RESEARCH COMMERCIALIZATION AND TECHNOLOGY TRANSFER FRAMEWORK

The Scinnovent Center;

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RESEARCH COMMERCIALIZATION AND TECHNOLOGY TRANSFER FRAMEWORK

THE SCINNOVENT CENTRE

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OUTLINE

ACRONYMS

ABS	Access and Benefit-Sharing
ARIPO	African Regional Intellectual Property Organization (Anglophone)
BIH	Botswana Innovation Hub
CBD	Convention on Biological Diversity
CAN	Competent National Authority
EARO	Ethiopia Agricultural Research Organization
EC	European Commission
EEZ	exclusive economic zone
EPO	European Patent Office
EU	European Union
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
GIGRG	Inter-institutional Group on the Management of GR
GR	Genetic resources
HPFI	Health and Performance Food International BV – a Dutch Company
ICT	Information Communication Technology
IP	Intellectual Property
IPRs	Intellectual Property Rights
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
JV	Joint Venture
MAT	Material Transfer Agreement
MINEPDED	Ministry of Environment, Nature protection and Sustainable Development
MTA	Mutually Agreed Terms
MoU	Memorandum of Understanding
NARO	National Agricultural Research Organisation (Uganda)
NaSARRI	National Semi Arid Resources Research Institute
NBL	Nile Breweries Limited

OAPI	Organisation Africaine de la Propriété Intellectuelle (Francophone)
PCT	Patent Cooperation Treaty
PIC	Prior Informed Consent
R&D	Research & Development
RTA	Regional Trade Agreement
S&CI	*Soil and Crop Improvements Company*
SME	Small and Medium Enterprise
SMTA	Standard Material Transfer Agreement
TK	Traditional Knowledge
TRIPS	Agreement on Trade Related Aspects of Intellectual Property
UN	United Nations
UNCS	Uganda National Council for Science
UPIVC	University patent innovation value chain
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

DEFINITIONS

Access and benefit-sharing – fair and equitable sharing of benefits arising from use of genetic resources

Bioprospecting – is the search for biological resources with actual or potential value for development into potential commercial applications

Biotechnology - means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use

Contracting party – a party to a treaty that has agreed to be bound by the treaty

Genetic resource – genetic material or plants or animals with actual or potential value (monetary or non-monetary)

Licence – an instrument of complete or partial transfer of ownership of intellectual property from one party to another

Material Transfer Agreement (MTA) – an instrument used to seal a relationship between the source (owners) of genetic material and the user of genetic material. It is a form of contract that details what materials are in question, how they are to be passed on to the user, the benefits that should accrue to the owners, if money is involved – the mode of payment, if non-monetary benefits are involved – the form that such benefits should take, and so on.

Mutually agreed terms (MAT) – terms of an agreement that have been understood and agreed upon by all parties in the negotiations.

IP *intellectual property*. Refers to intangible property that results from creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce. IP is protected in law by patents, utility models, copyright, trademarks, industrial designs, trade secrets, geographical indications amongst others. This protection is for a specified period of time to allow the inventors/creators earn recognition or financial benefit from what they invent or create

Prior and informed Consent – or free prior and informed consent – it's a process –

- *Prior* – being given the opportunity to collaborate with and provide consent or objections to a project or development before it takes place with enough time to consider the information available and likely consequences
- *Informed*- being given all information needed to make a decision about whether or not to provide or withhold consent to a project or development. Information must be current, in a language that can be understood, independent, and objective. Access to technical assistance must be available
- *Consent* – giving permission to a particular project or agreement. A community can provide or withhold consent.
- *Researcher* – a person interested in exploring the potential applications of a genetic resource. He ought to seek prior informed consent of the community to carry out commercial or non-commercial research about the properties and potential applications of a given genetic resource.

Technology is science or knowledge put into practical use to solve problems or invent useful tools. This knowledge includes methods, systems, and devices which are the result of scientific knowledge being used for practical purposes. It also describes machinery and equipment developed from the application of scientific knowledge

Traditional knowledge shall refer to any knowledge originating from a local or traditional community that is the result of intellectual activity and insight in a traditional context,

including know-how, skills, innovations, practices and learning, where the knowledge is embodied in the traditional lifestyle of a community, or contained in the codified knowledge systems passed on from one generation to another. The term shall not be limited to a specific technical field, and may include agricultural, environmental or medical knowledge, and knowledge associated with genetic resources.

"University patent innovation value chain" means the whole process from scientific and technological innovation knowledge to patent value realization, including three stages: knowledge innovation, applied research and patent commercialization, and a dynamic feedback channel.

INTERPRETATION OF TERMS

"Access" means the opportunity to use genetic resources, data from research findings or new technology

"Assignment" means the transfer of ownership of Intellectual Property Rights between the seller (Assignor) and the buyer (Assignee). Where IP is jointly owned, all partners constitute the 'assignor'

"Background Intellectual property" means all IP rights licensed to or owned by project partners at the beginning of the project and may include computer algorithms, software codes, drawings, notebooks, data and photographs. Use of such background IP in a joint project must be clearly agreed upon and also the ownership of new discoveries, improvements, and IP where background IP was used.

"Benefit-sharing" means the sharing in a fair and equitable manner the research data from a project or the proceeds of commercialization of IP or technology resulting from a research project such as fees for assignment, licensing , joint venture or franchising..

"exclusive licence" means a licence contract that confers on the licensee and, where it is established expressly in it, on the persons authorised by the licensee, the right to exploit the licensed industrial property right to the exclusion of all other persons, including the rights owner;

"Foreground IP". means Intellectual Property that is, or has been created, exemplified or developed (whether in whole or in part) from the Research. In a collaborative environment, this would be the IP that results from the collaborative project.

"industrial property rights" mean rights under patents, certificates of utility models and technovation and registration of industrial designs issued under a relevant law;

"invention" means a new and useful art whether producing a physical effect or not, process, machine, manufacture or composition of matter which is not obvious, or a new and useful improvement of it which is not obvious, capable of being used or applied in trade or industry; and includes an alleged invention;

"inventor" means the person who actually devises the invention as and includes the legal representative of the inventor;

"licence contract" means a contract or an agreement by which a person grants permission to use his or her industrial property rights, know-how, or other technical information or technical services;

"licensee" means a person licensed under a contract which is registered or taken to be registered under a relevant law;

"licensor" means a party to a licence contract who grants the permission under a contract registered or taken to be registered under a relevant law;

"Memorandum of Understanding " means an agreement between two or more parties that sets out certain rights and obligations. It may not involve direct consideration.

"Ownership" means the rights holder of genetic materials, research data, IP, technology or licence as this may be contained in an agreement or such other document with legal force. Joint ownership is allowed for joint projects.

"Party/parties" means the persons agreeing to collaborate or in any way involved in an agreement of whatever nature such as PIC, MAT, MTA, Assignment and License.

"Person" means a natural person or an organisation or institution where registered or not.

"R & D" means research and development. This could be either primary research or applied research or further research aimed at improving a given IP to make it more marketable.

"Technovation" means developing new ideas, products, services, and processes which exploit technology. At its best, technovation is said to create valuable products and services no one

has yet asked for or creates "disruptive" change (major leaps in the way things are done). Most of these technovations are in the ICT sector. Many people are developing Apps for different things such as monitoring contacts of COVID-19 positive persons, baking using given recipes, identifying theft in supermarkets and others.

"Utility model" means any form, configuration or disposition of element of some appliance, utensil, tool, electrical and electronic circuitry, instrument, handicraft mechanism or other object or any part of the same allowing a better or different functioning, use, or manufacture of the subject matter or that gives some utility, advantage, environmental benefit, saving or technical effect not available in a named country before and includes micro-organisms or other self-replicable material, products of genetic resources, herbal as well as nutritional formulations which give new effects.

TYPES OF INTELLECTUAL PROPERTY RIGHTS

The major types of IP include-Patents, Copyrights, Trademarks, Service marks, Trade secrets, Industrial designs, Geographical indications and plant varieties.

Patents

A patent is a certificate of ownership of an innovation, usually in the fields of science and technology. Patents are used in a wide variety of businesses such as pharmaceutical, biotechnology, engineering and telecommunications. It is similar to a title certificate to land. Inventions in science like an efficient fuel type, materials for faster transmission/conduction of heat, new medicine, a new addition to a machine etc are patentable subject to fulfilling the conditions for patentability. A patent holder can use, exclude others from using his invention without permission (usually in the form of a licence or assignment), assign the patent ('sell'), or just keep it. This is again comparable to the owner of a piece of land. Such an owner can sell it, plough it, lease it out or let it lie fallow! However, with respect to a patent, withholding or not working a patent still serves a preventive purpose, i.e. no one else can register a similar patent.

A patent can be worked (industrially produced on a large scale and commercialized) to avail useful products to society that were previously not available. For example, a patent granted for a vaccine for COVID-19 can be worked to produce enough doses of the vaccine. This process of commercialization guarantees some benefits to the patent holder or the inventor. This can happen through the sale of a new vaccine or product from the patent. A patent is usually given for a period of 20 years. In practice, the society accords an inventor a monopoly for a period of 20 years.

The award of a patent goes with the inventor making the 'secrets' or the invention known to the public. However, others are not allowed to work the patent except under certain conditions. After this period, it becomes a 'free for all'. For example, the patents for amoxicillin and aspirin expired a long time ago. So anyone who wishes to produce those drugs can do so without let or hindrance.

A patent is used to protect an invention that is new, involves an inventive step and is capable of commercialization. Some things are not patentable, for example, a scientific or mathematical discovery, theory or method; a method of medical treatment or diagnosis or anything against public policy or morality.
Patent creation activities can be divided into three stages, i.e. knowledge innovation stage, applied research stage and patent commercialization stage.

Knowledge Innovation Stage

Basic research based on personal research interests and organizational goals dominates the academic work at universities. This research has a focus on theoretical knowledge rather than commercial interests. Individual researchers generate an idea propelled by the spark of thought. This research is usually funded by government. The major output at this stage is largely knowledge innovation as expressed through academic papers, published works, and or manuscripts. Being open and universal, research in universities could bring large rewards to society. This research not

only reinforces the theoretical basis of scientific research activities but also, reflects attempts at solving current and future actual problems.

This research output cannot be transformed directly into practical use. Nevertheless, data generated at this stage can form valuable 'confidential' information or constitute 'trade secrets'. However, the 'rush' to publish at this stage can hinder the output from the second stage.

Applied research stage

At this stage, applied research is conducted that leads to secondary innovation. Application research is seen as research that acquires knowledge to meet specific or public needs, and such research is often designed to produce future market value. Its main output takes the form of a patent or similar innovation. This stage requires tremendous resources both human, technological and financial. Human resource continues to be a hindrance in Africa due to brain drain. Low economic status of many African states means not enough resources can be availed to high-tech scientific experimentation. This probably explains the low output of patents from African Universities and other research institutions.

Collaborative research can help 'pool' both human and technological resources and work towards achieving this stage. It takes about 2-3 years to register a patent. A person may lose the right rights to a patent if before filing an application, the invention is published or other people are told about it (except a legal advisor). Scientists who like rushing to conferences at the end of their research must be aware.

Patent commercialization stage

In this stage the knowledge and patents acquired in the first two stages is converted into economic value. This transformation of patents into productivity can occur through a series of channels such as assignment, licensing and joint ventures. Patents are sold to the industry or other institutions for further research. Commercialization can take up to seven (7) years after registration of a patent, especially in the pharmaceutical industry, and after further and thorough research and development activities.

Case example 1

Researchers from different institutions may wish to come together to collaborate in research project, for example, for producing a vaccine for COVID-19 and other related viruses. The base substrate here could be some plant material nurtured by two communities in different countries. These communities are the owners of the genetic material.

The researchers may access to the genetic material through the use of instruments such as prior informed consent (PIC) from the community concerned detailing the purpose and proposed use of the material; mutually agreed terms (MAT) which will specify the manner of benefit-sharing amongst the actors including ownership of the foreground IP, mode of benefit-sharing, and how the benefits are to be paid out; and material transfer agreement (MTA) where the material is to be sourced from another country.

The researchers, through an agreement for collaboration must specify composition of a project management committee, ownership of the data to be generated from the project, use of and eventual disposal of equipment procured for the project such as microscopes, laptops and motor vehicles, repository of the data and how and when to publish it.

Upon completion of the project, the candidate vaccine must undergo clinical trials and further research and development (R&D). At this point, it may be prudent for the owners of the IP to either assign it or license it to a pharmaceutical company that has the infrastructure for global clinical trials and eventual marketing. All parties ought to be represented at any negotiations for assignment of license. The percentage sharing of the proceeds of commercialization must be agreed upon upfront.

Utility Models

These are inventions that do not meet the stringent requirements of a patent. They largely include modifications of existing works to improve their functionality. In the recent past, technical institutions have been announcing 'inventions' such as a 'hand held' tractor, aeroplane, a convertible 'bench-to-table with two benches-and – back-to-bench', grinding machines, motorised bicycles, different shapes of bottles and cups and so on. In the real sense, these are not completely new inventions, hence, they do not fit in the category of patents. Yet they offer an improvement in the functionality of existing products. In the advent of COVID-19 and given the worldwide shortage of ventilator machines, some institutions in Africa have devised 'localized ventilators'.

