

Federal Public Service of Public Health, the Safety of the Food Chain and the  
Environment, Directorate General of the Environment  
International Affairs Section  
Biodiversity Unit



Centre for the Philosophy of Law  
The Catholic University of Louvain  
Research Unit on the Governance of Biodiversity

## BELGIAN FEDERAL SURVEY

***Public infrastructure and regulations on access to  
genetic resources and the sharing of benefits  
arising out of their utilisation for innovation in  
life sciences research***

***Access to, conservation and use of biological diversity in the  
general interest***

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July 2006

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## Acknowledgements

This report is the fruit of reflections and the investment by a certain number of people whom we wish to thank warmly.

This publication was produced for the Federal Public Service of Public Health, the Safety of the Food Chain and the Environment – Directorate General of the Environment, with a view to supporting and underpinning its reflections on the degree of knowledge of and account taken by Belgian stakeholders of the Convention on Biological Diversity in the area of access to genetic resources and the fair and equitable sharing of benefits from their utilisation. While quantified data is difficult to obtain in this field, the qualitative results from the study are essential due to the questions that they raise and the orientations they suggest.

We are happy to be able to express our thanks here to everyone who through their presence, assistance and encouragement have made the creation of this research possible. Among other things, we think of Marie Laffineur and Catherine Maréchal, as well as Fabienne Vervalle, Marie-Claire Brand, Benjamin Six and all of the staff at the Centre for the Philosophy of Law at UCL.

We also wish to express our gratitude to different institutions which supported and reinforced our research. We would like to mention the *Veterinary Unit at the Life Sciences Institute* in UCL which helped us in the persons of Prof. Donnay, Prof. Barte and Ms Daniaux in their capacity as experts. We thank Prof. Tyteca of the *Ecology and Biogeography Unit* at UCL, who also placed his knowledge at our disposal. Similarly, we are also grateful to Mr Patiny from the *Evolutionary and functional entomology Unit* in the University Faculty of Agronomic Sciences in Gembloux, as well as the *Walloon Potato Sector Council*, and notably Mr Ducatillon and Ms Romain.

We are also grateful to those who participated in the pilot interviews, for the time that they dedicated and the wise advice that they conveyed. Finally, we would like to thank all of the people who responded to the survey and, as a result, made the compilation of this report possible. We hope that this study will be a working tool and instrument of reflection which will lead to practical measures by organisations which sought its compilation, and that it can advance regarding access to and conservation of biological diversity in the general interest and will be useful to different Belgian users of genetic resources.

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## **BELGIAN FEDERAL SURVEY**

### **Public infrastructure and regulations on Access to genetic resources and the sharing<sup>2</sup> of benefits arising out of their utilisation for innovation in life sciences research**

#### ***Access to, conservation of and use of biological diversity in the general interest***

In order to contribute to the establishment of Belgian positions on an international system and especially to obtain representative information on the degree of knowledge and the account taken by Belgian players of the provisions of the Convention on Biological Diversity in terms of access to genetic resources and fair and equitable sharing of benefits arising out of their utilisation (ABS), the Directorate General of the Environment in the Belgian Federal Public Service of Public Health, the Safety of the Food Chain and the Environment launched a call for tenders with the aim of conducting a survey. The subject of the latter is: *a contract relating to the analysis of the degree of knowledge of and account taken by Belgian stakeholders of the provisions of the Convention on Biological Diversity in terms of access to genetic resources and the fair and equitable sharing of benefits arising out of their utilisation.*

In November 2005, the public authorities entrusted the conducting of this study to the Research Unit on the Governance of Biodiversity at the Centre for the Philosophy of Law (which specialises in ABS issues) in the Catholic University of Louvain. The survey was completed in June 2006. It was necessary to collect information from Belgian stakeholders to complete this survey. The inclusion of all of the public and private institutions and all other Belgian players potentially involved in the utilisation of genetic resources was envisaged.

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<sup>2</sup> ABS: Access to genetic resources and sharing of the benefits arising out of their utilisation.

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## **List of abbreviations**

§: paragraph

ABS: Access to genetic resources and Benefit Sharing

APAQ-W: Walloon Agency for the Promotion of Quality Agriculture

Art.: article

Asbl: association sans but lucratif [non-profit association]

BCCM: Belgian Co-ordinated Collections of Micro-organisms

CBD: Convention on Biological Diversity

COP: Conference of the Parties on the CBD

EU: European Union

FPS: Federal Public Service

GRs: Genetic Resources

IPEN: International Plant Exchange Network

IPGRI: International Plant Genetic Resources Institute

KUL: Katholieke Universiteit Leuven

MTA: Material Transfer Agreement

NGO: Non-Governmental Organisation

R&D: Research and Development

SME: Small and Medium-size Enterprise

UCL: Université Catholique de Louvain [Catholic University of Louvain]

UPOV: International Union for the Protection of New Varieties of Plants

VALSE: Valuation for Sustainable Environments

WIPO: World Intellectual Property Organisation

## Abstract

In order to contribute to the establishment of Belgian positions on an international ABS regime and especially to obtain representative information on the degree of knowledge and the taking into account by Belgian players of CBD provisions regarding access to genetic resources and the fair and equitable sharing of the benefits arising out of their utilisation (ABS), the Directorate General for the Environment of the Belgian Public Federal Service of Public Health, Safety of the Food Chain and the Environment launched a call for tenders to carry out a survey. In November 2005, the public authorities awarded the execution of this study to the Research Unit on the Governance of Biodiversity at the Centre for the Philosophy of Law (which specialises in ABS issues) of the Catholic University of Louvain.

Only biological resources which did not originate in Belgium were studied in the framework of this study. For this study, the term 'biological resources' includes non-human organisms or parts of organisms used in fundamental research and research & development in life sciences. This includes material such as phytogenetic resources (algae, bryophytes, vascular plants), animal genetic resources, mushrooms and yeasts, bacteria and non-independent organisms (viruses, plasmids, etc.).

Two important constraints had to be taken into account when choosing the methodology for this survey: (1) the vaguely defined and moving boundaries of the statistical population of the stakeholders 'concerned' (2) the difficulty of the subject of the study, which covers complex aspects such as intellectual property rights to genetic resources and the traceability of movements of these resources.

For these reasons we decided to adopt a qualitative approach by stage. This approach is based on the recommendations of the VALSE project on survey methodology (Valuation for Sustainable Environment, financed by the EU, and published in *Ecological Economics*, Vol. 34/2). We pursued the following working stages:

1. in-depth interviews with 9 stakeholders representing sectors affected by ABS,
2. identification of the stakeholders: a list of addresses of the 1,109 organisations operating in the different sectors affected by the exchange of resources with foreign countries,
3. establishment of a random sample that was questioned in-depth using detailed questionnaires,
4. analysis and processing of the results of the questionnaires,
5. a meeting of a group of experts to compare the results with other European surveys in order to obtain a consensus on recommendations.

We carried out in-depth surveys among a sample of 400 organisations, selected at random from the main list of the identified population. We received 57 responses, with a relatively homogenous response across the different sectors. Due to the random construction of the sample and the homogenous level of response, we can assert that our qualitative sample is representative and indicates the general trend among the stakeholders involved in exchanging genetic resources, except for the 'biotechnologies' sector, which was not represented in the responses to the questionnaires, plus the 'research' and 'collections' sectors, which were slightly over-represented. In contrast, the healthcare sector and processing industries are slightly under-represented.

The questionnaire deals with:

- (1) the degree of knowledge of the CBD among Belgian stakeholders,
- (2) the degree of application of ABS provisions contained in Article 15 of the CBD and in the Bonn guidelines,
- (3) an overview of the institutional models and practices for the exchange of material in order to contribute to the current negotiations on the implementation of the Bonn guidelines.

The two main results of the study are:

- Firstly it appears that the CBD is well known in the collections and research sectors, regardless of whether these involve private or public stakeholders. The CBD is little known or unknown in other sectors which include more private players than public players. This finding shows that the CBD seems to be better known by players involved in upstream research and innovation (fundamental research, or applied research with numerous and varied possible practical applications), and less known by the players involved in downstream R&D (market products, trading activities) regardless of whether they are private or public players.
- Secondly, it seems that the implementation of ABS provisions is relatively widespread relating to prior informed consent, but almost non-existence as regards sharing benefits, as the main tool for establishing prior consent is a research partnership with the supplier country.

