, with immediate or future harmful consequences for the organism.

The link between diet and health is well established. A good diet can improve your general health, correct metabolic imbalances and minimize the effects of metabolic disorders.

Prevention is always more effective than cure, so it's crucial to make informed food choices today. You don't have to wait until tomorrow to suffer the harmful consequences of a poor diet. As the saying goes, "prevention is better than cure". So take control of your health by adopting a healthy, balanced diet. And above all, don't hesitate to consult a health professional or nutritionist for personalized advice.

Maguy LUVANDU and Consort BELESI/NSC



Lu pour vous

Discovering oil palms

As the world's leading oil crop, oil palm is a strategic crop for many tropical countries. Its rapid expansion is generating new research questions in many fields, not only agronomic, but also environmental, social, economic and political..

Originally from tropical Africa, the oil palm is widely cultivated in tropical zones, particularly in Asia. From time immemorial, it has provided food, materials and health and hygiene products. As the leading supplier of vegetable fats, it produces two oils simultaneously: palm oil and palm kernel oil. Palm oil, whose main producers are Malaysia and Indonesia, is used for 80% of human consumption and for the manufacture of derivatives for industrial use.

An elegant palm tree native to Africa

The oil palm is an elegant palm tree native to the Gulf of Guinea. It owes its species name, Elaeis guineensis, to the ancient Greek elaia, meaning olive, for its oil-rich fruits. It has always been harvested for food in tropical Africa. It arrived in South America in the 16th century and only in the early 20th century in Asia, first in Sumatra and then in Malaysia, where it took off in the 1960s..

The leaves, or palms, surround and pro-

tect the vegetative bud. New leaves are produced continuously in the center of the crown, while the older ones are pruned or wither. They measure from 6 to 9 meters and have over 300 lamelliform leaflets arranged in several planes. The base of the leaf, or petiole, is lined with sharp spines.

The trunk, or stipe, is constant in diameter and unbranched, with the diamond-shaped sections of the cut leaves arranged in spirals.

Flowers are grouped in inflorescences, some male, others female, and appear in the axils of each palm, except in the case of early abortion.

The fruits, very rich in oil, are fleshy, ovoid drupes gathered in «bunches» that can weigh from 1 to 60 kilos. In adulthood, a mature diet weighs an average of 15 to 25 kilos and bears around 1,500 fruits.

The fruit has a smooth skin protecting an oily, fibrous pulp, which in turn covers a very hard black shell. This shell, pierced by 3 germinative pores, contains a solid ovoid kernel called the «palm kernel». Together, the shell and the kernel form the palm seed. The kernel is surrounded by 1 to 3 very small embryos which, by feeding on it after germination, give rise to 1 to 3 seedlings.

The different types of oil palm

There are three main types of oil palm, distinguished by the thickness of their fruit shells :

- ***The dura type is characterized by its thick shell;***
- ***The pisifera type is recognizable by its absence of a shell, but this palm is female sterile, and produces fruit only very exceptionally.;***

- ***The tenera type, a hybrid of the previous two, is characterized by its thin shell. Pollination of an inflorescence of a dura palm with pollen from a pisifera palm produces 100% of tenera hybrid seeds, used in all plantations today.***

Types are also differentiated by fruit pigmentation. The nigrescens type, the most common, is black then reddish-brown when ripe. The virescens type, green before maturity, turns orange. The albescens type has a pulp that contains no carotenoids..

Native to Latin America, Elaeis oleifera is a close relative of Elaeis guineensis. Crossed with its African cousin, this palm produces an interspecific hybrid with slow height growth and resistance to certain diseases. Its oil production is currently being improved. Its very red oil is of excellent quality and similar in composition to olive oil.

Palm groves

The best yields are obtained on deep soils. They require 2,000 hours of annual sunshine, over 1,800 mm of well-distributed rainfall throughout the year, average temperatures of 28°C, minimum temperatures over 20°C and humidity over 60%.

Whether family-run or agro-industrial, plantations must obtain selected seeds from approved institutions: to plant one

hectare with 143 palm trees, 200 germinated seeds need to be ordered.

Fertilization represents a significant burden on operating costs, but is essential to optimize production and maintain plant fertility.

Combination with food crops - maize, cassava, plantain, yam, rice, groundnuts, okra, chillies, etc. - is common on family farms during the palm's first 2 or 3 unproductive years, when it is still lightly planted.