Utility models are provided for largely in the laws of least developed countries. They are protectable. However, their protection is far shorter than that allowed for patents. A rights holder will normally apply and be granted a certificate. Sometimes, one may apply to convert from a utility model to a patent and vice versa. It is easier, faster and cheaper to register a utility model. A rights holder for a utility model could assign or licence someone to market the 'invention'.

Where a utility model is developed from a joint collaboration between institutions, its ownership, ownership of the resultant IP and ownership of the data that led to its development should be jointly held in a ratio that represents the percentage contribution of each partner to the project. Such clearly demarcated ownership also has an impact on eventual assignment and licensing of the IP in the utility model.

Case example 2

Two institutions may wish to collaborate to produce a remote-controlled machine for processing cereals into flour. One institution could have generated some software data and the other one has technical drawings, hard materials and engineers before project begin. The collaboration then produces a grinding machine that is digitally controlled. Such a product is a utility model in that all the knowledge used to create it already exists. The difference is that it had not been applied to creating such a machine. In this example, the copyright in software data by one partner and the copyright in technical drawings by the other represent the background IP that the parties bring to the table. The resultant utility model is jointly owned. However, there could be another institution that financed the project. Such owner of capital may wish to be a co-owner of the intellectual property.

Having produced such a utility model, there will be need to mass produce these machines (commercialize) them to cover a given market. None of the research collaborators may have neither the capacity to produce these machines on a large scale nor the requisite marketing infrastructure. In order to financially benefit from this IP, the owners may choose to either assign or licence the IP to another party capable of commercializing the IP. Where the funds are from public coffers, there may be need to assign or licence the IP at a much lower fee. The owners could licence actors in other countries in order to spread out their market reach and hence, the income therefrom.

Copyright

Copyright is a certificate of title usually granted to an author of literary, dramatic, musical, artistic and certain other intellectual works (e.g. software code). Copyright does not protect mere ideas. The work must be captured in some way, e.g. written down or recorded. In order to attract protection, the work must be original, that is, not copied.

Protection is for life of the author plus 50 years. Moral Rights are rights an author retains over the integrity of a work. Moral rights can be waived but cannot be assigned. Copyright is important for IT companies, e-commerce, literature, music and theatre; internet, television, film, press and other media; training and education.

Protection is automatic on both published and unpublished works. Copyright accrues automatically and has no cost. Copyright protection is instant once the work has been captured in some way, e.g. written down or recorded. However, it is advisable to register it with the relevant office for ease of enforcement of the right.

Copyright allows the author to protect their original works. Database right allows the author to protect databases where the author has made a substantial investment in making the database. A copyright or database right holder gets the right to stop others from copying, adapting, distributing, communicating to the public, renting or lending copies to the public or performing in public and to get compensation if these rights are infringed. The duration of copyright varies with the type of work, but it is generally 50 years after the life of the author. Database right protects lasts for 15 years from when the database is made or, if the database is published during this time, for 15 years from publication.

Copyright is the commonest intellectual property right that is generated by academicians and researchers. Every publication made is copyrighted. However, many may not either be aware of or care about copyright. It is probably lack of this care that many authors 'surrender' their copyright to publishing houses and wait for royalties of between 10-30% of the sales. Many Universities are missing out on earnings from copyright from their employees. Copyright is virtually the only available IP to academicians and researchers in the Arts and Humanities, even when all others also publish. Many institutions have 'publishing houses' that lie largely underutilized. This situation needs to be addressed.

Case example 3

An IT solution that links cameras in a building to a mobile computer application (app) to enable the user to be able to monitor what it going on in the building when (s)he is far away. In such a project, a variety of cameras exist in the form of CCTV. What is needed is an app. Creating a relevant app may involve a lot of programming and production of a source code and related programmes. The resultant product can be protected under copyright. Collaborating institutions can be registered as joint-owners. Having done it for one building, they may wish to 'commercialize' their IP. This they could do on their own or licence others to commercialize it in various geographical regions.

Trademarks

A trademark or service mark is a word, a symbol, a logo, a picture, a design of goods (or services), or a combination of these, used to distinguish the goods (or services) of one person or organization from those of others in the marketplace. Examples of such trademarks include the rings/circles for the International Olympic Committee, those on motor vehicles such as Mercedez Benz, Audi, and Toyota. Others are signs used by many high profile companies such as Samsung, Philips, Apple and HP. Manufacturers of foodstuffs also have marks they use to distinguish their products.

Some people may use other peoples, marks to sell their rather inferior goods. This process is called counterfeiting or 'passing off'. When a mark for a Mercedez car is placed on a car that is NOT from that company, this can confuse or mislead buyers. This also has the effect of tainting the reputation of the genuine company, besides eating into the company's profits. Hence, the need for trademark protection.

Products from patents and copyright can be assigned names or signs that would then require trademarks or tradenames registration. With a registered trade mark, one can stop a similar sign being used for similar goods or services. One may use the ™ symbol for free and puts people on notice that you assert rights in the name. The ® may only be used after a trade mark registration. The protection goes on for as long as the mark is being commercially used.

Trade secrets/confidential information

Trade secrets or confidential information is information generated by an entity. For example, researchers generate a lot of data, most of which does not end up in publications. For example, results from clinical trials indicate largely whether a given drug is efficacious or not, how long it takes in the body under various circumstances, and the side effects under different conditions. It is not possible to publish all this information, and yet the information may be useful in marketing the drug. Other information such as customer lists, manufacturing techniques or business methods can help a business beat the competition.

In research, this confidential information can be useful in working out more IPs and in promoting registration of IP. Usually, scientists rush to publish their findings so that they can be known to have been the 'first' to do so or to make a certain discovery. However, once such information gets into the public domain, it cannot be protected through patents. Institutions and individual researchers should not rush to discard data collected from research.

Industrial Design

An Industrial Design is a type of IP that applies largely to shapes or appearance of objects such as the shape of a bottle, a spoon, a cup or headlights. It is believed that a lot of thinking goes into any such design. It is instructive that cars from the same manufacturer may bear a similar design or shape. The same applies to phones, cookers and other manufactured goods. A design helps to distinguish goods in the market place. For example, a Landcruiser VX V8 has a shape that differs clearly from that of a BMW X6 or even a Pajero. Pens manufactured by different companies bear differing designs.

An industrial design can be used to enhance a product that already exists. For example, the Volkswagen Beetle of 1970 has a different shape from that of 2020. Design rights are relevant for all businesses that create products or articles which need to look different to others. The protection lasts 10-15 years (also 25 years in Europe). A registered design enables the rights holder to stop (and get compensation from) anyone else making or selling a substantially similar article.

A lot of research goes into designs of industrial products. Researchers and institutions involved should be careful to register their design within six months of revealing it to the public.

Geographical indications (GIs)

Geographical indications are rights that accrue from a reputation and special characteristics of a product attributable to a specific location. For example, 'Champagne' is a sparkling wine from a small area called Champagne in France. No other maker of a sparkling wine is allowed to call it Champagne. Toyota cars are notably from Japan and Mercedes Benz from Germany, oranges come from Israel, bananas from Mexico, Arabica coffee comes from Kenya, while basmati rice is from India. Also, Samsung phones are known to be from Korea while iPhones are from America. Italy is considered the hub of fashion be they shoes or suits. GIs are also applied to handicrafts and textiles, characterizing them according to the source of origin. In similar vein, it is possible to also characterize genetic resources according to the geographical zone from which they are obtained. Geographical indications also serve a purpose similar to that of trademarks in the international market. GIs help give a given product a prominence and dominance in the market. The European Union has a specific law on GIs.

INTELLECTUAL PROPERTY IN THE CONTEXT OF PUBLIC–PRIVATE PARTNERSHIPS

Where parties agree to come together in a collaborative project, a number of issues ought to be examined and dealt with at various stages of the project. These touch on ownership, access, benefit-sharing, publications, new networks/partnerships, career mobility as represented by change of jobs/employers by researchers to a project, and need for guidelines on access and benefit sharing (ABS) and existence (or lack of) relevant contracts.

Ownership

A collaborative research project requires that the parties pool together some resources. Some of these resources could come from external funding in the form of a research grant. Certain inputs will be required such as equipment, reagents, laboratories, machinery including motor vehicles, tools and other materials such as genetic materials. Additionally, certain outputs are expected from such a collaboration which include but is not limited to new data, new methods/knowledge, processes, tangible and other intangible products. Besides, at the end of the collaboration, certain materials may remain unused or arise as a by-product of the research. Equipment bought specifically for the project such as laptops and motor vehicles will need to be dealt with. A thorough well thought out agreement, sometimes called a memorandum of understanding (MoU) can be used to capture all the above.

Access

Disputes can arise around the areas of access to and sharing of (i) limited resources such as genetic resources, lab space and scientific equipment; (ii) outputs of research such as products, processes, data and knowledge; and (iii) access by non-parties to the collaboration such as consultants, suppliers and other service providers. With respect to access to genetic materials, the collaborators should use a prior informed consent (PIC) to enable researchers to access such materials. Together with the PIC is another instrument called mutually agreed terms (MAT). This can be used to spell out how parties will relate once the materials move into the hands of researchers. Access to outputs of research by both collaborators and outsiders can also be provided for in such an instrument.

Access to facilities and equipment such as lab space, scientific equipment, computers, motor vehicles, and other related materials can be regulated through a memorandum of understanding (MoU) between the collaborating parties. In this MoU, parties must also specify how third parties (those not in the collaboration) can access some of the generated products, knowledge and processes. Here, *assignment* and *licensing* can come in handy.

Benefit-sharing

The manner of sharing benefits is very sensitive as people expect to benefit, sometimes, sooner than the actual benefits start flowing in. Many actors expect to share in the benefits, such as the community from which genetic materials are obtained, participating institutions, individual researchers; and others connected to the project in one way or another such as a company formed or contracted to commercialize the products.

Communities from which materials are obtained are entitled to benefits by virtue of having nurtured and conserved the materials over many years, together with the initial traditional knowledge that forms the basis of bioprospecting. Communities may claim either monetary or non-monetary benefits. Many African countries have enacted laws and set up institutions to manage matters relating to benefit-sharing of commercialization of IPs based on genetic materials.

Participating institutions are entitled to ownership of products of the research including any benefits that may accrue from commercialization of IPs. These can claim ownership of the research data and any resultant IPs. Benefit-sharing can be made on the basis of prior agreements involving all actors and based on an institution's IP policy.

Many African countries were slow to embrace and domesticate international conventions relating to IP. For example, after the enactment of the 1992 Convention on Biological Diversity (CBD), it was not until 2010 that African countries came up with the Swakopmund Protocol which gives a clearer road map on how to protect traditional knowledge and associated genetic resources. This Protocol can be credited with spurring national legislation relating to traditional knowledge. Hence, it took very long time for many African countries to put structures in place for protecting their traditional knowledge. With respect to the *Hoodia* plant in Southern Africa, arrangements were made to benefit the San community. In Ethiopia, the government was not so lucky with respect to the Teff plant, a kind of cereal that is used as a staple food and which, unlike wheat, does not contain the carcinogen glutamine. The Ethiopian government was cheated out of benefits (see case study below).

Institutions that do not have policies on IP are losing out on benefits. Innovators in such institutions are marketing their innovations without regard to the institutions. One area where institutions have lost out is in the area of copyright to books and computer programmes. Many authors are University based. However, after publishing their books, they make arrangements with booksellers on marketing and royalties to the exclusion of the institutions. Similarly, many people innovating in the area of ICT and electronics are young people based in institutions. However, due to lack of IP policies, either the innovators may run away with the benefits, or outsiders (external third parties) could 'snatch' the innovation and run away with it. Many institutions are losing valuable revenue due to lack of policies.

Sometimes research institutions in Africa lose out on IP because funding comes from outside where it is predetermined that all IPs will belong to the funding institution or the foreign collaborating institution. There is need to renegotiate any agreement relating to collaboration with a foreign institution to properly capture the aspects on IP.

Publications

Publication is an acknowledged means of sharing knowledge or availing valuable new knowledge to the public. However, where IPs are concerned, sometimes publication can vitiate registration of patents, utility models and industrial designs. It therefore becomes necessary to delay publication in journals where it is desired to apply for IPRs. This delay is not denying the public knowledge but rather a way of availing products to the public in the fullness of time.

In collaborative projects, it is important that parties agree upfront how to handle the issue of publications. It ought to be spelt out in the MoU when, where and how to publish the results of the research. In the MoU, it must be agreed on the order of publication – who comes as the lead author and the sequence of the other researchers. Sometimes it may be prudent not to publish at all where the data gathered represent trade secrets. The rush to publish can deny institutions the right to apply for IPs.

Follow-on innovation

Parties need to covenant on how to deal with follow-on innovation. This is particularly so where new collaborators come on the scene or where researchers find that they can get more out of the data than the earlier foreseen information. With respect to genetic resources, the PIC usually specifies that the researchers seek a fresh PIC. In all other cases, it is a matter of contract.

New networks/partnerships

Where new networks or partnerships may be interested in data, information and knowledge gathered elsewhere, this can be regulated through a MoU. Such a MoU could take the form of a non-disclosure agreement, non-compete clauses within an agreement and non-solicitation clauses.

For new employees, clauses in their contract of employment would suffice. It is vital that new actors be bound through non-disclosure agreements (NDAs) in order to limit the extent of the publication of the information received. These NDAs are also called confidentiality agreements. Aspects of benefit-sharing must always be borne in mind while sharing data or information. It should equally be indicated what liabilities such new entrants should bear.