We have formulated two series of more specific recommendations linked to the ABS system:

1) *Documentation and information relating to the exchange of resources*

- Documenting the exchange of material would facilitate the implementation of ABS measures. Including the country from which the material originates in the documentation would make it possible to identify the legal entity competent for implementing and applying ABS regulations for the harvested material. This is compatible with a certificates of origin/source/legal provenance system in the supplier country, but also with other recognised international mechanisms.
- This recommendation would help to create or reinforce the legal security needed by (private and public) stakeholders involved in R&D downstream in the chain. This would allow them to evaluate cases where sharing benefits would apply during access to material from upstream players (research centres and collections).
- This recommendation would develop confidence between suppliers and users of genetic material (where culture collections are often intermediaries), by making transactions more transparent.

2) *Free access policies in countries which use resources*

One of the main difficulties linked to the implementation of appropriate ABS regulations is the high cost of system transactions. Researchers would be most penalised by a system where the transaction costs are high (research work is expensive and only produces a small direct yield or none whatsoever). This justifies supplementing provisions to share benefits (aimed particularly at downstream research) with provisions that create incentives for players upstream in the R&D process. This can be done *inter alia* by developing:

- A facilitated policy for accessing and disseminating biological material within public research institutions (universities, public culture collections, etc.), by developing guidelines by sector, as is the case for example for the ‘National Institutes of Health’ in the United States. These guidelines could contain measures that make it possible to ensure that public institutions’ resources remain the ‘public property’ domain for all research use upstream in the innovation chain;
- A ‘licences’ and ‘benefit sharing’ policy differentiated for genetic material downstream in the innovation chain (i.e. with properties which are already known, from which specific applied products can be developed): non-restrictive dissemination of the genetic material and the associated information for specific non-commercial or ‘humanitarian’ applied research and an exclusive and restrictive licence contract for all research pursuing commercial applications.



# Chapter 1 – Introduction

## 1.1 Historical context

The Convention on Biological Diversity (CBD) was adopted in Rio de Janeiro in 1992. Its entry into force following ratification by the 30 Member States dates from 1993. In June 2006, 188 States were parties to the CBD.

One of the three goals of the Convention on Biological Diversity is:

‘the fair and equitable sharing of benefits arising out the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over these resources and to technologies, and by appropriate funding.’

Article 15 of the Convention plans a framework for the implementation of this third objective of the Convention on access to genetic resources and sharing the benefits arising out of their utilisation. Moreover, article 8(j) encourages the equitable sharing of benefits from the utilisation of knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity.

The Conference of the Parties also decided to set up an *ad hoc* Working Group, whose mandate is to develop guidelines on ABS. This meeting, held in Bonn, Germany, from 22 to 26 October 2001, contributed to the development of draft guidelines on access and benefit-sharing to assist the Parties and various stakeholders with the implementation of the Convention. These guidelines were submitted to the Conference of the Parties at its sixth meeting held in The Hague in 2002. One of the major accomplishments of COP VI was the adoption of the Bonn guidelines on access to genetic resources and the fair and equitable sharing of benefits arising out of their utilisation (see Decision VI/24).

The guidelines should help the Parties, the Governments and the other stakeholders to develop a general strategy on sharing and access, as well as to identify the stages involved in the process of obtaining access to resources and sharing benefits. More specifically, these voluntary codes of conduct aim to help the parties, governments and other stakeholders in the development of legislative, administrative or political measures and/or contractual negotiating arrangements on access and benefit-sharing.

The guidelines were recognised as forming a useful first step in an evolving process of implementing the Convention provisions relating to accessing and sharing resources. Following the World Summit on Sustainable Development, and more precisely, the call for the negotiation of an international regime to promote the equitable sharing of benefits by the CBD, the inter-sessional meeting on the Convention’s multi-annual work programme to 2010, held in March 2003, recommended that the *ad hoc* working group on access and benefit-sharing should study the process, nature, scope, components and modalities of an international regime during its second meeting in December 2003, held in Montreal, Canada. Thus, the working group prepared recommendations on negotiating an international regime which were submitted to the Conference of the Parties during its seventh COP in February 2004 in Kuala Lumpur, Malaysia. During COP VII, the Member States officially decided to mandate the *ad*

*hoc* Working Group on access and benefit-sharing to negotiate an international regime on access and sharing. The third meeting of the Working Group on ABS was held in Bangkok, Thailand, from 14 to 18 February 2005. It examined the nature, scope and potential objectives of an international regime of this type. The fourth meeting of this working group took place in Granada, Spain, on 30 January-3 February 2006. During these meetings, the working group began negotiations for an international regime on ABS in accordance with COP decision VII/19 D. It also dealt with other subjects suggested by decision VI/24 B, such as the international certificate of origin/source/legal provenance, or measures facilitating the respect for and compliance of prior informed consent issued by the parties supplying the resources, including the measures' degree of feasibility, practical nature and cost.

The negotiation of this international regime expresses the will of user states to promote and achieve the implementation of ABS measures.

## 1.2 Goals of the study

This study has multiple goals. Firstly it aims to identify the real and potential stakeholders for or users of genetic resources in Belgium. Secondly, it seeks to determine the degree of knowledge held by these stakeholders on the Convention on Biological Diversity and on the ABS measures in the Bonn guidelines. Finally, the third goal entails analysing the applicability or non-applicability of these ABS measures by Belgian users in the exchange of genetic resources with supplier countries. This study could consequently act as a basis for Belgian governments to create a new federal ABS policy.

To fulfil these goals, this study adopts a 'double approach process'<sup>3</sup>, i.e.

1. make differentiated information available to people who regulate the exchange of GRs. This information deals with the structure and processes utilised by the user sectors in access to genetic resources;
2. inform all of the potential genetic resources stakeholders about the CBD, the Bonn guidelines and how to contribute to these decision-making processes.

This approach aims to facilitate the integration of users in the procedures for regulating and establishing rules for ABS. It also allows government institutions to obtain a realistic picture of how Belgian users access GRs. Moreover, this approach tends to inform on how the latter share the benefits arising out of this utilisation.

Similar studies have been carried out in other European countries:

**Germany** – Federal Ministry of Environment, Nature Conservation and Nuclear Safety  
'Users of Genetic Resources in Germany - Awareness, Participation and Positions regarding the Convention on Biological Diversity' (Bonn, Germany 2005) by Karin Holm-Müller, Carmen Richerzhagen, and Sabine Täuber.

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<sup>3</sup> TEN KATE & LAIRD 1999, p. 325

**The United Kingdom** – Department for Environment, Food and Rural Affairs  
‘Review of the Experience of Implementation by UK Stakeholders of Access and Benefit Sharing Arrangements under the Convention on Biological Diversity’ (January 2005), by Fernando Latorre.

**France** – Ministry of Ecology and Sustainable Development – FinAEnviro  
‘Evaluation économique de l’utilisation des ressources génétiques en France’ [Economic evaluation of the use of genetic resources in France] (interim report, November 2005) by Patrick Hubert and Sarah Fernandez.

**Switzerland** – Federal Office for Foreign Economic Affairs. ‘Access to genetic resources and means for fair and equitable benefit sharing: a case study from Switzerland’ (September 1997) by Benno Bättig.

Developed on the basis of these four studies as well as the results of the study carried out in 1999 by ten Kate & Laird<sup>4</sup>, which deals with general responsibility due to the lack of information about international ABS regulations<sup>5</sup>, this survey is adapted to Belgium’s situation and specific features, while remaining open to the European dimension of the subject.

In its specifications, ‘FPS Environment’ requires a two-stage user identification phase. The first demand was to identify the users. The second was to consult and highlight (1) their knowledge/awareness of ABS measures, (2) their understanding of these measures, (3) their experience/application of these measures. As a result, we will follow this two-stage analytical structure to produce a global portrait of the stakeholders that we encounter.

The first stage of this study identifies the Belgian users of non-human biological material from foreign supplier countries (this excludes all indigenous Belgian material). This identification sought to be the most exhaustive possible. As such, one of the final goals of this study is to provide ‘FPS Environment’ with information on which it can base its new federal policy in the area. Thus, the idea was to consult the broadest possible panel of users (*infra* Chapters 3 and 4).

The second stage of this study focuses on determining the level of knowledge and awareness that users have about the ABS measures in the CBD and the Bonn guidelines. This information was collected on the basis of an analysis of the impact of the level of information and awareness of ABS measures within different sectors of users.