Permanent manual harvesting

After 1 year in the nursery and 3 years of vegetative growth, harvesting can begin. Production increases until the age of 8, then stabilizes and declines after 20 years of cultivation.

Harvesting takes place every 10 to 15 days. Because of this frequency, mechanization has never been technically or economically viable. The harvester, equipped with his tool, observes each palm tree in order to detect ripe bunches, cut them and remove them from the plot at the same time as the detached fruit.

The bunches must be harvested when they are fully ripe, when the first fruits fall spontaneously: this is when oil synthesis is complete and the quantity of oil is at its maximum. The bunches are then transported to the oil mill.

As long as the bunches are at harvester height, they are cut with a harvesting chisel or machete. As soon as the bunches appear higher up, a sickle attached to the end of a pole is used. It's not the decline in production that forces us to replant at around 25 years of age, but the great difficulty of harvesting palms over 12 meters tall.

Diseases and pests

Oil palms are subject to numerous pests and diseases, which can have serious consequences for growth and production. Rodents (rats, agoutis, etc.), porcupines and wild boars attack very young palm trees, devouring the terminal bud. Limacodidae

insects cause defoliation, leading to a drop in production.

A large beetle, Oryctes spp., attacks palm trees as soon as they are planted. It excavates a gallery in the terminal bud, and the new leaf emerges with a fishbone-shaped cut. The proliferation of larval breeding grounds, formed by the decomposing stipes of palms felled for replanting, encourages the pest's proliferation. Damage can be considerable in a young plantation if integrated pest management is not applied.

In Africa, oil palms suffer from the fungal disease fusariosis. In South-East Asia, Ganoderma basal rot of the stipe is increasingly prevalent in replanting. In Latin America, heart rot is responsible for major losses: entire plantations have been ravaged in Colombia, Brazil, Surinam and Ecuador.

Oil palm, the leading producer of vegetable fats

The first supplier of vegetable fats ahead of soya, the oil palm produces two oils. Red palm oil is extracted from the pulp of the fruit. Palm kernel oil, ivory in color, comes from almonds, or palm kernels..

Palm oil is extracted at the place of production, within 48 hours of harvesting, after cooking the bunches (sterilization), de-stemming, pressing and decanting. Modern oil mills have a high capacity - 20 to 120 tonnes of fresh bunches per hour - while traditional oil mills process less than a tonne per hour, if not per day. The crude oil obtained is a beautiful red color, due to the presence of carotenoids.

Palm oil

80% of palm oil is used for human consumption: margarine, basic vegetable fats, edible oil, cooking oil and specialized fats. It is also used in the manufacture of industrial derivatives: fatty acids, soaps and cosmetics, industrial soaps, inks, resins and methyl esters. Red palm oil must then be refined, bleached and deodorized, then separated into its various components.

The food industry is a major consumer of

palm oil and its derivatives: industrial pastries, chocolate products, confectionery, ice creams and even dietary meal replacements. These products are often made from blends of vegetable oils (palm, soya, rapeseed, sunflower), some of which can be substituted for others, depending on their relative prices. In many African countries, palm oil is traditionally used as cooking oil.

Resistant to high temperatures, palm oil is mainly used in frying baths. It behaves like corn, sunflower, soybean or rapeseed oils, which are rich in essential fatty acids. Refining has little effect on its antioxidant content (tocopherols and tocotrienols). In its raw state, its high carotenoid content boosts blood levels of vitamin A, hence its preventive effect on certain eye diseases.

The oil produced in Latin America from the interspecific hybrid E. guineensis x E. oleifera, richer in unsaturated fatty acids and carotenoids than standard palm oil, is considered a tropical equivalent of olive oils.

Palm oil can also be used as a fuel in diesel engines, either from pure oil or after transformation into methyl ester, mixed with diesel fuel.

Palm kernel oil

Palm kernel oil is one of the lauric oils, like coconut oil, with 39 to 54% lauric fatty acids.

In palm oil mills, after pressing and extraction of the palm oil, the nut shells are broken, the kernels recovered and dried. They are then transported to large seed crushing units for extraction of palm kernel oil (50% of the dry weight of palm kernels). This oil accounts for 8 to 10% of palm oil production, making a significant contribution to the sector's bottom line.

Palm kernel oil has a wide range of outlets, including cooking oil blended with other vegetable oils, and margarine, soap and

cosmetics, oleochemistry.