In practice, some come in to replace others. In such a case, they should take over all rights and liabilities of their predecessor, bearing in mind the realities of the progress made on a project. Others come in as additional actors. Here again, agreements should be made cognisant of the stage of progress of the on-going project.

Career mobility/change of jobs

Research scientists are professionals on the move especially in search of the elusive 'green pastures'. Indeed, Africa suffers heavily from the phenomenon of 'brain drain'. Sometimes, a career move or change could happen when they are involved in an ongoing project. There is need to control disclosure of information through a non-disclosure agreement (see schedule II for a sample). In such cases, where the researcher wishes to use the information at his/her new station, then it will be necessary for an agreement to be drawn up.

Lack of guidelines on ABS

Many Universities and research institutions do not have guidelines on ABS. This could be due to the fact that most research in the past has concerned itself with 'basic information gathering'. Little emphasis has been placed on applied research. However, in the recent past, there has been an increasing demand for applied research - the type that can result in commercialization. Besides, there is loss of revenue to institutions that do not have clear IPR policies.

It is vital that each institution develops guidelines on ABS for properties that belong to the institution and for any potential partner. For example, out of 70 Universities in Kenya, only few have IP policies in place (for example, Jomo Kenyatta University of Science and Technology-JKUAT, Pwani University, and University of Nairobi). It has been observed that many African countries do not have IP policies. As a result, they are not able to benefit from commercialization of products from their research. In realization of this WIPO in collaboration with ARIPO have started a programme of capacity building in four Universities in Africa, namely JKUAT (Kenya), Zimbabwe's Africa University, the Namibia University of Science and Technology (NUST) in Windhoek, and Ghana's Koforidua Technical University (KTU). Uganda's National Agricultural Research Organisation (NARO) is the only non-higher education institution in this group.

Most importantly, financiers of research projects need to make availability of such guidelines as a prerequisite for funding.

Lack of relevant legal instruments

Intellectual property (IP) is comparable to tangible property in certain material respects. For example, to lease a house, one needs an agreement called a Lease. In IP such a 'lease' is called a 'licence'. To fully benefit from IP, a variety of contracts are necessary.

A contract is an agreement that spells out obligations of the parties to it. Those agreeing to contract bind themselves to certain obligations, whose violations could lead to commercial loss (by payment of what is due), abandonment of the contract by the offended party, or compulsion to perform as agree (specific performance). Contracts build confidence amongst the contracting parties. For example, a non-disclosure agreement binds the parties not to disclose confidential information or preliminary results of a research project. Through an NDA, researchers can also agree on how to use the research data, when to use it and where to use it. A Licensing agreement allows the person renting the IP (the Licensee) to use it in accordance with agreed terms and to pay royalties as agreed.

It is therefore important for all actors in the arena of IP to make very clear contract to regulate their activities from acquisition of research materials, research equipment, generation of research data, handling of research data, registration of IP, and various forms of commercialization of IP. Absence of a well drafted contract can cause an institution untold troubles.

Lack of relevant contracts can be a source of strife and prolonged litigation. Contracts help specify obligations and rights of various actors in a project, and therefore, guide the researchers. Institutions therefore need to set up strong divisions for intellectual property rights.

Marketing of Utility Models and technovations

Many institutions encourage their students and employees to be creative and innovative. Some rise to the occasion. In other cases, utility models emerge out of ongoing research work. Most critically, many institutions are not ready to handle such innovations. They have no mechanisms for dealing with the new products. Most get excited to show them off at trade shows and no more. The innovators are left more or less on their own. Some institutions have no policies on intellectual

property rights in place. They or others have no dedicated administrative structures for commercialization of intellectual property.

TOOLS AND APPROACHES FOR COMMERCIALIZATION AND TECHNOLOGY TRANSFER

Collaborative projects involving two or more parties require delicate handling in order to enable the participants to satisfactorily and equitably benefit from their labours. There is need for clear agreements to cater to various stages of research, development and innovation. These include prior-informed consent, material transfer agreements, non-disclosure agreements, licensing agreements, technology transfer agreements, joint ventures agreements, and franchising agreements.

Approaches to commercialization

The approaches to commercialization include assignment, licensing, franchising and joint ventures. These are mechanisms through which protected ideas which are of commercial value are passed on to an entity that has the wherewithal to commercialize them. Usually, many universities are handicapped when it comes to direct commercialization.

Through *assignment*, the ownership of IP is transferred from one person to another under agreed 'commercial' consideration, which could be monetary or non-monetary. *Assignment* is akin to selling one's property like, selling a car.

Licensing is comparable to 'renting' a tangible property. However, a tangible property can only be 'rented out' to one person at a time. IP is infinite. It can be licenses to many people simultaneously. In practice, IP can be licensed to different people in different regions or even countries.

Franchising is allowing another person to run a business similar to what is already going on using the same name and quality of products or services. This approach can be used to expand a business.

Joint venture is a collaborative enterprise in which parties to it agree on the mode of collaboration.

Another approach is a *start-up company* where the institution concerned attempts to commercialize products and services from her own ideas. In Kenya, for example, Moi University has taken over the former Rivatex company assets (a textiles company) and is using it for commercialization purposes. Recently, Moi university and Jomo Kenyatta University of Agriculture and Technology won tenders for the production of laptops under the government's e-learning programme. Other universities and public research institutes in the region have also attempted to set up start-up companies for the same purposes. These approaches have been discussed in detail below (in section X).

Assignment of Intellectual Property Rights

Intellectual property includes patents, utility models, copyright, trademarks, industrial designs, goodwill, and rights in know-how and confidential information (trade secrets), domain names, and (for a software business) source code and documentation about the software. An Assignment allows the seller (Assignor) to get paid for the intellectual property rights and the buyer (Assignee) is free to commercialize the intellectual property.

An Assignment of Intellectual Property Rights grants the buyer ownership to use the intellectual property. For trademarks, patents, utility models, copyright, and designs, the assignment needs to be in writing in order to be effective. To assign intellectual property rights from an employee or consultant to the company they work for, it is enough to include relevant clauses in the Employment Contract and Consultancy Agreement.

Licensing of IP

IP rights, being intangible in nature, can be 'rented-out' as many times as the owner wishes. Unlike tangible property that is finite, IP does not get finished. Many people can exploit it at the same time. It can thus be 'rented out' to many people to use it simultaneously. This process is called "Licensing". While a house (as well as any other tangible property) can be rented out only to one person at the time, your patent, copyright, utility model, and other IPRs can be licensed to 10, 50, or 1000 licensees in different geographical areas at the same time. This way, IP offers better potential for income than tangible property.

IP Licensing is a process through which the holder of an IP grants permission to third parties to utilize the IP asset(s) for a specified period, for a specific purpose, in a particular territory, and under agreed upon conditions. These terms are contained in a contract also referred to as a licensing agreement. Licensing is therefore a potent vehicle for ways of commercializing an IP asset and earning money out it.

The licensor (owner of IP) can earn money through a licence in terms of licensing fees and royalties. A Licensor can also expand his business to new markets in other countries that one would never be able to reach by oneself. Licensing to entities in other countries enables the Licensor to capitalize on local knowledge, network and expertise in other geographical areas; their distribution and/or manufacturing capacity; their capacity to introduce the necessary adaptations that may facilitate penetration of their local markets; and the valuable knowledge that they may generate from exploiting the IPRs. A Licensor is able to improve the products or services that encompass the licensed IPRs and to maintain oversight and control over the way in which the IPRs are used.

There are three types of licences: exclusive, non-exclusive and sole.

Through an *exclusive license,* the Licensor (i.e. owner of an IP asset) gives to the Licensee the exclusive rights to use its IPRs in a given territory (i.e the entire country, a particular region, etc.). The Licensor binds himself not authorize any other person to use its IPRs on the same territory. Not even the Licensor can use the IPRs on that territory. In a *non-exclusive license,* the Licensor retains the right to appoint other Licensees to use its IPRs in the same territory. In other words, the Licensor can further license its IPRs to other parties, and , to use them itself. Under *sole license,* the Licensor undertakes the commitment not to appoint further Licensees, but retains the right to use the IPRs in question by itself

A license also offers certain advantages to the Licensee. For example, it is a useful vehicle for transfer of technology. A Licensee can start using new or advanced technological know-how and valuable brands without having to create them himself, thereby saving on significant investment in terms of money and time. Even big corporations do not carry out all the R&D by themselves. They prefer sometimes to acquire some IPRs from counterparts. A Licensor can learn new skills that can help you in your business strategy.

A license should specify how payment is to be made (i.e. whether royalties only or payment of a lump sum at the beginning followed by royalties), whether royalties are to be paid inclusive of taxes or not, when royalties should be paid, and the currency of use. The amount of royalties should be based on the value of the IP, where this can be computed. A non-monetary form of payment is the use of 'cross-licensing', where in exchange for a given license, the Licensor is allowed to use the IPRs of the Licensee.

In collaborative projects, the Licensor (all such collaborating partners) should be represented during the negotiation for a license, and amongst themselves agree on the manner of sharing of the profits. To reiterate, results of research (confidential information), registrable IPs such as computer programmes, source codes and utility models can be licensed. Similarly, collaborating partners can benefit from transfer of technology through licensing.

Technology Transfer Agreements

Technology transfer is a process whereby one party transfers its technology to other party for commercial purposes or for developing some new products. Transfer of technology takes place by signing a contract between the parties. In other words, a technology transfer agreement is similar to a type of IP license where the object of the contract is an item of technology either developed or in the process of being developed.

Technology transfer agreements are often more complex and technical than IP licenses. This is because the contracts have to cover all the legal issues and to effectively deal with all relevant technical and scientific issues relating to the invention that embodies the technology. The negotiation here should ideally involve a lawyer and a scientist.

These contracts relate to the use and exploitation of the particular technology that is intended to be transferred, the issue of eventual improvements made by the Licensee, and duration of the contract. Due to the often-short life-cycle of technologies that may sometimes become obsolete within few years, a license for transfer of technology is usually shorter than that for IP.

A technology could embody a logo and a special design. Negotiations for a license for transfer of technology should, in such cases, include negotiations for the trade mark and industrial design. Where disclosure of Trade Secrets and know-how is necessary for better exploitation of the technology, their negotiation should be included in the same technology transfer contract.

Joint Ventures Agreements

When two or more partners come together to work on a new project this is called “Joint Venture” (JV). A joint venture may be established by way of a contract, whereby parties agree to work together and stipulate various roles and responsibilities for each party.. Joint Ventures may also be formed by creating a new and separate entity. JV help to save time and money. In certain countries where foreigners are not allowed to independently carry out business, entering into a JV with a local business actor is mandatory.
In case of higher education institutions, these may want to either collaborate amongst themselves or with sponsors or with the industry. Upon forming a Joint Venture, partners agree to share risks, profits, assets, and results. They may be initially required to make contributions in the form of tangible and intangible assets. A joint venture may create new tangible and intangible assets in the process.

A contract for a JV should provide for clear rules relating to management and decision-making responsibilities; the contributions that each party is expected to make in terms of tangible properties and in terms of IPRs; the ownership, management and commercialisation, etc. of new intangible assets resulting out of the Joint Venture.
An agreement for a joint venture can be made to cover several phases as follows:

Before entering into a Joint Venture

Parties need to sign a Non-Disclosure Agreement (NDA) in order to share any confidential information amongst partners. A party that desires to enter into a JV should also do a proper due diligence on the potential partners, i.e. is it a local or international company, does the potential partner have legal personality, who can commit that partner to a binding agreement? What do they own in terms of both tangible and intangible property? . This will help you understand what they can bring on board including their IP capacity. Also it will be necessary to consult a lawyer in matters of anti-trust laws.

At the time of entering a Joint Venture

A party needs to decide on whether and how to assign or license her IPRs to the Joint Venture; negotiate the terms of the assignment/license relating to existing IPRs for the benefit of the Joint Venture; and negotiate ownership issues relating to new IPRs that might be created by the Joint Venture, including possible improvements of existing IPRs
Also to be negotiated are all relevant implementation and operationalization issues (e.g. who can use IPRs, how, where, for how long, limitations, benefit-sharing etc.).

During the implementation of Joint Venture

Parties should set up a mechanism for monitoring the project so as to ensure that all agreed upon matters relating to IP are complied with, including ownership and implementation issues.

At the End of the Joint Venture

Shortly before the end of the period of the JV, parties should assess whether the partnership produced the expected results. Parties may also negotiate and agree upon how to share tangible and intangible assets created by the JV, if they wish to end their partnership. Parties may also renew their partnership under the terms of the existing JV, or under new terms.

A Franchising Agreement

Franchising is a special type of licensing agreement, that allows the replication of a particular business format that has already been shown to be particularly successful. The Franchisor agrees to expand its business by granting to various Franchisees, the right to replicate its manner of doing business for a defined period and in exchange for a financial consideration. The Franchisor licenses to the Franchisees the right to use its IPRs such as patents, utility models, industrial designs, trademarks, copyright, trade secrets and know-how.

The Franchisees will operate under the control of the Franchisor and in line with its directives. The Franchisor will also provide training and assistance to the Franchisees for example, by sharing the necessary know-how, training them on selling techniques, account keeping etc. The Franchisee in return will pay a lump sum at the beginning of the agreement and royalties to the Franchisor. The Franchisor enjoys significant control over the Franchisee's operations especially over the way in which the Franchisees use Franchisor's trademark.