Then, the study analyses users’ national, regional and international ABS experiences. The objective here is to concentrate on how information is disseminated within the represented sectors. The study also examines the channels through which the different groups of users receive information. The same applies to the methods selected by users to obtain the genetic material. This research also includes a study which evaluates the utility of ‘Government measures targeting users – provisions encouraging compliance’. These are measures which encourage taking increased account of users in the ABS process.

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<sup>4</sup> Survey carried out on behalf of the European Commission and entitled ‘The commercial use of biodiversity: access to genetic resources and benefit-sharing’, Ten Kate, K., & Laird, S. (1999). Earthscan publication, London.

<sup>5</sup> TEN KATE & LAIRD 1999, p. 294.

Finally, the study tries to retranscribe the positions of users with respect to ABS measures. It is actually very important to take account of users' viewpoints and perspectives in the process of international negotiations on the ABS regime. This research therefore enables users to participate by giving their viewpoint. The survey also offers users the opportunity to communicate their experiences and the problems raised in the Belgian institutional and political framework. It offers a good means for indicating the levels of information or information shortfalls, while proposing ways to improve the implementation of ABS measures.

## Chapter 2 – General methodology of the survey

Two important constraints had to be taken into account while establishing the methodology for this survey: (1) the existence of relatively undefined and moving borders around the statistical population, (2) the difficult nature of the subject of the study, which deals with complex aspects such as intellectual property rights to genetic resources (GRs) and the traceability of movements of the latter.

The first obstacle is linked to the development of debates on the implementation of the CBD. New stakeholders are increasingly becoming involved in the discussions (scientific research communities or culture collections), and are being added to the initial stakeholders at the basis of debates (commercial stakeholders and indigenous communities). But to seize the dynamic nature of this convention, it is important to adopt a global approach to the population and also to include these new stakeholders in the statistical sample. This implies making concessions. By trying to determine the real but uncertain limits of our sample strictly, we have to accept the fact that a degree of exactness will be lost in terms of data processing. The second obstacle is linked to the legal uncertainty which characterises the field of exchanges of genetic resources. The international and regional controversies on the different ways of interpreting the provisions of the CBD and the Bonn guidelines also have to be added to this.

For these reasons we have decided to adopt a qualitative approach combined with a progressive methodology for constructing the sample. This approach is based on the recommendations of the VALSE project dealing with the survey methodology (Valuation for Sustainable Environments, financed by the EU, and published in *Ecological Economics*, Vol. 34/2). Its aim is to collect qualitative information on the social preferences and difficulties raised by the various stakeholders concerned (first stage) in order to undertake an in-depth survey among a random sample of the population (second stage). We wanted to follow this methodology and to add a third stage to it. During this third stage, we presented our results to a representative group of stakeholders and academics who are experts in this field.

To summarise, we adopted the following procedure:

1. In-depth interviews with the 9 stakeholders representing the different sectors, set out below;
2. Identification of the stakeholders: a list of addresses of 1,109 organisations operating in different sectors affected by the exchange of genetic resources with foreign countries;
3. The establishment of a random sample surveyed with the help of questionnaires which aimed to be the most exhaustive possible,
4. Analysis and processing of the results of the questionnaires.
5. Meeting of a group of experts to compare the results with other European surveys in order to obtain a consensus on recommendations.

This study is therefore based on the quantitative and qualitative interviews with current or potential Belgian stakeholders for genetic resources. This study is an empirical analysis based on a written survey offered to Belgian users of genetic resources. But it also aims to be a conceptual analysis of the state of the art of ABS measures in Belgium.

Qualitative interviews were held first. To do this, we selected a list of 18 people who appeared to represent the different Belgian sectors involved sufficiently. Of these 18 persons, 9 agreed to be interviewed. These interviews contributed to a better understanding of the details of the different Belgian user sectors of genetic resources.

After compiling the list of users subject to the survey, we started the qualitative and quantitative interviews. Starting from a sample of 1,109 potential users from private and public areas, we selected 400 users at random using a randomisation computer program and sent them a questionnaire in English, French and Dutch. 236 private institutions as well as 164 public institutions were drawn in this way. Of these 400 organisations, we decided to undertake a close follow-up of almost 150 of these institutions (50 private institutions/100 public institutions). This took concrete shape through the forwarding of reminders encouraging them to answer the survey every week for three weeks. The survey took place for 4 weeks.

The survey is titled '*Public infrastructure and regulations on ABS for innovation in life sciences research: access, conservation and use of biological diversity in the general interest.*' It covers both a private and public segment, via two respective questionnaires. The private questionnaire is made up of two sections: the first informs about the profile of the users, the second concerns the knowledge and position of users with respect to the CBD. The public questionnaire is made of these two same sections, to which two sections of questions specific to this sector are added: practices for exchanging biological resources between public institutions and the needs of public life sciences infrastructures both to support fundamental research and applied research.

Finally, we evaluated the completed questionnaires while respecting the goals of the study as best as possible and using different statistical analysis techniques. We have generally used the nominal values for each result, because we estimated that doing percentages on a sample of 57 questionnaires was not appropriate<sup>6</sup>.

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<sup>6</sup> Comment: we let the variable 'no answers' in each graph, to be able to measure the knowledge and interest shown in the question by the stakeholders.

## **Chapter 3 – Qualitative interviews by 9 individuals representing the Belgian stakeholder in the identified genetic resources**

### **3.1 The interviews**

We interviewed nine people, each representing the sectors listed in the study.

An identical canvas was used for each interview:

1. General understanding of the survey, its intentions and goals;
2. Understanding of the survey itself (should we add/remove questions? Should we clarify questions? Is it difficult to answer certain questions due to the time needed to gather information, or due to confidentiality problems?)
3. What were the main questions/results raised during the interview?

Each person questioned proposed editorial modifications about the questionnaire (clarification or modification of some terms of questions, addition or deletion of questions, etc.). Their main goal was to make the questionnaire more readable and understandable. These proposed modifications are included in the reports for each interview<sup>7</sup>.

All of the people interviewed also suggested creating a ‘public/private’ division for the questionnaire, so that it would be better adapted to the organisation receiving it and to increase the chances of a response. We decided to take this advice and created a short questionnaire (16 questions) for private organisations and a long questionnaire (30 questions) for public bodies (see the questionnaires enclosed with this report in Annex 1).

### **3.2 Results of the interviews by sector**

In the healthcare sector, the interviewed person had a partial knowledge of ABS measures in the CBD and the Bonn guidelines. The interviewee emphasised the importance that should be assigned to research and would like to see an increase in the funds allocated to fundamental and applied research, at federal and regional level. The person also emphasised that a reorganisation or reconcentration of resources would be needed to promote improved management of resources.

In the agricultural sector, the two people interviewed had a limited knowledge of the subject and of its stakes. They did not see the link which may exist between the use of genetic resources and the agricultural sector, as they know it. As a result, they did not feel very concerned by ABS rules. They proposed making a division in the questionnaire between the public sector and the private sector to target the surveyed organisations more effectively.

The person questioned in the processing industries sector had a limited knowledge of the use of GRs in Belgium, and consequently the ABS rules. This appears to be linked to the remoteness of the interviewee’s field of activity from the subject of the report. Nonetheless, the person showed major interest in the question and suggested explaining the link between processing industries and the subject of the survey in the questionnaire to maximise the interest of the surveyed organisations.

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<sup>7</sup> The reports on these interviews are included with this report, but are not part of the published document, for confidentiality reasons.

In the crop protection sector, the person questioned had an excellent knowledge of the subject and the stakes involved. The interviewee emphasised the importance of conservation and collection in the GR trading chain. According to the interviewee, it is also necessary to reinforce and develop national, regional and international trading networks for genetic resources, starting with small local networks. This can only be done by maintaining gene banks, private and public collections, as well as updating the related information and making it available to everyone. It is also essential to clearly determine the competencies and duties of each Belgian institution both at regional and federal level. According to this person, one of the reasons why exchanges have slowed down (apart from enforcement of the CBD) is the malfunctioning of the Belgian institutional system in terms of phylogenetic resources (no specialist institutions with exact and particular expertise in this field; no national policy in the field and no financial resources '*de facto*'). Finally, the interviewee emphasised the importance of informal networks and the role of individuals in the collection, conservation and exchange of resources.

In the field of biotechnologies, the interviewed person was working for the federation of chemical industries. The interviewee had a limited knowledge of the subject and its stakes. The person suggested explaining the link between chemical companies and the topic of the survey in greater detail in the questionnaire.