Bioenergy, fertilizers and other oil by-products

In the field of bioenergy, the fibers are burned in special boilers that produce pressurized steam to sterilize the bunches and generate the electrical energy needed to run the mill. Palm oil mills are self-sufficient in energy and contribute to the electrification of neighboring villages. Fermentation of oil mill effluent produces methane gas that can be used to run generators or motor pumps.

The stalks, what remains of the bunches after destemming, are rich in organic matter and fertilizing elements. They are returned to the palm groves as they are or after composting as a soil improver, reducing the need for chemical fertilizers in the plantation. Palm kernel cake and oil mill effluent

are used to manufacture cattle feed.

In addition to the fruit, other parts are used: the fermented sap (palm wine and alcohol), the heart (saw palmetto), the stipe (woodwork), the palms (roofing)...

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PUBLIC-SECTOR RESEARCH CENTERS AND INSTITUTES IN THE D.R. CONGO

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Objective: To improve the state of health of the population through research in the following fields: pharmaceutical, medical, anthropological, psychological or socio-cultural.
Address: 9, Av. Lukusa C/Gombe; E-mail: dnyembo@gmail.com; Tel: 0824580211

ATSRC (Applied and Technologic Sciences Research Center)

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RCHS (Research Center in Human Sciences)

Objective: To ensure the human development of the Congolese people through the study of its social, economic and political dimensions with a view to identifying the factors that have a positive or negative influence on its development.
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RCMT (Research Center in Mathematics Teaching)

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Address: 84, Av. des Ambassadeurs C/ Gombe; E-mail: mabelamatendorostin@gmail.com; Tel: 0815031877

GRC (Geophysical Research Center)

Objective: To provide the country with a national geophysical observation network, for the global study of the internal behavior of the earth in the DRC.
Address: 44, Av. de la démocratie, C/ Gombe(within GMRC); E-mail:tondozi@gmail.com; Tel: 0854426228

AIPS (African Institute of Prospective Studies)

Objective: To carry out forward-looking studies in order to propose solutions to crises and problems linked to the evolution of African societies.
Address: Av. Cardinal Malula, C/ Lemba; E-mail: mgrtarcibangu@yahoo.fr; Tel: 0996658741

MDRC (Multidisciplinary Development Research Center/Matadi)

Objective: To carry out operational research in central Congo in the field of applied linguistics of African cultures and applied sciences
Address :Hôtel de la porte Matadi; E-mail: Mwanzanicolas5@gmail.com; Tel:0815037949

NCPLR (National Committee for the Protection of ionizing Radiation)

Objective: - Regulatory authority for protection against the dangers of ionizing radiation in the DRC management of radioactive sources of radioactive materials such as uranium.

Address: 4675, Av. Colonel Ebeya, Immeuble Quitus 2ème niveau; Email: Flory1963@gmail.com; Tel: 0816684665

AEC (French Atomic Energy Commission)

Objective: To carry out, promote and coordinate scientific and technical research in various fields of science and industry, concerning the use of atomic energy and space research.
Address: UNIKIN building; E-mail: Steve.muanza.kamunga@gmail.com; Tel: 0808643248

CGI (Congo Geographic Institute)

Objective: Production of the base map of the DRC at a scale of 1/50,000 and its derivatives.
Address: 106, Blvd du 30 Juin, C/Gombe; E-mail: Fidele.balibuno@unikin.ac.cd; Tel: 0974449240

GMRC (Geologic and Mining Research Center)

Objective: To carry out studies and analyses to improve knowledge of the soil and subsoil of the national territory.
Address: 44, Av. de la démocratie, C/ Gombe; E-mail: rolandkakule@gmail.com; Tel: 0851506161

NIASR (National Institute for Agronomic Study and Research)

Objective: To promote the development of agriculture in the Congo. To maintain varieties, multi-local trials, and its farmers, management and conservation of germplasm.
Set up a program to monitor and evaluate research activities.
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its reason for being, with a view to producing basic and pre-basic seed.
Resume publication of the agricultural magazine to disseminate research results.