On the one hand, franchising offers two major advantages to the Franchisor. Firstly, the Franchisor can enjoy an expansion of its business to other geographical areas with limited investment, and secondly, the Franchisor gets very substantial revenues generated by the franchising agreement. On the other hand, a Franchisee saves time and money in the development of a business from scratch, and benefits from the Franchisor's goodwill and reputation. A Franchisee also benefits from the use of the intangible assets of the Franchisor, such as its trademark and logo.

The Franchisor establishes a comprehensive "Manual of Operations" which describes in detail every single aspect of the Franchisees' way of implementing their business. Periodic training by the Franchisor and "surprise visits" may be carried out by representatives of the Franchisor to monitor full compliance with all the instructions contained in the Manual. Any form of negligence on the part of the Franchisee could ruin the reputation of the Franchisor.
A Franchisee ought to do due diligence regarding the Franchisor's product and trade mark in order to ascertain the possible success of the franchise in a new location. Sometimes a feasibility study may be necessary.

INFRASTRUCTURE FOR COMMERCIALIZATION AND TECHNOLOGY TRANSFER

The major infrastructure for commercialization and technology transfer are incubators, technology parks and start-up companies/spin-offs

Incubators

Incubators are also referred to as 'accelerators' or 'commercial centres'. Incubators are used to support the establishment of businesses largely through provision of resources and facilities. In particular, the actors benefit from provision of shared space, provision of advanced equipment as well as availability of managerial support, and provision of networking possibilities. Incubators allow for access to knowledge by the private actors and collaborators and also allow for access to finances. Incubators make it easier to access markets. Good ideas can be quickly identified and the ensuing IP protected. Incubators also help universities to establish university and industry linkages. Most of all, incubators encourage entrepreneurship.

It should be recognized at the outset that two types of incubators are recognized. The first one is the so called 'for profit' incubators. Such incubators are usually set up by business entities. Then there are the so called 'non for profit' incubators which are the type operated by universities and research institutions. This later are normally financed by public funds. University incubators can be successful because of availability of infrastructure, networking, human and technical support and institutional reputation. Several universities in Africa have attempted to set up incubators in collaboration with businesses.

Universities in Africa are increasingly experiencing a reduction in their financial allocation. Many public universities have been challenged to set out of their 'ivory tower' conclave of teaching and research, and embrace a 'third stream' of activities dealing with incubation of start up firms; the commercialization of knowledge; the development of knowledge transfer partnerships and the delivery of entrepreneurship courses.

Case examples

An example of a functioning 'for profit' incubator is the L'Ouverture, inc. in the Barbados. L'Ouverture specializes in digital publishing. It is engaged in the publication of story books, proposal writing, film making, publishing, archival and library research, dissemination of artistic and scholarly products; and creation of intellectual and entrepreneurial partnerships.[1] L'Ouverture is a limited liability company which got its name from a person born to slavery in 1743, and who led a successful revolt against slavery in Haiti. L'Ouverture, inc. nurtures young writers and creative thinkers.

Most incubators take on a science and technology-oriented look. Many companies in the US and in Europe have set up their own 'for profit' incubation centres. For example, Bayer has several incubation centres where knowledge acquired is first tested for commercial viability.

[1] L'Ouverture Arts Facilitator Inc, at https://louverturepublishing.wordpress.com/what-is-a-knowledge-incubator/ (18 July 2020)

The founders of Apple computers - Steve Jobs, Steve Wozniak and Ronald G. Wayne manufactured the first Apple computers in the spare bedroom of Steve Jobs' parents' Los Alto, CA, home. When business showed promising prospects, they moved to Jobs' parents' garage. The rest is history.

The VIB Bio-Incubator in Ghent and Leuven are run by the VIB research institute in Belgium. They are intended to be used by both start-up companies and established ones that focus on intensive bio-research. Companies housed here are provided with space, technical and financial services.

The Oslo Cancer Cluster incubator is a publicly funded facility that helps companies to move their ideas to commercialization. The companies are usually provided with advice on how to develop a business, IP protection, regulatory frameworks and a network of investors and pharmaceutical companies.

Kenya has some incubators at the Kenya Industrial Research and Development Institute, University of Nairobi, Kenyatta University and Strathmore University, to name but a few.

In Cameroon, The Technipole Sup Valor is a business incubator established by the University of Yaoundé to promote the socio-economic development of the country. The incubator identifies and supports young entrepreneurs with high growth potential. A number of Universities in South Africa as elsewhere in Africa have incubation centers. Indeed, it is acknowledged that incubators help to accelerate commercialization of valuable ideas.

Technology parks

A technology park is seen as an organisation that works to promote innovation, university/industry linkages, formation of new business ventures, and commercialization of products and services. Technology parks have also been variously referred to as research parks and science parks. Technology parks usually require the involvement of multiple players such as academicians, government, industry and the community. Examples of early technology parks include the Stanford technology park set up in the 1950s and which later became Silicon Valley.

Others set up a decade later are the Cornell business and technology park (Cornell University) and the Research Triangle within Carolina and involving research and academic institutions in that area. In Africa, science parks developed in the 1980s starting with Universities in South Africa. Almost all countries in Africa either have or has attempted to set up a science park. However, most have never actualized their potential due to scarcity of funding and little research outputs.

Technology parks are more capital intensive than incubators. Academic and research institutions can use incubators, and where there is a prolific production of IP, a technology park can be considered.

Start-up companies

An academic or research institution may decide to set up its own company for commercializing products of IP. For example, two research institutes in Kenya that is the Kenya Agricultural and Livestock Research Organisation (KALRO) has established seed merchant/selling outfits for their new plant varieties; while the Kenya Medical Research Institute (KEMRI) has its own production facilities for the sanitizers. Nairobi and Moi Universities have set up companies for 'generating' extra funds for the universities although the sole mandate is not IP.

Several challenges confront institutions that use start-up companies. Firstly, the overall mandate of an academic or research institution is NOT business. Therefore, a business operated under such an institution will be stifled by the main agenda of the institution. Secondly, business is meant to be for profit making. Therefore, the skills required will be slightly below those required by an academic or research institution (notably such institutions required PhDs). Yet the salaries attached to positions in a company are usually much higher than those of an academic or research institution. Such a scenario is likely to create conflicts that almost always work against the start-up companies

Case example

Uganda's National Agricultural Research Organisation (NARO) represents a good success story of moving technology from the laboratory to the shops. NARO entered into a public private partnership (PPP) with Nile Breweries Limited (NBL), a subsidiary of the multinational brewing company SABMiller, for the production of an improved variety of sorghum for brewing pale lager beer. This new high yielding sorghum variety called Epuripur. Epuripur was initially developed to improve food security. Now it has multiple uses. Other collaborating institutions are the National Semi Arid Resources Research Institute (NaSARRI), the private seed company known as AfroKai and the public-sector extension service (NAADS). These institutions involve very many farmers who take the improved seeds and plant on their farms on contract from NBL. This way, many actors benefit in a variety of ways. This success story has been achieved through the use of many agreements.

INTERNATIONAL FRAMEWORKS FOR COMMERCIALIZATION AND TECHNOLOGY TRANSFER.

Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), 1994

The TRIPS Agreement is an instrument of the World Trade Organisation that builds on the existing multilateral systems for the protection of various IPRs. Provisions from other international instruments are included by reference. The instruments explicitly referred to in the Agreement are the Paris Convention for the Protection of Industrial Property, notably the Stockholm Act of this Convention of 14 July 1967 (the "Paris Convention (1967)"), the Berne Convention for the Protection of Literary and Artistic Works, notably the Paris Act of that Convention of 24 July 1971 (the "Berne Convention (1971)"), the International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations adopted at Rome on 26 October 1961 (the "Rome Convention") and the Treaty on Intellectual Property in Respect of Integrated Circuits adopted at Washington on 26 May 1989 (the "IPIC Treaty" or "Washington Treaty").
These instruments give national governments power to legislate and control the management of IP within their territories within internationally accepted norms.

A major criticism of these instruments is that they are all premised on the western notion of individual ownership of property. Traditional knowledge and communal ownership of knowledge are alien terms in Western terminology. Little wonder, none of these mention the terms ABS, which was first coined in the 1992 UN Convention on Biological Diversity. TRIPS therefore gives good guidance on all IPs other than those based on genetic resources and or traditional knowledge.

Convention on Biological Diversity (CBD), 1992

Access to Genetic Resources and fair & equitable benefit-sharing

Article 15 of the Convention addresses the terms and conditions for access to genetic resources and benefit-sharing. It recognizes the sovereignty of States over their natural resources and provides that access to these resources shall be subject to the prior informed consent of the Contracting Party providing such resources. It also provides that access shall be based on mutually agreed terms in order to ensure the sharing of benefits arising from the commercial or other utilization of these genetic resources with the Contracting Party providing such resources. So the article provides in part-

> *Article 15. Access to Genetic Resources*
>
> 1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.
>
> […]
>
> 5. Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.
>
> […]

It is therefore with this knowledge that many countries have set up governmental institutions to manage prior informed consent (PIC).

Access to and Transfer of Technology

The Preamble to the CBD recognizes the importance of technology in dealing with biological resources. In article 2 the Convention defines technology to mean the same thing as biotechnology. Biotechnology. Article 10 (e) encourages cooperation between public and private sectors in the following words '10 (e) Encourage cooperation between its governmental authorities and its private sector in developing methods for sustainable use of biological resources.' Article 12 (c) urges 'developed' states to cooperate with developing states in developing methods for use of biological resources.

Article 16 deals with access to and transfer of technology. It is recognized that certain technologies will be useful in dealing with biological resources. Access and transfer is then left to contracting parties to work out ways of so dealing with this on 'mutually agreed terms'. Such access and transfer is to recognize protection of IP in those technologies. Exchange of information (Art 17) from scientific studies is to be dealt with in a similar manner. Article 18 provides for States Parties to the Convention to develop mechanisms for cooperation in research and joint ventures. The CBD states-

> *Article 17. Exchange of Information*
> 1. The Contracting Parties shall facilitate the exchange of information, from all publicly available sources, relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries.
> 2. Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with the […].
> *Article 18. Technical and Scientific Cooperation*
> 1. The Contracting Parties shall promote international technical and scientific cooperation in the field of conservation and sustainable use of biological diversity, where necessary, through the appropriate international and national institutions.
> 2. Each Contracting Party shall promote technical and scientific cooperation with other Contracting Parties, in particular developing countries […].
> 3. […].
> 4. The Contracting Parties shall, in accordance with national legislation and policies, encourage and develop methods of cooperation for the development and use of technologies […].
> 5. The Contracting Parties shall, subject to mutual agreement, promote the establishment of joint research programmes and joint ventures for the development of technologies […].

Completely missing in the CBD is any form of compulsion to transfer technology from the 'technology-rich' countries to the 'technology-poor' ones. Additionally, the emphasis on respecting IP in technology makes such technologies very expensive for poor countries as IPs have the effect of creating monopolies. Nonetheless, any cooperation in this area must be captured in the instruments of MAT, MAT and any other additional agreements.

Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising Out of Their Utilization

Proposes the formation of a National Focal Point – like the government agency overall responsible for the CBD. The National Focal Point has ascribed to it the function of linking applicants for genetic resources to the communities and the National Competent Authority. At rule 13 it proposes the Competent National Authority (CNA) has the following functions prescribed for it amongst others – to require a PIC, to set rules for MAT, process and approve agreements and ensure local communities effectively participate in the process. Rule 18 requires that various stakeholders be consulted throughout the entire process. Rules 26 – 28 delve into the process of giving prior informed consent.

Rule 42 deals with the fair and equitable sharing research and development and the benefits that accrue from commercialization. Under Rule 43, mutually agreed terms should include terms that do not prohibit the local communities from continuing to use the genetic resources, terms for material transfer agreement, possibility of joint ownership of IP, recognition of the sovereign rights of the provider State, type and quantity of the GR, whether there should be transfer to third parties possibilities for re-negotiation, provisions on benefit-sharing and how confidential information is to be treated. Rule 48 states that benefit-sharing should be amongst those who are owners of the GR, those who have contributed to the scientific and commercial process. Such actors include the local community, academic institution, governmental and non-governmental entities.

Under Rules 59 and 60, there are proposals on dispute settlement which accordingly should follow the contractual agreements. Here it is important to rope in experts in the preparation of various agreements to minimize misunderstanding and ensure efficient resolution of disputes. Rule 46 refers to monetary and non-monetary benefits. There is no separate mention of 'technology' in the guidelines.

Nagoya Protocol on Access and Benefit-Sharing, 2010

Article 2(c) defines utilization of genetic resources to include the application of biotechnology. The matter of fair and equitable benefit-sharing is dealt with at article 5 in which parties are to use legislative, administrative and policy instruments. Article 6 provides for prior informed consent (PIC) in which provider states are urged not to use unreasonable means to block access to genetic resources, to make clear and unambiguous rules on how to obtain the PIC, involvement of the local community, procedures for mutually agreed terms (MAT) and also to provide for dispute settlement.

The protocol also recognizes genetic materials that could be transboundary and urges member states to use a global multi-lateral benefit-sharing mechanism under article 10 'Parties shall consider the need for and modalities of a global multilateral benefit sharing mechanism to address the fair and equitable sharing of benefits […]'. Article 11 provides for a clearing house for access and benefit-sharing as well as for information sharing. Article 14 prescribes the kind of information sharing as that relating to the legislative, administrative and policy measures for access and benefit-sharing, informational on the national focal point and national competent authorities, how permits are issued, model contractual terms, authorities for the local and indigenous communities, tools developed for monitoring genetic resources as well as information on the established codes of conduct and best practices.