In the research sector, the person interviewed for vegetation research had a very good knowledge and understanding of the subject. The interviewee emphasised the role of informal networks in acquiring information and material as well as the importance of maintaining the system of the unrestricted and free exchange of biological material among researchers. Thus, according to this person, it is essential to adapt the application of CBD ABS provisions at national level in a way that does not hamper exchanges of information and material.

The person interviewed for entomological research had an excellent knowledge of the subject. The interviewee encouraged the promotion of conservation and therefore the exchange of biological material, notably through a limiting and simplification of regulations in the area. The interviewee also stressed the risks linked to an increase in strictly regional financing for research, because, in the person's opinion, this risks encouraging the compartmentalisation/appropriation of information by region. This would lead to a limit in exchanges of material as well as information sharing. Finally, the interviewee underlined the importance of informal networks in the exchange of information and material.

Finally, the *ex situ* collections sector was represented by two people who have a very good knowledge of the subject. They stressed the importance of promoting conservation and consequently promoting the exchange of biological material between international conservation and research centres. They proposed possibly adding explanatory paragraphs or annexes to the questionnaire to explain the link between each sector and their use of biological resources more clearly. To conclude, they pointed out that the CBD ABS provisions do not tend to facilitate the development of trading in material (according to them, the inverse result is being seen).

### **3.3 Conclusions of the pilot interviews**

On the form, we decided to accept the advice widely given in these pilot interviews that the questionnaire should be divided into two parts (public/private). Nonetheless, we will

subsequently see that this division, which was intended to match the structures of the surveyed organisations better, is not justified because it does not reflect the reality experienced by users of genetic resources.

In contrast, due to a concern for impartiality, we decided not to add explanatory paragraphs to questions to facilitate an understanding of these by each of the surveyed sectors. In fact, we felt that this created a risk of orienting understanding of the subject and therefore of biasing the answers.

At the fundamental level, the information from these different meetings leads us to ask about three points which we believe are interesting to examine in greater depth. They will be explored in case studies at the end of the survey (see Chapter 6 of this report). These three observations are:

- 1) the lack of government incentives in the ABS area;
- 2) the important role played by informal networks in the exchange of resources;
- 3) the lack of coordination/cooperation between the different public and private organisations which have access to genetic resources from abroad.

Firstly, it is noted that there is a lack of government incentives in areas linked to the use of genetic resources in Belgium. Public, administrative or research institutions lack financial and/or other support for access to foreign genetic resources and the promotion of equitable use of these resources.

The second significant piece of information from these interviews is a recognition of the importance of informal networks in access to and the exchange of genetic resources. We use the term ‘informal networks’ to describe genetic resources exchange networks made up of private persons/institutions that collect and exchange biological material, e.g. amateur associations, species protection NGOs, etc. Through these networks of enthusiasts and fans of insects or plants, research professionals access species living throughout the world without making a formal request to access the resource through a defined and outlined path, punctuated by administrative formalities.

The third point, of certain interest, is the lack of coordination and contacts between the different private and public Belgian institutions/organisations working on the same subject. This shortfall leads to a lack of value enhancement of national research efforts, and consequently a limiting of the exchange of information on access to genetic resources and benefit sharing.

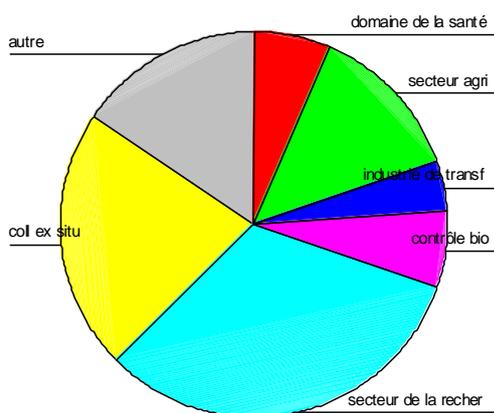
These three preliminary observations from the pilot interviews guide us in the analysis of the results of the survey. They are explored and justified in the subsequent case studies (Chapter 6).

## Chapter 4 – Determination of the different sectors and identification of the Belgian stakeholders by sectors based on the questionnaire

This chapter describes the different sectors identified and questioned in the framework of this study. These sectors are: the healthcare field (pharmaceutical companies, medicinal plants, diagnostics, and cosmetic products), agriculture (vegetable and animal selection and improvement, horticulture, fish farming, forestry), processing industries (the food industry, animal feed), crop protection (control of pests and diseases, diagnostics, phytopharmaceutical industries), biotechnologies, the research sector (in biology, chemicals, medicine, biomedicine, pharmaceuticals, agriculture, biotechnology, phytopharmaceuticals) and *ex situ* collections (botanical gardens, zoos, aquariums, museums, herbaria, gene banks, collections of micro-organisms, collections of dead material, and private collections held by associations or NGOs).

The information presented for each sector is taken from the questionnaires. It is presented in the most neutral way possible and interpreted in Chapters 5 and 8 of this report. It can be supplemented by information from the literature in general, and in particular by the excellent survey carried out by ten Kate and Laird.

We carried out in-depth surveys among a sample of 400 organisations selected at random from the main list. We received 57 answers from this sample. The response level was relatively uniform between the different sectors making up the initial population of 1,109 organisations. We can therefore consider that this sample is adequately representative to indicate the general trend for the players involved in the exchange of genetic resources, with the exception of the ‘biotechnology’ sector, which is not represented in the answers to the questionnaires, and the research and collections sectors, which are slightly over-represented (for a definition of the different sectors, see question A2. in the questionnaire). In contrast, the health sector and the processing industries sector are slightly under-represented.



*Illustration 1: The different sectors interviewed (Question A2)*  
(Sectors ticked by the 57 respondents to the survey)

## 4.1. The ‘healthcare’ sector in Belgium

### 4.1.1. Identification of the sector

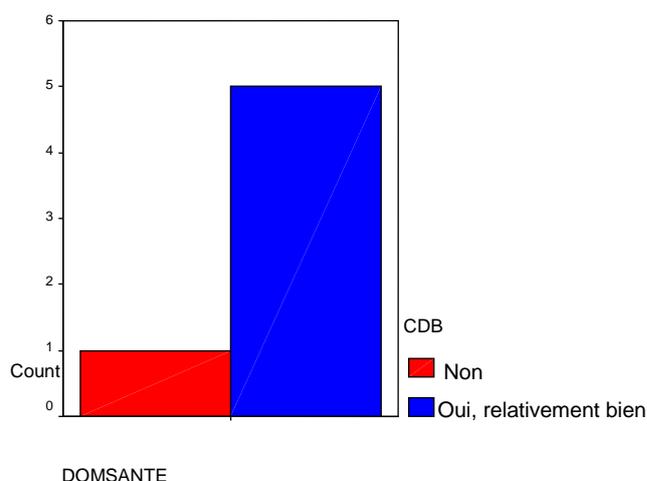
In the context of this study, the healthcare sector includes the pharmaceutical industries, the care and cosmetics industries, so-called ‘soft’ natural medicines and in vitro diagnostic companies/laboratories.

In the healthcare sector, the industries from the private sector in general play a predominant role. Our sample is made up of both major multinationals and small family-style firms.

Belgium hosts less than twenty multinational companies. The SME sector is much more developed, with almost one hundred companies<sup>8</sup>. 6 companies of the 57 that answered the questionnaire were identified as forming part of the healthcare sector. 3 companies had staff of fewer than 25 people and 1 company employed between 500 and 1,000 people.

Of these 6 organisations, 5 said that they know the CBD relatively well, and 1 not at all. One of them stated that it is involved in pharmaceutical research. In addition to these 6 companies, 3 other organisations in the sample of 57 institutions that answered the survey stated that they are involved in biomedical research. The latter identified themselves as forming part of the research sector and not healthcare.

The use of biological material in this sector is mainly dedicated to the development of a saleable product and for diagnostics. Research and conservation are present but to a lesser extent. No institution uses genetic resources for research on intermediate products or in the context of educational activities.



*Illustration 2: Knowledge of the CBD by the ‘healthcare’ sector (A2 and C1)*

<sup>8</sup> See the list of Belgian users, healthcare sector. This list is enclosed with this report, but is not part of the published document for confidentiality of information reasons.

In response to the question ‘Have you placed new products on the market or created a patent or a protective right to a new plant variety following research on biological resources?’, 1 organisation answered that it had placed new products on the market and 1 organisation answered that it created patents.

#### **4.1.2. Access to genetic resources and benefit sharing in this sector**

The discovery and development process in the pharmaceutical industry includes the acquisition of material for screening, identifying illnesses, developing methodologies and analysis laboratories, the identification of active agents and chemical structures, etc.