Address: 13, Av. des Cliniques, BP :2037 KINSHASA , C/Gombe; E-mail: domikankonde@yahoo.fr; Tel: 0818248620

RCALC (Research Center into African Language and Culture)

Objective: To coordinate and carry out all research projects concerning African languages and cultures.
Address: 53 C, Av. Makiso, blvd du 30 juin, Kisangani/-Tshopo. Tel: 0851934320

AFRC (Agro-Food Research Centre/Lubumbashi)

Objective: To identify processes for processing and preserving basic local agricultural products.
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Address: 1, Av. Président ILEO, Q/CRAA, C/Lubumbashi; E-mail: Julesnkulu@gmail.com; Tel: 0997131002

SSRC (Social Science Research Center / Bandunduville)

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To promote sustainable aquatic development.
Address: 29, Av. de la mission, Q/Salongo, C/Basoko. BANDUNDUVILLE, BP. 223; E-mail:akuzituka@gmail.com; Tel: 0815898971

FERC (Forest Ecology Research Center /Mabali)

Objective: Scientific research on plants, aquatic species and animal species.
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Objective: Research into diseases linked to malnutrition, such as related diseases by isolating certain molecules, such as SYZYSIUM GUINESIE to combat amoebic yeasts and diarrhea in South Ubangi.

Address: Mobutu n° 220/A. GEMENA/ SOUTH UBANGI PROVINCE; E-mail: cherusangi@yahoo.fr; 0992416091

NSRC (Natural Sciences Research Center /Lwiro)

Objective: To carry out, promote and coordinate research in the fields of science, technology and industry throughout the DRC.

Address: LWIRO LWIRO , TERRITORY OF KABARE/SUD KIVU; E-mail: robert.kasisi@umontreal.com; Tel: 0996806699.

MDRC (Multidisciplinary Development Research Center /Bunia)

Objective: To carry out operational research in the north-east of the DRC in the fields of applied linguistics, African cultures and applied sciences.
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Address:BUNIA/ITURI; E-mail: Kermwathomas@gmail.com; Tel: 0997717070

HRC (Hydrobiology Research Center in Uvira)

Objective: To program, coordinate and monitor research activities in hydrobiology, limnology and hydrology.
hydrobiology, limnology and fisheries in all ecosystems.

Address: 115, AV. du Congo, Q/Kimanga, C/Kalundu, UVIRA / SUD KIVU; E-mail: bidakamuhoza@gmail.com; Tel: 0997716307.

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Address: 106, Blvd du 30 Juin, C/Gombe; E-mail: Odette.kabena@gmail.com; Tel: 0816904370.

GVO (Goma Volcanological Observatory)

Objective: Prevention of volcanic risks by monitoring volcanoes and Lake Kivu.
Kivu; Management of natural risks; scientific research.

Address:142, Avenue Du Rond Point ; Quartier Les Volcans ; Commune de Goma ; Ville Goma; North-Kivu; E-mail: mavotulu@gmail.com; Tel: 0998584734

WERC (Water and Environment Research Center)

Objective: To serve as a training and research center focusing on water and environmental management.
To propose solutions to problems that could arise around water. Create a national network of Congolese scientists and researchers to analyze and disseminate information on the impact of climate change in the DRC. Promote education and the right to the environment.

Address: 44, Comité Urbain C/ GOMBE; E-mail: ngelipatience@gmail.com; Tel: 0818105625.

RCSARP (Research Center for the Selection and Adaptation of Ruminants and Pigs)

Objective: To carry out studies and research in the field of ruminant and pig breeding

Address: 45, Av. Lumumba, Q/de la gare, LUPUTA/ KASAI-ORIENTAL; E-mail: tshamalagabriel@gmail.com; Tel: 0851817370

NCRS (National Center for Remote Sensing)

Objective: Research in remote sensing.
Address: PLACE ROYAL IMMEUBLE PLACE ROYAL IMMEUBLE KASAI; E-mail: davidngindub@gmail.com; Tel: 0815103502.

NCROS (National Center for Research in Oral Science)

Objective: To carry out studies and research in the field of oral health.
Address: 13, 10ème Rue, Industriel Quarter, C/Limete; E-mail: Cnrsbd.rdc.@gmail.com; Tel: 0822244152; 0811835159; 0840922982

CAS(Congolese Academy of Sciences)

Objective: Promotion and dissemination of science, technology,arts and letters. Support for inventive initiatives.
Address: Sciences Faculty/ UNIKIN local 28; E-mail: jjmuyembet@gmail.com; Tel: 0813330242

MIPRC (Matadi Interdisciplinary Pedagogical Research Center)

Objective:--Information science.
Address: The buildings of the Matadi Higher Pedagogical Institute; Tel: 0896501462

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