Article 15 requires states to enforce compliance with local legislation. This article states –

> 15 COMPLIANCE WITH DOMESTIC LEGISLATION OR REGULATORY REQUIREMENTS ON ACCESS AND BENEFIT-SHARING
>
> 1. Each Party shall take appropriate, effective and proportionate legislative, administrative or policy measures to provide that genetic resources utilized within its jurisdiction have been accessed in accordance with prior informed consent and that mutually agreed terms have been established, as required by the domestic access and benefit-sharing legislation or regulatory requirements of the other Party.

Responsibility for managing genetic resources in a given territory is vested in the state.

Swakopmund Protocol on Protection of Indigenous Knowledge, 2010

Section 2.1 – defines traditional knowledge to include genetic resources. Section 5.4 recognizes joint ownership between communities in different States. In such a case the countries concerned together with ARIPO shall register the owners. Section 6 vests ownership of traditional knowledge in the communities and in individuals within the communities. Section 7 confers upon the owners the right to give or deny consent and to institute legal proceedings. Section 8 permits the owners to enter into agreements for access, authorization, assignment & licensing, which agreements must be in writing and approved by the National Competent Authority (NCA).

Section 9 provides for fair and equitable benefit-sharing in both monetary and non-monetary terms based on mutually agreed terms (MAT).. Section 12 – permits a State to issue a compulsory licence

for the exploitation of traditional knowledge in the interest of national security or public health. Section 13 – the term of protection for rights held by the community is indefinite whereas for rights held by individuals within the community is 25 years.
The Swakopmund Protocol does not take cognisance of the need to access or transfer technology.

International Treaty on Plant Genetic Resources for Food and Agriculture

Provides for access to and benefit-sharing of genetic material. The farmer's contribution towards preserving and protecting genetic material is recognized, thereby paving the way for benefits sharing. States have an obligation to provide a conducive environment for the exploration and improvement of genetic materials useful for food and agriculture. This convention seeks to improve food production and, in the process, to alleviate hunger in the world. The utilization of genetic resources involves many actors and complex processes. The processes and procedures involved in the use of genetic resources are summarized in figure X below.

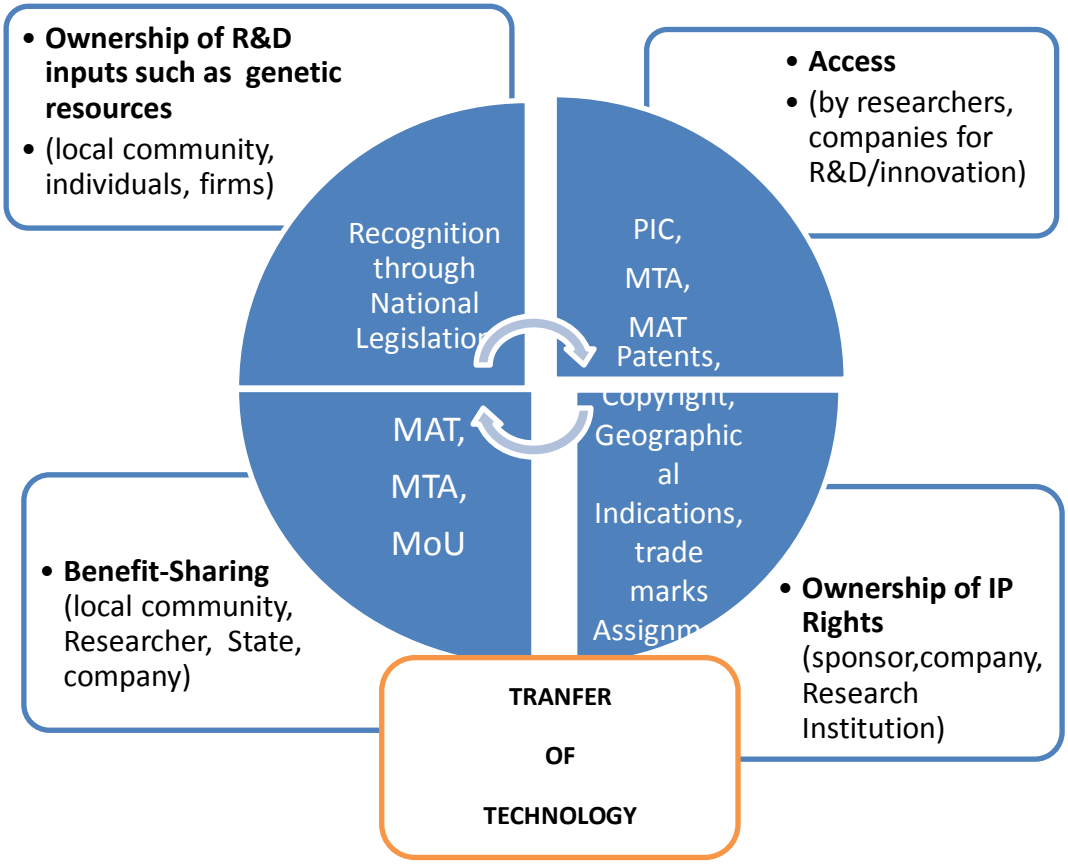


Figure X: A Summary of Processes involved from ownership of genetic resources to ownership of IP, access to genetic resources and technology and benefit-sharing (Chart by Moni Wekesa, 2020)

The PIC, MAT and MTA should be comprehensive enough to include clauses on access, ownership of new knowledge and ensuing rights, transfer of technology and benefit-sharing. In addition, the various types of IP are vital vehicles for transfer of technology as they embody the 'secrets' of the invention or creation.

NATIONAL FRAMEWORKS FOR COMMERCIALIZATION AND TECHNOLOGY TRANSFER

Botswana uses the Botswana Innovation Hub (BIH) Intellectual Property Policy for purposes of commercialization and transfer of technology in the use of her genetic resources. The country has an elaborate Industrial Property Act, 2010, that guides on the protection and utilization of intellectual property. Botswana has set up a technology transfer office within the BIH.

Cameroon has not yet set up an ABS system. She relies largely on MoUs. The Ministry of Environment, Nature protection and Sustainable Development (MINEPDED) is the designated National Competent Authority. It in turn coordinates a committee drawn from other ministries for purposes of giving permits.

Kenya has several laws in place such as the Industrial Property Act, No 3 of 2001, the Environmental Management & Coordination Act No 8 of 1999, the Forest Conservation & Management Act 2016, The National Land Policy 2009, Natural Resources (Classes of Transaction Subject to Ratification) Act No 41 of 2016, Protection of Traditional Knowledge & Cultural Expressions Act No. 18 of 2018, Science, Technology & Innovation Act No 28 of 2013, and the Wildlife Conservation & Management Act No 47 of 2013. In terms of institutions, these include Kenya Industrial Property Institute, National Environment Management Authority, Kenya Forest Service, National Land Commission, National Research Fund, National Innovation Agency, and Cabinet Secretary for Culture, and Kenya Wildlife Service.

These institutions have various competencies. For example, Kenya Wildlife Service will be the main actor where the materials sought are under its jurisdiction such as bacteria and other living organisms, The National Land Commission will be useful in determining ownership of the genetic resources based on land rights and the Kenya Industrial Property Institute is the body designated to register patents and other intellectual property rights. Questions of ownership of results, ensuing intellectual property, access to and transfer of technology are handled in specific operative instruments such as MAT, MTA and MoUs.

Country Case Study: Mozambique

Mozambique adopted its ABS regulation in 2007. The Mozambican Parliament approved the ratification of the Nagoya Protocol on 13 March 2014. The regulation has eight chapters covering general dispositions, institutional attributes, access and transfer, the protection of associated TK, access to technology and technology transfer, benefit-sharing, administrative sanctions, and final dispositions. The objective of the regulation is to establish rules governing access to, and protection of, genetic resources, as well as the associated TK relevant to the conservation and sustainable use of biodiversity, and fair and equitable benefit sharing resulting from their use and exploitation. The rules apply to: (a) access to components of GR in the national territory, the continental shelf and exclusive economic zones for the purposes of scientific research, technological development or bioprospecting; (b) access to TK associated with GR relevant for the conservation of biodiversity, the integrity of natural resources and the use of its components; (c) the fair and equitable sharing of benefits derived from the development of components of GR and associated TK; and (d) access to technology and the transfer of technology for the conservation and use of biodiversity. The dispositions apply to all individuals and enterprises involved in bioprospecting, whether domestic or foreign.

The Ministry for Coordination of Environmental Affairs is the CNA for access and benefit-sharing of GR. In this role, it presides over an Inter-institutional Group on the Management of GR (GIGRG). This group is composed of representatives from the Ministry for the Coordination of Environmental Affairs, the Ministry of Science and Technology, the Ministry of Agriculture, the Ministry of Fisheries, the Ministry of Health, the Ministry of Education and Culture, the Ministry of Tourism, the Ministry of Mineral Resources, and the Ministry of Industry and Commerce. Guest participants may be invited from public and private entities, along with specialists in ABS.

The CNA, in consultation with the GIGRG, is responsible for: (a) granting authorization for access to samples of components of GR existing in situ, in the national territory, on the continental shelf, the territorial sea or exclusive economic zone, and associated TK; (b) granting authorization for the shipment of samples of components of GR and associated TK by national institutions, public or private, or foreign institutions; (c) supervising any shipment of samples of components of GR and associated TK; (d) publicizing lists of species for facilitated exchange (information exchange), consistent with international agreements to which the country is signatory; (e) granting special authorization for access to public or private national institutions that carry out research and development activities in biological or similar areas; (f) authorizing the shipment of samples of components of GR for foreign institutions; (g) accrediting a national public or private institution as faithful depositary of representative samples of components of GR to be sent by public or private national or foreign institutions; (h) authorizing access to components of GR and associated TK that contribute to the advancement of knowledge and that are not associated with bioprospecting when a foreign legal entity is involved; (i) concluding or granting contracts for use of GR and benefit sharing, as well as the terms for transfer of material; (j) periodically producing and disseminating a list of authorizations for access and shipping, terms of material transfers and contracts for use of GR and benefit sharing; and, (k) approving complimentary norms necessary for the implementation of the Regulation.

The CNA is also responsible for the creation and maintenance of a database that contains information obtained from the field during the collection of samples of GR, information on associated TK, information on all permits for access to GR and associated TK, information on ex situ collections, and terms of material transfer agreements and ABS contracts.

The GIGRG is responsible for: (a) assisting the CNA in taking decisions under the regulations; (b) monitoring the implementation of the terms of material transfer agreements and utilization of GR, and for the sharing of benefits concluded or granted by the National Authority; (c) coordinating the actualization of standards on ABS for GR and associated TK at the national level; (d) ensuring, in cooperation with other competent organizations, the implementation of norms on ABS for GR and associated TK; (e) developing annual technical reports on the status of ABS for GR and associated TK in Mozambique; (f) serving as a vehicle for the exchange of information on ABS on GR, and on associated TK at the national, regional and international level; (g) promoting programs for communication and public awareness on questions related to ABS on GR and associated TK at the national level; (h) proposing technical standards, criteria for authorization of access and shipping, as well as the elaboration of guidelines for ABS contracts and terms of material transfer agreements; and, (i) promoting training programs on ABS on GR and associated TK.

Access to components of GR located in situ on the national territory, continental shelf, and exclusive economic zone, and to associated traditional knowledge by means of a sample and/or request for information, is only authorized for national institutions, public or private, which carry out research and development activities in biological and similar areas, with prior authorization of its owners.

The person responsible for an expedition to collect GR under the Regulation must furnish the CNA with a declaration listing the material accessed at the end of their activities in the area accessed. The participation of foreign legal persons in the expedition undertaken to collect components of GR in situ and/or for access to associated TK is only permitted when undertaken in conjunction with a public national institution, which is responsible for coordinating the activities. When there is a significant public interest, as determined by the CNA or GIGRG, entry to a public area, community area or area on which there is a right of use and enjoyment of land for access to samples of GR does not require prior approval of the owners, but the owners must still benefit from the benefit-sharing obligations of the Regulation.

The ex situ conservation of samples of components of GR should be undertaken in the national territory and may, in addition, at the discretion of the CNA on the advice of the GIGRG, be held abroad. Ex situ collections must be registered with the CNA, but the authority to register collections may be delegated to one or more institutions under the Regulation 55. The shipment of samples of the components of GR can only be made from materials in ex situ conditions, held pursuant to the Regulation, and based on information on the intended use prior to signing a MTA. Whenever there is the prospect of commercial use of the product or process resulting from the use of components of GR, an ABS contract must be signed in advance. The shipment of samples of GR for facilitated interchange under international agreements must be done in accordance with the conditions defined in those agreements.

Authorization for access and shipping requires the prior consent of the local community involved, with the advice of the legal authority; the competent organ, when access takes place in a protected area; the holder of the right to use and enjoyment of the land, when access occurs in an area where

these rights exist; or the competent fishing or maritime authority when access takes place in national waters, the continental shelf or the exclusive economic zone (EEZ) . The holder of the access permit is responsible for reimbursing the rights-holders in the case of damage or prejudice when these are duly proven. The access permit for species with restricted endemism or those species that are threatened with extinction requires prior authorization from the competent organ. The institution possessing special authorization for access and shipping must forward the prior authorizations to the GIGRG during the period of validity, or they will be treated as cancelled. The terms of material transfer agreements will be based on the model approved by the CNA, in consultation with the GIGRG.