At the outset, the pharmaceutical industry used solely natural products to develop and create medicines. These ‘natural products’ are made up of all animal, vegetable, human biological material, etc. Today, pharmaceutical research uses natural products as well as synthetic components for research and to manufacture new medicines. It is estimated that the time to develop a medicine based on a synthetic product is half as long as that involving the use of natural products. The ‘purity’ of the synthetic components, their fast identification and their reliable large-scale production are so many criteria which favour the use of these products to the detriment of natural products. Moreover, the use of synthetic components significantly reduces development costs.

But the use of natural products in the context of pharmaceutical research is not on the point of disappearing *per se*: biological material offers greater structural diversity as well as new characteristics and the possibility of working on biologically active molecules. As a result, the pharmaceutical industries participate in the acquisition and use of biological material.

The healthcare sector uses all the types of genetic resources proposed in question B1 homogeneously. Only one organisation stated that it has a private collection of biological material. This is an organisation of fewer than 25 people.

No information on the development of the exchange of genetic resources or exchange practices is available. This can be explained by the fact that this information can be considered as more or less confidential.

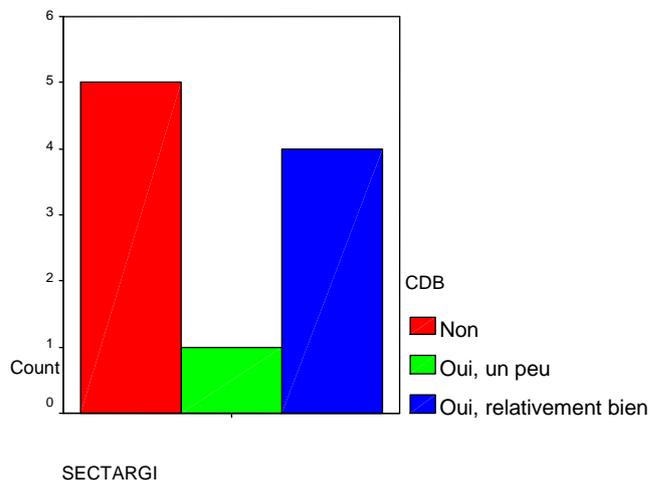
This sector mainly sources its genetic resources in America (11 responses in total for the three regions: North America, Central America and South America), and possibly in Europe (2 answers). In general, it acquires supplies directly abroad with low transport-related costs in exchange for direct/royalties payment or non-monetary compensation.

## **4.2. The ‘agriculture’ sector in Belgium**

### **4.2.1. Identification of the sector**

The agricultural sector sample includes a population of 136 organisations, working in the fields of vegetable/animal section/improvement, and horticulture. The fields of forestry and fish farming are not represented, even though they are viewed as part of the agricultural

sector<sup>9</sup>. 13 organisations out of 57 defined themselves as being part of the agriculture sector. 10 institutions said that they do research in the sector. 3 companies have fewer than 50 employees, 3 organisations had between 50 and 100 employees, and 4 were companies that employ between 100 and 500 people.



*Illustration 3: Knowledge of the CBD by the ‘agriculture’ sector (A2 and C1)*

Of the 13 organisations which answered the survey, 5 of these stated that they know the CBD a little or relatively well, while 5 said that they do not know it. The three others did not respond.

The use of biological material in this sector is relatively homogeneous. 4 organisations stated that they use genetic resources for fundamental research, 4 to develop a saleable product, 3 to acquire intermediate products, 6 for a collection or conservation, 2 for education, and 4 for diagnostics.

In response to the question ‘have you placed new products on the market or created a patent or obtained a protective right to a new plant variety following research on biological resources?’, 3 organisations answered that they obtained protective rights to a new plant variety, 1 organisation stated that it had products undergoing development, and 1 organisation answered that it was in the process of obtaining rights to protect a new plant variety.

#### **4.2.2. Access to genetic resources and benefit sharing in this sector**

The agriculture sector uses the types of genetic resources proposed in question B1 homogeneously. 9 organisations state that they have a private collection of biological material.

One third of the organisations did not clarify the development of the exchange of genetic resources, one third state that exchanges have been growing since 1992, while one third stated

<sup>9</sup> See the list of Belgian users, healthcare sector. This list is enclosed with the report but is not part of the published document for reasons of confidentiality of information.

that the figure is the same. The rate of growth of exchange nonetheless seems to have been falling for 1 year.

This sector mainly collects its genetic resources in Europe (10 responses in total for Western Europe and Eastern Europe), and in America (6 responses in total for Northern America, Central America and Southern America). Asia was quoted once. It acquires supplies for free or in exchange for non-monetary compensation.

5 organisations said that they gather their biological material directly in the country of origin of the material, with 3 institutions stating that they collect over 75% of their material for free or with a low cost linked to transport. When they receive the biological material from suppliers established in the country of origin of the material or elsewhere, this only concerns small quantities (less than 25% of the total material used by the organisation) and this remains free or with a low cost linked to transport.

Bodies in the agricultural sector distribute genetic resources to many different partners: *ex situ* collections (2 answers), collections of dead material (1 answer), research organisations (2 answers), non-commercial users (1 answer) and commercial partners (1 answer).

The most used procedure for the acquisition of material is to request information from usual or potential partners in the country of origin (4 answers). But other means are used: a direct approach to commercial suppliers and the purchase of material from these suppliers (2 answers), the acquisition of biological material through independent means directly in the zones of interest (2 answers), the acquisition of biological material by implementing a previously concluded agreement between the parties, on the basis of factual information (informed consent, international agreements implementing the CBD) (2 answers), international independent networks of genetic resources (e.g. International Plant Exchange Network - IPEN) (1 response), establishment of cooperation for research with partners in the countries of origin of the material (4 responses), establishment of commercial cooperation with partners in the country of origin of the material (2 responses), and contact with *ex situ* collections (1 response).

Two bodies stated that they apply codes of good conduct: 1 code of national good conduct and an international code of good conduct.

### **4.3. The ‘processing industry’ sector in Belgium**

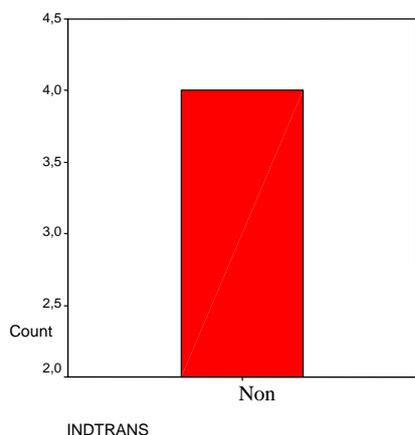
#### **4.3.1. Identification of the sector**

The sample of the processing industries sector includes a population of 193 organisations, working in the food industry and the animal feed industry<sup>10</sup>. 4 organisations out of 57 defined themselves as part of the processing industries sector. 2 companies had fewer than 25 employees, and 1 employed between 100 and 500 people.

All stated that they are unfamiliar with the CBD.

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<sup>10</sup> See the list of Belgian users, healthcare sector. This list is enclosed with this report, but it is not part of the published document, for reasons of confidentiality of information.



*Illustration 4: Knowledge of the CBD by the ‘processing industry’ (A2 and C1)*

Use of biological material in this sector is limited to the search for intermediate products, which is not surprising for a processing industry.

#### **4.3.2. Access to genetic resources and benefit sharing in this sector**

The 4 processing industries use mushrooms and yeasts as a biological material. 3 organisations state that they do not hold a private collection of biological material.

Two organisations did not clarify the development of exchanges of genetic resources, 1 stated that exchanges have been growing since 1992, while one stated that the level is the same. The rate of growth in trade nonetheless appears to have fallen for the past year.

This sector provides little information relating to its access to resources and the location where these resources originate. One institution stated that it acquires supplies directly abroad, while the 3 others did not respond. It acquires supplies for free or in exchange for non-monetary compensation. No information is available about practices for acquiring material.