Articles 14-15 of the Regulation address the protection of associated traditional knowledge. Articles 16-18 address access to technology and technology transfer. Articles 19-24 address benefit-sharing. Article 25 lays out administrative sanctions. Articles 26-29 cover IP rights, supervision, destination of royalties, and the adequacy of activities.

Country Case Study: South Africa

South Africa uses an ad-hoc approach to govern ABS. The ABS framework is made up of sections of South Africa's Biodiversity Act of 2004, amendments to the Patents Act made in 2005, and the Bioprospecting and Access and Benefit-Sharing Regulations of 2008. Bioprospecting Guidelines were also issued in 2012 for users, providers, and regulators. South Africa ratified the Nagoya Protocol on 10 January 2013 and is undergoing a process of legal reform to bring its laws into compliance.

A key objective of the Biodiversity Act is to ensure the fair and equitable sharing of benefits arising from bioprospecting, which is defined as research, development or the application of indigenous biological resources for commercial or industrial use, which leverages traditional knowledge or applications of TK in the use of such resources. In regulating bioprospecting, the Act institutes an ABS regime over bioprospecting, including indigenous biological resources, administered by a Bioprospecting Trust Fund, to provide protection to traditional knowledge as key a contributor to the commercial or industrial application of biodiversity resources, and to ensure that royalties received are equitably dispersed.

To be eligible for a permit for bioprospecting derived from traditional knowledge, or from the traditional use of a biological resource, the applicant must disclose to stakeholders the full nature of the bioprospecting project. The applicant must also gain the prior informed consent of the Indigenous community providing access, and have both a mutual transfer agreement and a benefit-sharing agreement in place. The mutual transfer agreement must identify the particulars of the provider and the recipients of the biological resources, along with the type, area of source, quantity, purpose, and present potential uses of the biological resource. Similarly, the benefit sharing agreement must specify the characteristics of the indigenous biological resources subject to the agreement, the parties to the agreement, the scope of the use of the biological resources, regular review intervals, and the manner and extent to which communities will share in the royalties derived from bioprospecting.

Both respective agreements must be in a standard form, and are of no effect without Ministerial approval. Approval is granted when the Minister is satisfied there has been adequate disclosure to

affected stakeholders, and that the benefit-sharing agreement is equitable. The Minister may also seek technical advice on the agreement, or interfere with the contractual terms to ensure that the equitable sharing of benefits occurs. Lastly, the holder of the permit is liable for all mitigation costs to remedy any adverse impact on the environment deriving from the bioprospecting project.

The Patents Amendment Act of 2005 integrates protection for indigenous biological resources and traditional knowledge into existing patent legislation. In addition to incorporating definitions for indigenous biological resources and traditional use, the Amendment Act also requires applicants for patents to disclose if the patent is based on traditional knowledge or the use of the biological resources, and to show proper title for access. To demonstrate proper title, as required by the Biodiversity Act, an applicant must have material transfer and benefit-sharing agreements in place. Lastly, the submission of false information in relation to the role of traditional knowledge in the patent, and/or the holding of proper title via the required mutual transfer and benefit-sharing agreements are both grounds for revocation of the patent.

Country Case Study: Uganda

The National Environment (Access to Genetic Resources and Benefit-Sharing) Regulations, 2005, were adopted pursuant to sections 44 and 107 of the National Environment Act. The object of the regulations is to: (a) prescribe the procedure for access to genetic resources for scientific research, commercial purposes, bioprospecting, conservation, or industrial application; (b) provide for the sharing of benefits derived from genetic resources, and (c) to promote the sustainable management and utilization of genetic resources, thereby contributing to the conservation of the biological resources of Uganda.

The scope of the regulations is defined in article 4 to include access to genetic resources or parts of genetic resources, whether naturally occurring or naturalized, including genetic resources bred or intended for commercial purposes or for export. The regulations do not apply to certain situations, such as the exchange of genetic resources where the exchange is done by a local community among themselves and for their own consumption, or where the exchange is certified to be only for food, in cases of access to human genetic resources, and in cases of approved research activities intended for educational purposes.

The Uganda National Council for Science (UNCS) is designated as the CNA. Its functions include facilitating the negotiation and conclusion of all accessory and material transfer agreements, including the terms and conditions upon which access is to be granted. It is also responsible for ensuring that these agreements contain sufficient provisions on benefit-sharing, and ensuring that representative samples and specimens of genetic resources collected are deposited in Uganda, and that technology transfer and information exchange in relation to genetic resources is undertaken by the persons accessing the genetic resources.

To access genetic resources, the applicant must obtain a written PIC form, and enter into an accessory agreement with the lead agency, local community, or owner. The applicant must also carry out an environmental impact assessment where required, enter into a materials transfer agreement, and pay a fee. The nature of the person who can apply is undefined, but it appears that any individual or corporation can apply, and that foreign applicants do not require a local collaborator.

The regulations provide schedules for PIC, the accessory agreement, and the material transfer agreement. The MTA must clearly state the rights and obligations of parties, guarantee the deposit of duplicates of all specimens of the genetic resources accessed, and require the collector to provide for the sharing of benefits arising from the intellectual property rights accruing from genetic resources. It may also provide for the future application and use of genetic resources, including the sharing of benefits arising from the future application and use of genetic resources.

Moreover, the regulations require that benefits be shared in accordance with the principle of fairness and equity, and on mutually agreed terms. The regulations give examples of benefits, including monetary and non-monetary benefits. They also highlight that the PIC, accessory agreement, and MTA do not entitle any person to access genetic resources; rather, they enable an applicant to proceed with the application for an access permit. Applications must be submitted to the competent authority, which transfers them to the lead agencies that are responsible for the management and regulation of access to genetic resources under the Regulations. A lead agency reviews the application and advises. In so doing, the lead agency must ensure that the rights of local communities are protected, including verifying compliance with consent requirements and ensuring that accessory agreements have been concluded between the applicant and all affected parties.

Several provisions of the regulations are also dedicated to compliance. Indeed, where a collector has violated the regulations, the competent authority may revoke the access permit. Moreover, any person who breaches certain rules of the regulations (such as the obligation to obtain PIC, accessory agreement and MTA), commits an offence, and may be liable to a fine or imprisonment, as well as other sentences. Lastly, the permit holder must submit regular status reports to the competent authority and the lead agency on research and development relating to the genetic resources concerned. Uganda enacted the Industrial Property Act, 2014 which establishes various institutions for regulating various forms of IPRs, including their protection and commercialization.

NEGOTIATING COMMERCILIZATION AND TECHNOLOGY TRANSFER

Various instruments that can be used in negotiation for ownership, access and benefit-sharing are Assignment, Licence, TT agreements, Agreements, MTA, MAT, PIC, NDA, Franchising, and Joint Venture. In dealing with any of these instruments, it is important that relevant experts be roped in, including lawyers. The experts on the IP involved will be able to give some technical insights into the subject matter, while lawyers will navigate the various international and national laws to ensure that the resultant documents are legally sound. These specific instruments have been described at section X above and elsewhere in this document. Figure X below shows where and at what stage some of these instruments can be used in negotiations that touch on genetic resources. The case study on teff plant of Ethiopia underscores the importance of setting up a multi-disciplinary team for negotiating any of the instruments.

COUNTRY CASE STUDY: ETHIOPIA

TEFF AGREEMENT WITH HPFI OF NETHERLANDS

Teff belongs to the genus *Eragrostis*, which is one of a large family of wild grasses. Its origin is believed to be in Ethiopia where it is grown as a cereal, similar to maize, wheat, rye, and barley. As opposed to the other grains, Teff has no gluten. Gluten intolerance (coeliac disease or gluten sensitivity) is 'a lifelong autoimmune disorder in which a person's body cannot tolerate a group of grain proteins known as gluten'. Teff is gluten free and it can be used for the preparation of foods for gluten-intolerant individuals. In Ethiopia, teff grain is ground into flour and fermented for the preparation of teff-based foods such as injera (a traditional gluten-free pancake), local alcoholic drinks such as *tella* and *katikala.*

In 2004, Ethiopia signed its first material transfer agreement on teff. This agreement was made between the Ethiopian government (the Institute of Biodiversity Conservation and Research and the Ethiopia Agricultural Research Organization (EARO)) and the Dutch Company, Health and Performance Food International BV – HPFI - (now called Soil and Crop Improvement BV).

Health and Performance Food International can 'use the genetic resource of teff only for the purpose of developing non-traditional teff-based food and beverage products that include teff flour (gluten free flour, which can also be premixed, and a bread mix with teff) and seeds (which includes gluten-free beverages such as beer and distilled drinks). The agreement prohibited the company from using teff genetic resources for any unspecified uses, including chemical and pharmaceutical uses.

Following the specification of the uses of teff in the material transfer agreement, the Ethiopian government is bound by two terms. The first term states that the Ethiopian government shall not grant access to teff genetic resources to any other party unless the Ethiopian government secures the consent of the company. The second term binds Ethiopia not to export teff seeds to any other party.

Alternatively, if the company does not begin commercialization of the products, then Ethiopia was NOT free to enter an agreement with another company. Ethiopia got almost nothing from this

agreement. HPFI became insolvent and transferred its materials to other companies owned by the same people, but which companies had not agreement with Ethiopia!

Ethiopia got news that some obscure company with little connection to Ethiopia, the home of *teff*, has patented the naturally occurring grain, and as such possesses the legal rights to exclude others from making, using, selling or importing the grain, its flour and any food product made from it, may seem entirely odd. For most Ethiopians, who have cultivated the grain and consumed it as the staple diet *injera* for millennia, however, the patenting is nothing short of daylight robbery.

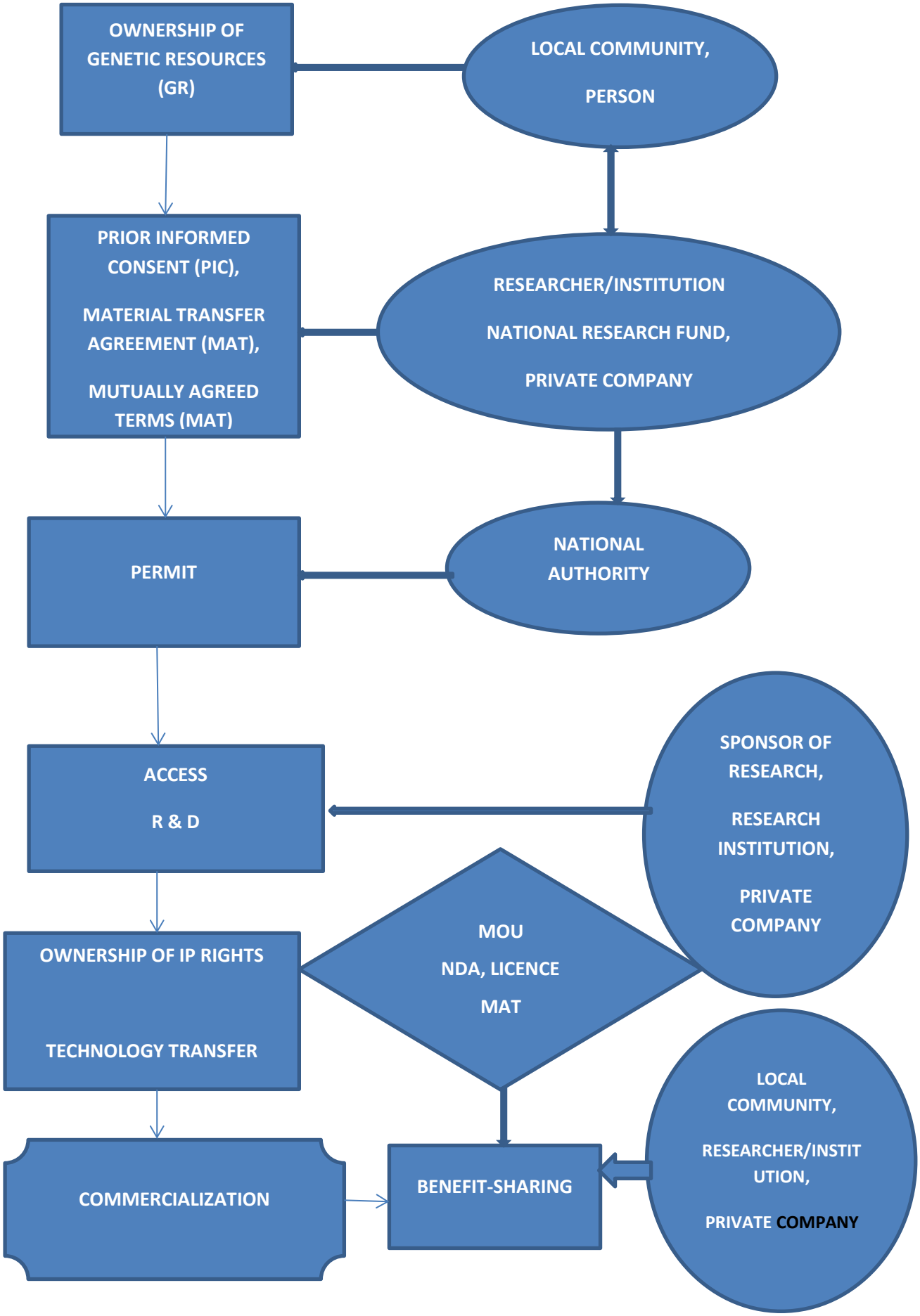
The first patent application was filed in the Netherlands on July 22, 2003 by *Soil and Crop Improvements Company (S&CI)*, a predecessor of HPFI, based on a Memorandum of Understanding (MoU) signed with *Ethiopian Agricultural Research Organization (EARO)* acting a representative of the Ethiopian government. The MoU allowed 1,440 kg of *teff* seeds, 12 *teff* varieties each weighing 120kg, to be shipped from Ethiopia to the Netherlands for research and development (R&D) purposes. Unfortunately, and rather negligently on the part of the Ethiopian government, the MoU had no provisions covering any IP rights that were likely to arise during the R&D efforts. This opened the door for S&CI and HPFI to assert ownership on all the IP rights that flowed from the R&D, which they did by filing patent applications with broad patent claims, first, as noted above, in the Netherlands, and then internationally, which included the United States, Japan and Europe at large (continent wide European patents, once granted, have to be "validated" in individual European member countries to be effective in those countries).