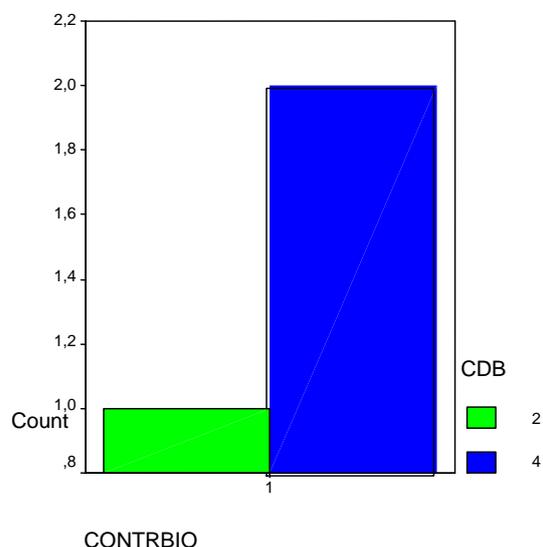
### **4.4. The ‘crop protection’ sector in Belgium**

#### **4.4.1. Identification of the sector**

The sample of the crop protection sector includes a population of 59 organisations working in the control of pests and diseases, diagnostics and the phytopharmaceutical industry<sup>11</sup>. Six organisations define themselves as forming part of the crop protection sector, with 1 of these institutions stating that it does research in this sector. 1 company had a staff of fewer than 25 people, 4 companies employed between 50 and 100 people, and 1 employed between 100 and 500 people.

<sup>11</sup> See the list of Belgian users, healthcare sector. This list is enclosed with the report but is not part of the published document for reasons of confidentiality of information.

Three of these stated that they know the CBD a little or relatively well. The 3 others did not reply.



*Illustration 5: Knowledge of the CBD by the 'biological control' sector (A2 and C1)*

The use of biological material in this sector is very homogeneous. 2 organisations stated that they use genetic resources for fundamental research, 2 for the development of a saleable product, 2 to acquire intermediate products, 5 for collection or conservation, 4 for education and 6 for diagnostics. As a result, almost all of the organisations in this sector participate in education as well as collection and diagnostics activities.

In response to the question 'have you placed new products or created a patent or obtained a protective right to a new plant variety following research on biological resources?', 1 organisation responded that it had obtained protective rights to a new plant variety, and 1 organisation answered that it had products undergoing development.

#### **4.4.2. Access to genetic resources and benefit sharing in this sector**

Companies acting in crop protection use all the types of genetic resources proposed in question B1 in a relatively homogeneous way. 5 organisations stated that they hold a private collection of biological material.

2 organisations did not clarify the development in exchanges of genetic resources, 2 of these state that exchanges of genetic resources have been growing since 1992, and 2 stated that the level is the same.

This sector acquires genetic resources from everywhere in the world. The leading supplier continent is Asia (10 answers in total for Central Asia, East Asia, South East Asia, South Asia and Western Asia), followed by Africa (5 answers in total for Western Africa, East Africa, Central Africa, Northern Africa and South Africa), Europe (5 responses for Eastern Europe and Western Europe), then America (4 answers for North America, Central America and South America). 1 institution said that it acquires supplies directly abroad, while the others did not answer. It acquires supplies for free or in exchange for non-monetary compensations.

Two institutions stated that they gather over 75% of their biological material in the country of origin, either for free (1 answer), or with a low cost linked to transport (2 answers). Three organisations receive material from suppliers established in countries where the material originates, and 1 organisation receives it from suppliers established in a different country. The material received is also free (3 answers) or with a low transport cost (1 answer).

Three organisations replied that they distribute biological material to other users: *ex situ* collections (1 answer), collections of dead material (1 response), and other research organisations (1 response).

The most used procedure for obtaining material is to request information from usual or potential partners in the country of origin (3 answers). But other means are used: a direct approach to commercial suppliers and the purchase of material from these suppliers (1 answer), the acquisition of biological material by independent means directly in the zones of interest (1 answer), independent international networks of genetic resources (e.g. International Plant Exchange Network - IPEN) (1 answer), the establishment of research cooperation with partners in the country of origin of the material (1 answer), the establishment of commercial cooperation with partners in the country of origin of the material (1 answer), and contact with *ex situ* collections (1 answer).

2 bodies stated that they apply codes of good conduct: 1 national code of good conduct and 1 international code of good conduct.

#### **4.5. The ‘biotechnologies’ sector in Belgium**

##### **4.5.1. Identification of the sector**

The sector is made up of the following fields: energy, materials, biocatalysts, and chemical industries. We have a sample of 69 organisations which are part of this sector. None of these answered our questionnaire. We are therefore unable to provide information about this sector.

##### **4.5.2. Access to genetic resources and benefit sharing in this sector**

No information.

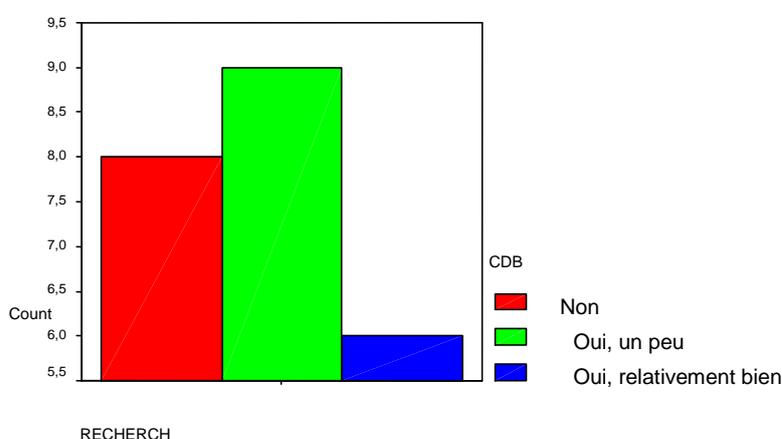
#### **4.6. The ‘research’ sector in Belgium**

##### **4.6.1. Identification of the sector**

The research sector is made up of the following different research fields: biology, chemicals, medicine, bio-medicine, pharmacy, agriculture, biotechnology and phytopharmacy. We did not make a distinction between private research and public research.

Of our sample of 184 institutions in the ‘research’ sector, 29 organisations answered our questionnaire and define themselves as being part of the research sector. The most developed field appears to be biological research, with 12 organisations stating that they work in this field. 13 companies had fewer than 25 employees, 2 had a staff of 25 to 50 people, 5 employed between 50 and 100 people, 6 organisations employed between 100 and 500 people, and 1 employed over 1,000.

Of these 29 organisations which answered the survey, 15 institutions replied that they know the CBD a little or relatively well. 8 stated that they are unfamiliar with it. 6 organisations did not reply.



*Illustration 6: Knowledge of the CBD by the ‘research’ sector (A2 and C1)*

The use of biological material in this sector is targeted at activities linked to knowledge. 19 organisations said that they use genetic resources for fundamental research, 17 in the context of collection or conservation, 15 for education, and 11 for diagnostics. The commercial applications remain limited: only 3 institutions state that they use genetic resources for the development of saleable products, and 3 to acquire intermediate products.

In response to the question ‘Have you placed new products on the market or created a patent or obtained a protective right to a new plant variety following research on biological resources?’, 1 organisation answered that it had placed new products on the market, and 3 organisations answered that they had created patents, 1 organisation answered that it had obtained protective rights to a new plant variety, 1 organisation answered that it had products undergoing development, and 1 organisation answered that it was in the process of creating patents.

#### **4.6.2. Access to genetic resources and benefit sharing in this sector**

The research sector uses all of the types of genetic resources proposed in question B1 relatively homogeneously. 20 organisations stated that they hold a private collection of biological material; 7 said that they do not have one.

For 1992, 9 organisations did not stipulate the development in the trade in genetic resources, 10 stated that exchanges have grown since 1992, 8 said that it equal, and 2 replied that it is falling. Looking at the past year, 6 organisations did not clarify the development in exchanges of genetic resources, 8 stated that exchanges are growing, 13 stated that the level is equal and 2 stated that it is decreasing. While trading in genetic resources appears to be growing, the rate of growth in exchanges nonetheless appears to have fallen since 1992.

This sector acquires genetic resources from around the world. The leading supplier continent is Africa, followed by Asia and America. Supplies are obtained directly from abroad (4 answers), from an intermediate Belgian distribution organisation (1 answer) or otherwise (2 answers). In general supplies are acquired for free (4 answers), with a low transport cost (3 answers) or in exchange for non-monetary compensation (2 answers). But as the level of answers to these questions was relatively low, this information is likely not to be perfectly representative of practices in the sector.

The organisations in this sector either collect very little material directly in the country of origin (7 answers of less than 10%), or almost all of their material (8 answers of over 75%). This is mainly done for free (12 answers), with low costs linked to transport (5 answers) or with non-monetary compensation (3 answers).

The percentage of biological material received from the supplier in the country of origin of the material is quite low (less than 10% in the majority of cases). The material is obtained for free for 9 organisations, with a low cost linked to transport according to 6 organisations, and with non-monetary compensation or a combination of direct payment/royalties for just one organisation.

A certain number of organisations state that they distribute biological material to other users: *ex situ* collections (7 answers), collections of dead material (5 answers), other research organisations (7 answers), other non-commercial users (2 answers), and commercial users (1 answer).

The procedures for obtaining the material most used by the research sector are: a request for information from usual or potential partners in the country of origin (14 answers), the establishment of cooperation for research with partners in the country of origin of the material (14 answers), and contact with *ex situ* collections (7 answers).

3 research organisations apply codes of good conduct at national level, 1 at regional level and 6 at international level. 5 organisations use other types of trading systems, without specifying what is involved.

## **4.7. The *ex situ* collections sector in Belgium**

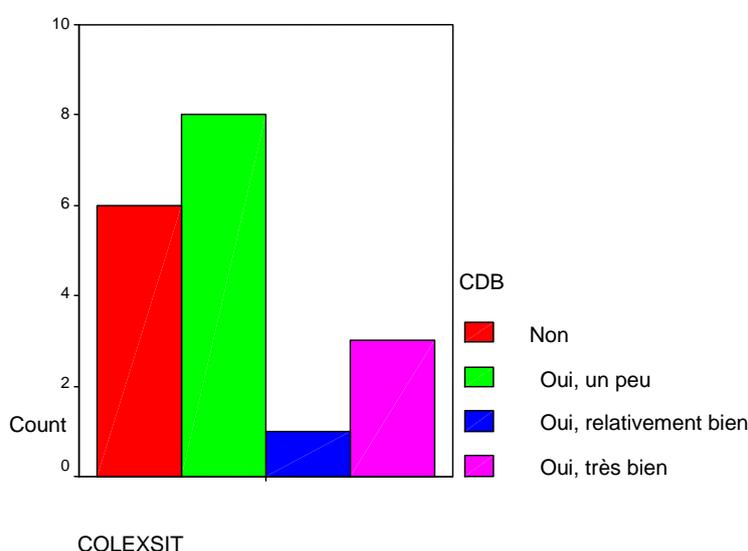
### **4.7.1. Identification of the sector**

The sample of the collections sector includes a population of 347 organisations, working in botanical gardens, zoos, aquariums, and museums, herbaria, gene banks, collections of micro-

organisms/cells, collections of dead material, private collections, and associations (NGOs, non-profit organisations)<sup>12</sup>.

Of 57 complete questionnaires, 21 organisations were defined as being part of the collections sector. We counted 3 botanical gardens, 4 zoos, 3 herbaria, 5 gene banks, 3 collections of micro-organisms, 7 collections of dead material, 1 private collection and one association. 8 organisations had fewer than 25 employees, 2 had 25 to 50 staff, 4 organisations had between 50 and 100 employees and 3 employed between 100 and 500 people.

12 institutions stated that they know the CBD a little or relatively well, including 3 which said that they know it perfectly well. 6 stated that they were unfamiliar with it.



*Illustration 7: Knowledge of the CBD by the ‘ex situ collection’ sector (A2 and C1)*

The use of biological material in this sector also involves activities linked to education. 9 organisations stated that they use genetic resources for fundamental research, 15 for collection or conservation, 12 for education and 5 for diagnostics. The commercial applications remain limited: only 2 institutions replied that they use genetic resources for the development of a saleable product, and 1 to acquire intermediate products.

In response to the question ‘have you placed new products on the market or created a patent or obtained a protective right to a new plant variety following research on biological resources?’, 1 organisation answered that it created patents, 1 organisation answered that it had products under development, and 1 organisation replied that it was in the process of creating patents.

#### **4.7.2. Access to genetic resources and benefit sharing in this sector**

<sup>12</sup> See the list of Belgian users, health sector. This list is enclosed with this report, but is not part of the published document, for reasons of confidentiality of information.

The collections sector uses the types of genetic resources proposed in question B1 with a preference for vegetable genetic resources (9 answers) and animal genetic resources (7 answers). 17 organisations stated that they have a private collection of biological material; 2 state that they do not have one.

For 1992, 6 organisations did not specify the development of the trade in genetic resources, 8 state that exchanges have grown since 1992, 5 said that the level is the same and 2 replied that it is falling. Looking at the past year, 4 organisations did not specify the development of trade in genetic resources, 7 stated that trade is growing, 9 said that it is equal and 1 said it is falling. While exchanges of genetic resources appear to be growing, the growth rate in exchanges nonetheless appears to have fallen slightly since 1992.

This sector acquires genetic resources from everywhere in the world. The leading supplier continent is Africa (41 in total for West Africa, East Africa, Central Africa, North Africa and South Africa), followed by Asia (32 answers for Central Asia, East Asia, South East Asia, South Asia and West Asia) and America (22 answers in total for North America, Central America and South America). These institutions acquire supplies directly abroad (3 answers) or otherwise (1 answer). They generally obtain supplies for free (2 answers), with a low transport cost (1 answer) or in exchange for non-monetary compensation (3 answers). But as the level of response to these questions was relatively low, this information is likely not to be perfectly representative of practices in this sector.

3 organisations in this sector collect very little material directly in the country of origin (less than 10%), whereas 6 organisations in this sector collect almost all of their material directly in the country of origin (over 75%). This is mainly done for free (8 answers), with low costs linked to transport (5 answers) or with non-monetary compensation (3 answers).

The percentage of biological material received from the supplier in the material's country of origin is quite low (less than 10% in the majority of cases). The material is obtained for free for 8 organisations, with a low cost linked to transport according to 5 organisations, with non-monetary compensation for just 1 organisation.

A certain number of organisations state that they distribute biological material to other users: *ex situ* collections (5 answers), collections of dead material (3 answers), other research organisations (4 answers), other non-commercial users (1 answer), and commercial users (1 answer).

The most used procedures for obtaining material by the collections sector are: a request for information from usual or potential partners in the country of origin (11 answers), the establishment of research cooperation with partners in the material's country of origin (11 answers), and contact with *ex situ* collections (5 answers).

3 organisations apply codes of good conduct at national level, 1 at regional level and 5 at international level.

## Chapter 5 – Results of the study

### 5.1 Global analysis of the different sectors of users

#### 5.1.1 The organisations questioned

Of the 7 sectors identified, only 6 are representative of the real population of Belgian users of genetic resources. These are the healthcare sector, agriculture, processing, crop protection, research and collections. As such, no organisation from the biotechnologies sector responded to the survey. We also saw that the research and collections sectors are slightly over-represented<sup>13</sup>, probably due to their motivation/interest in responding to the survey. This over-representation is confirmed by the importance assigned to education<sup>14</sup>. It is perceptible in all of the questionnaire. This could mean that Belgium is particularly developed in these two sectors.

Following the advice of the pilot interviews, we made a division in the initial questionnaire between public organisations and private organisations in order to draw up more personalised questions for each type of organisation. As stated in the chapter on the survey's methodology, we there compiled a so-called 'public' questionnaire and a 'private' questionnaire. While this division was justified in the section of the questionnaire on the degree of knowledge of the CBD, it proved invalid for the rest of the analysis. In fact, the public sector is better informed about the CBD and international ABS measures than the private sector. But for the remainder, no quantitative data makes it possible to make this distinction, as the public/private division for the remainder of the questions was almost equal. Moreover, some institutions to which we sent the public questionnaire public defined themselves as part of the private field, and vice versa. As a result, this division was not justified in practice, and we recommend not reproducing it in the design of a national policy on the subject.

We also asked whether the surveyed organisations had already placed a product on the market, or created a patent following research on genetic resources obtained abroad<sup>15</sup>. The results are low. Of 57 organisations, 13 stated that they had placed products, patents or protective rights to a new plant variety on the market<sup>16</sup>. 27 ticked the box 'none of these proposals'. This result tends to show that there is a lack of value enhancement of research, which for its part, is relatively developed.

Concerning the size of the surveyed organisations, 23 of these are made of fewer than 25 people, and 19 of these have 25 to 500 people<sup>17</sup>. Only two organisations which answered the survey have more than 500 employees.