The United States and Japanese applications were abandoned as the patent offices in those countries did not deem the inventions to be patentable. The Dutch and European applications, however, were granted early on, the latter becoming validated (i.e., effective) in Great Britain, Italy, Germany, Belgium, Austria, Turkey, France and Spain. The patents in the last three countries were eventually abandoned for failure to pay patent maintenance fees, leaving the patents in the other six countries alive.

Ancientgrain instituted an action against Bakels for patent infringement. It claimed that, by offering Teff bread flour mix covered by the scope of its (Ancientgrain) patent, Bakels infringed its patents. It claimed inter alia, damages for patent infringement, compensation of €150,000 and its full litigation costs.

Ancientgrain became the patent holder in 2014 as the successor-in-title of the previous patentee. The patents refer to flour mixtures of Teff, dough variants made from them and food products and related methods. In its defence, Bakels argued that it could not be liable for patent infringement as the patents were invalid due to lack of novelty, or at least inventiveness. The only legal option left for Ethiopia more than a decade after the grant of the patents, is to challenge the patents as invalid in the national courts of the respective countries.

FIGURE X: MODEL OF RESEARCH COMMERCIALIZATION AND TECHNOLOGY TRANSFER FRAMEWORK (Moni Wekesa, 2020)



SCHEDULE I: SAMPLE AGREEMENT ON ACCESS AND BENEFIT SHARING FOR

NON-COMMERCIAL RESEARCH

(Adapted from - Swiss Academy of Sciences 'Agreement on Access and Benefit Sharing for Non-Commercial Research' (Bern, 2010)

1. *Preamble*

   The purpose of this Agreement is to set out the conditions for the use of genetic resources, any associated Traditional Knowledge (TK) and the sharing of resulting benefits between the parties concerned in accordance with the Convention on Biological Diversity (the "CBD"), particularly in respect with the principles established under its Articles 1, 8(j), 15, and the Bonn Guidelines.

   The Agreement contains Mutually Agreed Terms (MAT) according to Article 15.7 CBD.

   The Agreement is designed to promote non-commercial academic research, such as research in taxonomy, ecology, biochemistry and genetics, and to foster conservation and the environmentally sound and sustainable use of genetic resources.

   Its objective is to provide a sound basis for cooperation, transparency, communication, and trust between the parties to the Agreement, taking account of the concerns of both providers and users of genetic resources

2. *Parties to the Agreement*

   [Insert the name and details of the following:

   , State and Institution (competent ABS national authority) , the contact person responsible for the implementation of the Agreement on behalf of the institution]

   Together hereinafter referred to as the "Provider".

   And

   [Insert the name and details of the responsible research institution, the representative of the research institution responsible for the implementation of the Agreement]

   Represented by the authorized head or member of the research team; authorized researcher

   [Insert the name and details of researcher].together hereinafter referred to as the "User".

   If the Provider is a holder of traditional knowledge (TK), a separate Agreement between researchers (as the User) and the holder of traditional knowledge (individual, community, legitimate representative of the community) needs to be concluded.

3. *Prior Informed Consent*

   This is a mandatory requirement in all international and local instruments. This can take two forms –

Option 1 - The Agreement is based on the Prior Informed Consent (PIC) issued beforehand by the Provider to the User for the access to the genetic resources concerned. The PIC document is attached to this Agreement and is considered an integral part of the Agreement.

Option 2 - The Provider hereby confirms that he/she has been informed on the research project by the User and consents to provide access to genetic resources in situ and/or ex situ necessary to carry out the research in accordance with the research project attached to this Agreement.

4. *The Purpose of the Agreement*

The purpose of this Agreement is to specify the terms for-

1. Accessing genetic resources,

2. Their utilization in accordance with the PIC,

3. Their possible transfer to third parties, and

4. for sharing the benefits resulting from the utilization of genetic resources.

If access is requested for a research project that includes Traditional Knowledge (TK) associated to the genetic resources, the sharing of benefits in relation to TK is to be agreed upon in a separate, ancillary agreement with the holders of the TK and according to the national law of the providing country if such legislation exists.

5. *Terminology*

In this Agreement the terms defined in Article 2 CBD shall have the same meaning, unless otherwise defined in this article. Terms from other instruments can be included with necessary modifications.

6. *Genetic Resources to be Accessed*

The User shall have access to the following Genetic Resource(s): [Insert list of the Genetic Resources to be accessed (species or strains or any other attributes of the material to be accessed that may help to define the genetic resources)].

Option 1 Since the species/strains present at the collection site are not known to the User at the time of concluding this Agreement, a general account of species/strains most likely to be collected is given in Annex XX. A list of the collected samples according to the researcher's field-notes is presented to the Provider within XX months after having gathered the samples.

Option 2 If the collected samples cannot be identified in the list of collected samples within the above prescribed period, their identification has to be shared with the User as soon as it is available.

7. *Utilization*

The Material may be utilized for non-commercial purposes including for academic research and collections, and for training, teaching, and education. The User must comply with the User's and Provider's national regulations and with relevant international law. The utilization of the Material or derived information for any type of Commercialization is prohibited.

Option 6.1 The Genetic Material shall be used exclusively for the following purposes: [insert allowed activities and/or uses].

8. *Change in Utilization from Non-commercial to Commercial*

The Commercialization of the Genetic Material and related information is prohibited. Any change in utilization from non-commercial to commercial shall require a new Prior Informed Consent in writing issued by the Provider. In this case, the terms of such Commercialization shall be subject to a separate agreement (MAT) between the involved parties.

9. *Transfer of the Genetic Resources (and Associated TK) to Third Parties*

It is important that the User binds Third Parties to the terms of this Agreement in order to avoid uncontrolled flow of genetic resources. If institutions or persons are appointed for specified analytical and technical auxiliary work, the conditions of this Agreement must be included in the contract regulating the cooperation. Several options can be explored:

Option 1 The User delivers to the Provider annually a list of the Third Parties to whom the Genetic Resource was transferred to.

Option 2 The User shall maintain retrievable records of any transfer of the Genetic Resources to Third Parties under the conditions corresponding to this Agreement.

Option 3 The User shall require the Third Party to sign an agreement containing identical obligations on Use and Transfer of the Genetic Resources (and associated TK) as set out in this Agreement.

Option 4 The Genetic Resources [and their associated TK] may be transferred to Third Parties only after having obtained the written consent of the Provider and in accordance with Mutually Agreed Terms between the Provider and the Third Party. Exempted is a temporary transfer of the Genetic Resource to taxonomic specialists for scientific identification. [This option is an extremely limiting measure. It is meant primarily in cases where the Material has associated TK. Given the current problem regarding the protection of TK, we assume that the Provider may have an interest to keep knowledge secret and therefore may want strict control on any further transfer of the Material and TK.]

Option 5 The User is entitled to deposit the Genetic Resources in collections that are accessible without restrictions for research purposes such as herbaria, museums, and culture collections.

Option 6 If the Genetic Resources are transferred to an ex situ collection of living Genetic Resources for educational purposes (such as zoos, botanic gardens), this institution is – in addition to the obligations of this Agreement – obliged to take any

appropriate precautions to prevent the Genetic Resource coming into the possession of any Unauthorized Person.

Option 7 If the use or storage of the Genetic Resource is subject to special conditions or restrictions, such conditions/ restrictions have to be clearly indicated on the label or otherwise linked to the sample, when transferring the Genetic Resource to Third Parties, including the indication of where the information concerning the special conditions/restrictions can be found. [This provision aims at eliminating any liability of the User in cases where the special conditions/restrictions of use are not communicated properly. This includes not marking the sample itself or not providing reference to information e.g. in the internet.]

10. Benefit Sharing

The benefits arising from the access and use of the Genetic Resources shall be shared fairly and equitably by the User, in accordance with the principles established in the CBD. Basic benefits to be shared include:

1. The offer to the Provider to include local researchers in the research activities, if such interest exists.

2. In case of publications or oral presentation of the research results, full acknowledgement is to be given to the source of the Genetic Resource;

3. If TK associated to the Genetic Resources is involved, the research results published or presented orally will include full acknowledgement of the source of the Genetic Resources and the TK, if so required by the providers.

4. The Provider will receive a copy of all publications;

5. Research results will be communicated to involved stakeholders (e.g. communities, indigenous people) in an adequate manner and according to reasonable requirements of the Provider;

6. If applicable, share duplicate specimens with the repository in the Provider country in accordance with good scientific practice. In addition, the User agrees to share the following benefits (choose from the list in Appendix I).

Parties to the Agreement are encouraged to extend the list and add other benefits as well.

11. Rights and Obligations of the Provider

The Provider defined in Article 1 is the responsible contact point for the User for the entire duration of the present Agreement. The Provider has the obligation to facilitate access to the Genetic Resources. This includes the facilitation of the acquisition of other permits required in accordance with the relevant national or regional regulations in the Provider country as well as export permits.

Option 1 The Provider designates the following institution [insert the relevant institution] as the responsible contact point for the User for the entire duration of the present Agreement. Contact details of the technical contact point are provided

in Annex [XX] to this Agreement. The Provider has the right to receive information on the state of the research from the User as agreed upon (see Article 12 on Reporting).

Option 2 The Provider requests that the following analytical parts as set out in the project are performed in the providing country: [insert a list of analyses to be performed in the Provider's country]. The Provider confirms that all necessary conditions (equipment, staff, and consumables) for conducting the analyses are available;

12. Rights and Obligations of the User

The User is entitled to administrative support and guidance to facilitate the acquisition of the necessary permits required by the Providing country. The User shall not use the Genetic Resource nor derivatives generated in the research for any commercial purposes, nor shall the User commercialize any Product derived from the Genetic Resource, unless with the written consent of the Provider. The User is obliged to take all reasonable precautions to prevent the Genetic Resource coming into the possession of any Unauthorized Person. The User is obliged to inform the Provider about any unforeseen research results that are of potential commercial interest, prior to any disclosure of this information to the public.

Option 1 If the research implies TK associated to the Genetic Resource, the User is obliged to respect any relevant international law and the national and regional regulations in the Provider's country, and has to proceed according to the instructions of the Provider. In any case the User is obliged to respect the customary law of the holders of the TK and has to apply ethical standards.

Option 2 Corresponding to national law the User will conclude an ancillary contract with the holders of TK and/or the private land owners of the genetic resources. The ancillary contract forms an integral part of this Agreement.

13. Data Sharing

This provision has the purpose to establish a long-term access to data generated by the User, which goes beyond the information that can be found in publications. It is up to the Provider to spell out the information of the vital interest for him/her. This provision should contain the precise description of the information/data required and the manner of the data transfer, such as time period, communication means, etc. Parties to the Agreement should account for potential barriers that transfer of data may bring along and regulate it as detailed as possible. For example, if there is a language barrier between the Provider and the User, the Parties should define the official language to operate with, or to define the particular standard to be used, if there would be more options, and so on. [A separate agreement on access to and use of data could be made and annexed hereto as part of this agreement]

14. Reporting

The User will deliver a written report in accordance under any of the following options-

Option 1 The User shall submit an annual written report on the research accomplished.

Option 2 Upon request of the Provider, the User submits a written report on the research accomplished.

Option 3 Upon request of the Provider, the User submits an annual written report on the research accomplished. The report shall include a list of Third Persons to whom the Genetic Material has been transferred.

Option 4 Since the Provider is a private citizen, upon his/her request, the report is translated into the local language by the User and adapted to a non-scientific audience.

15. Intellectual Property Rights

The User shall not claim any intellectual property rights over the Genetic Resource in the form received. If the User wants to obtain intellectual property rights on research results such act shall be treated as change in utilization and thus shall be regulated under Article 8 of the present Agreement. If the Provider wishes to obtain IPR on research results, such act shall be treated as change in utilization and shall be regulated under Article 8 of the present Agreement. In particular the ownership of the IPR and the distribution of the value derived from the IPR are to be negotiated.

16. Publications.

The User has the right to publish the results of the research related to the Genetic Resource according to Article 6 of the present Agreement, and according to good scientific practice. The origin of the Genetic Resource has to be acknowledged.

Option 1 The User has the right to publish the results of the research related to the Genetic Resource according to good scientific practice. The origin of the Genetic Resource has to be acknowledged, as well as the sources of TK associated with the Genetic Resource.

Option 2 The holder of TK associated to the Genetic Material has the right to request confidentiality of specific information [describe the information subject to confidentiality] such as for spiritual reasons; to prevent the depletion of the genetic resources; and/or to prevent unsafe/hazardous applications of the TK in the health sector.

Option 3 If the User, in the course of the research, discovers any unforeseen commercial potential of the Genetic Material, he/she is obliged to share such information with the Provider prior to any publication of such information. If the Provider intends to pursue a potential commercialization, this is subject to negotiations between the Provider and the User according to Article 8. The Provider agrees not to hold up the User's research work unless concerns are concrete and justified in terms of well-defined proprietary interest.

Option 4 If the User is prevented from publishing the results of the research due to the Provider's wish to obtain a patent over the research results, the Provider shall file the patent application within [XX] months. After the agreed period, if the Provider has failed to file a patent application, the User has the right to proceed with the publication of the research.

17. Handling of the Genetic Material after Termination of the Agreement

Upon completion of the project, Genetic Material will be stored or disposed of according to the utilization agreed under Article 7.

[This option takes account of the Provider's concerns that published results may reduce his/her opportunity to derive commercial value from his/her genetic resources. On the other side, it takes account of the User's interest that the Provider's decision to commercialize the material does not significantly impede or delay research.]

Option1 If the Genetic Material has been placed in storage, or in public collections, upon expiration of the Agreement or its termination, the Genetic Material may be available for use only under the same conditions as contained in this Agreement.

18. Duration and Termination of the Agreement

The present Agreement shall end on [insert the date] and may be renewed upon the mutual agreement of the Parties.

Option 1 The present Agreement shall be deemed to be in force until the Genetic Material is returned to the satisfaction of the Provider upon completion of the Project. Regarding the Genetic Material related information, the present Agreement shall be subject to any associated rights, such as copyright or trade secrets.

Option 2 When a Party to the present Agreement wants to terminate the Agreement prior to the completion of the Project, the Party shall give written notice [XX] months in advance.

The present Agreement may be terminated at any time by mutual agreement of the Parties. The present Agreement may be terminated immediately, in case of its breach.

19. Settlement of Disputes

The Parties agree to make attempts in good faith to negotiate the resolution of any disputes that may arise under this Agreement. If the Parties are not able to resolve a dispute within a period of [XX] months, such dispute shall be finally settled by an arbiter to be mutually agreed between the Parties.

Option If the Parties are not able to resolve any dispute within a period of [XX] months, such dispute shall be resolved before the [XXXX] Court law as the only competent body for resolving disputes arising under this Agreement and in accordance with [XXX]. [Insert applicable Law; Jurisdiction]

[Parties are encouraged as much as possible to use alternative dispute resolution (ADR) mechanisms

20. Other Provisions

Parties may also include provisions on other matters of their importance and regulate issues such as Warranties, Force Majeure, and Disclaimer.

21. Benefit-Sharing – see Appendix I

SCHEDULE II - INDICATIVE LIST OF NON-MONETARY BENEFITS (ADAPTED FROM THE CBD BONN GUIDELINES)

1. Sharing of research and development results; ,,
2. Collaboration, cooperation and contribution in scientific research and development programmes, particularly biotechnological research activities, where possible in the provider country; ,,
3. Performing certain analytical parts of the research in the providing country to the extent that adequate equipment is available and the User has the necessary resources (funding, time) for such arrangement. ,,
4. Participation in product development; ,,
5. Collaboration, cooperation and contribution in education and training; ,,
6. Admittance to ex situ facilities of genetic resources and to databases; ,,
7. Transfer to the provider of the genetic resources of knowledge and technology under fair and most favourable terms, including on concessional and preferential terms where agreed, in particular, knowledge and technology that make use of genetic resources, including biotechnology, or that are relevant to the conservation and sustainable utilization of biological diversity; ,,
8. Strengthening capacities for technology transfer to user developing country Parties and to Parties that are countries with economies in transition and technology development in the country of origin that provides genetic resources. Also to facilitate abilities of indigenous and local communities to conserve and sustainably use their genetic resources; ,,
9. Institutional capacity-building; ,,
10. Human and material resources to strengthen the capacities for the administration and enforcement of access regulations; ,,
11. Training related to genetic resources with the full participation of providing Parties, and where possible, in such Parties; ,,
12. Access to scientific information relevant to conservation and sustainable use of biological diversity, including biological inventories and taxonomic studies; ,,
13. Contributions to the local economy; ,,
14. Research directed towards priority needs, such as health and food security, taking into account domestic uses of genetic resources in provider countries; ,,
15. Institutional and professional relationships that can arise from an access and benefit-sharing agreement and subsequent collaborative activities; ,,
16. Food and livelihood security benefits; ,,
17. Social recognition; ,,
18. Joint ownership of relevant intellectual property rights.

SCHEDULE III

SOFTWARE DEVELOPMENT NON-DISCLOSURE AGREEMENT

(DESCRIPTION OF INTENDED PRODUCT)

This Non-Disclosure and Confidentiality Agreement (hereinafter only 'the Agreement') is entered into

BETWEEN

ABC of P.O. Box ---------- Nairobi, email---------- (hereinafter only 'the Client') which expression shall include his agents, officers, successors, assigns, licensee and servants of the one part

AND

XYZ of Post Office Box Number ---------- and ID Number ---------- (hereinafter called '**the Developer'** which expression shall where the context so admits include its successors, agents, servants and assigns) of the one part

In consideration of being furnished confidential information by the Client for the purpose of building [DESCRIBE THE PRODUCT] (hereinafter 'the product'), the Client and the Developer agree as follows-

1. **Confidential information**. The term 'Confidential Information' as used in this Agreement shall mean any data or information that is competitively sensitive material and not generally known to the public, including, but not limited to, information relating to any of the following: product development and plans, proprietary concepts, documentation, marketing strategies, finance, operations, software products, software source code or any related codes in all formats, systems, specifications, object code, inventions, databases, data, technical information, pricing, customer profiles, customer lists, design, present or future business activities, sales estimates, reports, business plans and internal performance results relating to the past, customer relationships, trade secrets, flow charts, the product, which the Client considers confidential.
2. **Exclusion from Confidential Information**. The obligation of confidentiality with respect to Confidential information will not apply to any information-
    a. If the information is or becomes publicly known and available other than as a result of prior unauthorized disclosure by the Developer;
    b. If the information is or was received by the Developer from a third party source which, to the best knowledge of the Developer , is or was not under a confidentiality obligation to the Client with regard to such information;
    c. If the information is disclosed by the Developer with the Client's prior written permission and approval;
    d. If the information is independently developed by the Developer prior to disclosure by the Client and without the use and benefit of any of the Client's Confidential information; or
    e. If the Developer is legally compelled by applicable law, by any court, governmental agency or regulatory authority or by subpoena or discovery request in pending litigation but only if, to the extent lawful, the Developer gives prompt written notice of that fact to the Client prior to disclosure so that the Client may request an injunctive order or other remedy to prevent or limit such disclosure and in the absence of such protective order or other remedy, the Developer may disclose ONLY such portion of the Confidential Information which it is legally obligated to disclose.
3. **Obligation to maintain Confidentiality**- With respect to Confidential Information-

a. Developer agrees to retain the Confidential information of the Client in strict confidence, to protect the security, integrity and confidentiality of such information and to not permit unauthorized access to or unauthorized use, disclosure, publication or dissemination or Confidential information except in conformity with this Agreement;
b. Developer shall adopt and or maintain security processes and procedures to safeguard the confidentiality or all Confidential information received by the Client using a reasonable degree or care, but not less than that degree of care used in safeguarding its own similar information or material;
c. Developer shall not publish, copy, or use the Confidential Information for their sole benefit;
d. Upon the termination of this Agreement, Developer shall ensure that all documents, memoranda, notes and other writings or electronic records prepared by it that include or reflect any Confidential information are returned or destroyed as directed by the Client;
e. If there is an unauthorized disclosure or loss of any of the Confidential information by the Developer, the Developer will promptly, at its own expense, notify the Client in writing and take all actions as may be necessary or reasonably requested by the Client to minimize any damage to the Client or third party as a result of the disclosure or loss; and
f. The obligation not to disclose Confidential information shall survive the termination of this Agreement and at no time shall the Developer be permitted to disclose Confidential information, except to the extent that such Confidential information is excluded from the obligations of confidentiality under this Agreement pursuant to paragraph 2 above.

4. **Non-Disclosure or Transaction**. Without Client's prior written consent, Developer shall not disclose to any other person, except to the extent, the provisions of paragraph 2 apply:
    a. The fact that confidential information has been made available to it or that it has inspected any portion of the Confidential information;
    b. The fact that the Client and Developer are having discussions or negotiations about the transaction; or
    c. Any of the terms, conditions or other facts with respect to the transaction.
5. **Relationship.** The Parties agree that there is no such statement in this Agreement that suggests any Party is an employee, partner, or that the Software is a joint venture. This clause shall prevail over any representations proposals or prior agreements that contradict this clause.
6. **Non-Compete.** The Developer agrees that at no time from the date of this Agreement until 5 December 2089 shall Developer engage in any business activity which is competitive with the Client, nor work for any company which competes with the Client.
7. **Non-Solicitation**. From the date of this Agreement until 5 December 2089,
    a. Developer agrees to not solicit any customer or potential customer associated with the Client to terminate or breach a contractual or other relationship with the Client;
    b. Developer agrees to not solicit for or sell the product to any customer or potential customer without the written authority of the Client.
8. **Representatives.** The Developer will take reasonable steps to ensure that its representatives (agents, servants, employees, officers, directors, subsidiaries, affiliates and

successors) adhere to the terms of this Agreement. The Developer shall be liable for any breach of this Agreement by any of its representatives.

9. **Disclaimer.** There is no representation or warranty, express or implied, made by the Client as to the accuracy or completeness of any of its Confidential information.
10. **Remedies.** Each party agrees that use or disclosure of any Confidential information in a manner inconsistent with this Agreement will give rise to irreparable injury for which –
    a. Monetary damages may not be a sufficient remedy for any breach of this Agreement by such a party;
    b. The other party may be entitled to specific performance and injunction and other equitable relief with respect to any such breach;
    c. Such remedies will not be the exclusive remedies for any such breach, but will be in addition to all other remedies available at law or in equity; and
11. **Notices.** All notices given under this Agreement shall be in writing. A notice is effective upon receipt and shall be sent via any one of the delivery methods recognized at law.
12. **Termination**. This Agreement shall terminate on the earlier of-
    a. by operation of law, or
    b. On 5 December 2089
13. **Amendment.** This Agreement may be amended or modified only by a written agreement signed by both of the parties.
14. **Jurisdiction.** This Agreement shall be governed and construed in accordance with the laws of Kenya.
15. **Dispute Resolution.** Any dispute arising with regard to this Agreement shall in the first place be subjected to negotiation for at most one month, failing which mediation for about one month, failing which to arbitration.
16. **Miscellaneous.**
    a. This Agreement shall inure to the benefit of and be binding on the respective successors, assigns and or licensees of the parties.
    b. Any provision of this Agreement adjudged to be illegal, invalid or unenforceable in whole or in part shall not affect the remaining provisions.
    c. Neither party will be charged with any waiver of any provision of this Agreement, unless such waiver is evidenced in writing signed by the party and any such waiver will be limited to the terms of such writing.
17. This Agreement shall
    a. be read together with the other Agreements dated 3 December 2019 and ---------- as if they all form one Agreement.
    b. Apply to any subsequent agreements between the Client and Developer related to this product.

DATED AT NAIROBI this _____ day of _____ 2020

Signed by }
ABC } _____
}
In the presence of }
}
}
}

}
}
}
}

COMMISSIONER FOR OATHS }

Signed for and on behalf of }
XYZ }

_____

}

In the presence of – }
}
}
}
}
}
}

COMMISSIONER FOR OATHS }

Non-Disclosure Agreements (NDA)

Research is likely to yield valuable information that of its own could help improve a business, form a basis for further and more pointed research, or lead to an invention. Scientists easily get excited at the idea of new information and many are tempted to want to be the first ones to announce such information to the scientific community. Sometimes, collaborating scientists on one project could also be collaborating with quite another different team on other projects that could require the use of the newly discovered information. It is also necessary to determine the protocol of who discloses which information, where and how, even in publications and or at conferences. Other times, it may be necessary to disclose sensitive information to potential partners regarding preliminary results of your R&D, on your production processes, Trade Secrets and know-how.

Before sharing research secrets and sensitive information it is necessary that the all actors sign a Non-Disclosure Agreement (NDA). NDAs bind parties to keep secret what comes their way in connection with a given project. It can also specify the manner and to whom such confidential information is to be disclosed to. Premature disclosure could lead to denial of a patent and loss of trade secrets. NDA may be bilateral or unilateral.

NDAs can also be used to bind employees and consultants from divulging sensitive information of an institution. Collaborating institutions must ensure that all collaborators have signed a NDA. Breach of a NDA can result in court proceedings where compensation can be sought.

Typically a NDA must include the details of the person being bound, a description of the research project or proprietary work , manner of dispute resolution, the choice of law, list of specific purposes for which the person being bound can use the information for, provision for damages (compensation), and the duration of the NDA (see sample ------). Each NDA is unique and it must address to specific needs and circumstance.