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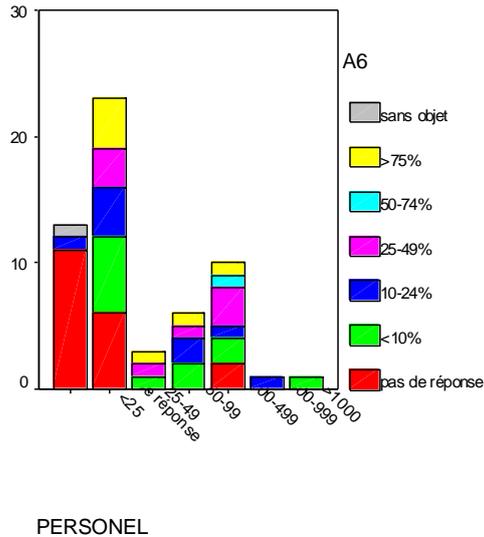
<sup>13</sup> Questions A2 and A3.

<sup>14</sup> Question A3.

<sup>15</sup> Question A4.

<sup>16</sup> Question A4 asked solely in the context of the ICCP. New varieties other than plants are therefore not included.

<sup>17</sup> Questions A5 and A6.



**Illustration 8: Total staff/personnel working on genetic material (A5 and A6)**

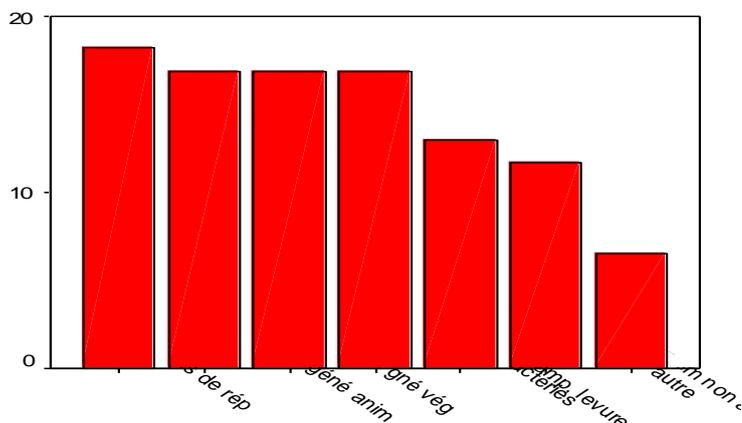
If a ratio is made between the total number of staff in the surveyed organisations and the % of this personnel working on genetic resources, it can be seen that the variability in the number of people working on genetic resources is relatively homogeneous across small and large organisations. 16 organisations assign between 25 and 100% of their staff to research. 20 institutions use less than 25% of their staff for research on genetic resources.

This means that 36 institutions out of 57 state that they use a part of their staff to do research on genetic resources. This confirms that Belgium is a country where the research sector is very developed. Moreover, 4 institutions with fewer than 25 people assign more than 75% of their staff to the manipulation of genetic resources. It can be assumed that these are collections, which are generally small structures where all of the staff work on the biological material.

Finally, when we asked whether the surveyed person wished to be contacted to participate in the negotiations on the new ABS regime, 3 persons answered ‘yes’<sup>18</sup>, 35 answered ‘no’, and 19 did not reply.

<sup>18</sup> This list is transmitted as a document enclosed with this report, but will not be published for reasons of confidentiality of information.

### 5.1.2 The genetic resources used



VAR00012

*Illustration 9: Type of biological material used (B1)*

#### Caption for question B1

- B1.0 No answer
- B1.1 Animal genetic resources
- B1.2 Vegetable genetic resources
- B1.3 Fungi, mushrooms, yeasts, etc.
- B1.4 Bacteria
- B1.5 Non-independent organisms
- B1.6 Others

This graph shows that our random sample effectively covers the different sectors in which Belgium operates with an international impact. These are mainly the research and collections sectors, with for example the leading global collection of bananas and plantains held at KUL and different microbiological collections in the field of yeasts, bacteria and plasmids, the best known being BCCM (Belgian Co-ordinated Collections of Micro-organisms<sup>19</sup>).

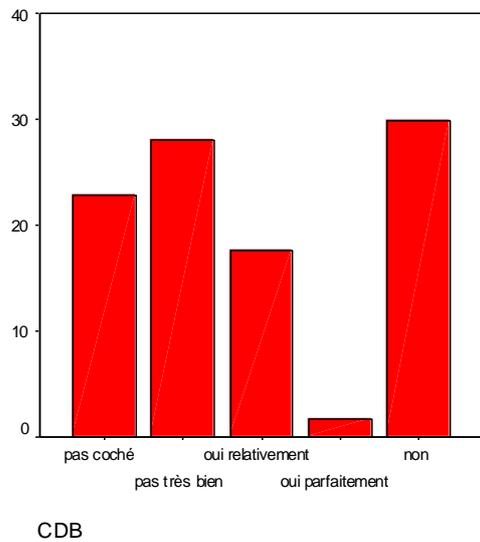
### **5.1 The degree of knowledge of the CBD by Belgian stakeholders**

In order to determine the degree of knowledge held by Belgian GR stakeholders about the CBD ABS measures and the Bonn guidelines, we asked a series of exact questions.

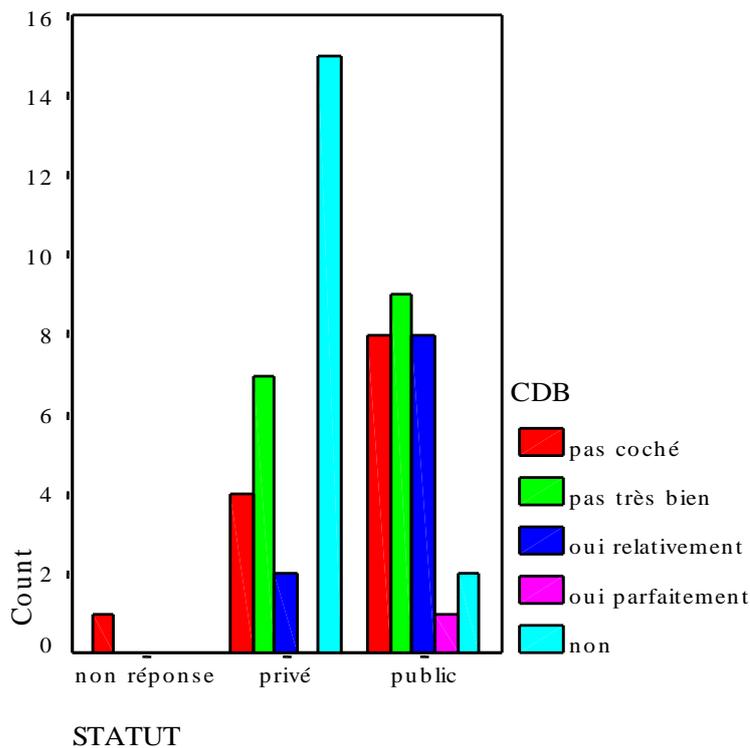
In response to the question, ‘Do you know the CBD?’, 17 persons answered no, and 27 persons answered a little, relatively well or very well. We saw above that the public/private division was not appropriate in determining the measures to take for an understanding and determination of the measures to take for the understanding and determination of measures to

<sup>19</sup> <http://bccm.belspo.be/index.php>

implement ABS. Nonetheless, we observed that for this question, ‘private’ institutions very largely admitted that they were unfamiliar with the CBD.



*Illustration 10: Knowledge of the CBD (C1)*



*Illustration 11: ‘Private or public’ status and knowledge of the CBD (A2 and C1)*

This can be explained by the fact that there is a lack of cooperation between institutions in the exchange of material. This can be linked to the company's degree of involvement in the value enhancement of information and material. As a result, favouring the value enhancement and exchange of information and material between institutions which know about the CBD and those which do not know the CBD can be a means of widening the degree of knowledge of ABS measures by Belgian stakeholders.

As regards the research and *ex situ* collections sectors, knowledge of CBD is good or even excellent, independently of whether the institution is private or public. This therefore means that institutions which collect material know the CBD, whereas those which do not collect material do not know it. We conclude from this that the CBD is viewed as a treaty that governs the collection/conservation of biological resources and not really their value enhancement through their exchange and the benefit sharing arising out of their utilisation. Looking at practices for access to resources (below §6.3), material transfer agreements are almost unused (2 answers)

The fact that the *ex situ* collections are familiar with the CBD can be exploited in the area of documentation and the dissemination of material. The collections can actually be an ideal platform for implementing a CBD certificate of origin system.

As regards the main concepts linked to the CBD<sup>20</sup>, half of the people surveyed are unaware of the concepts cited and when this is the case, the knowledge is limited. These are the 'Bonn guidelines', 'Clearing house mechanism', 'National Focal Point/Competent National Authority', 'Access and Benefit-sharing', and the Global Strategy for Plant Conservation<sup>21</sup>.

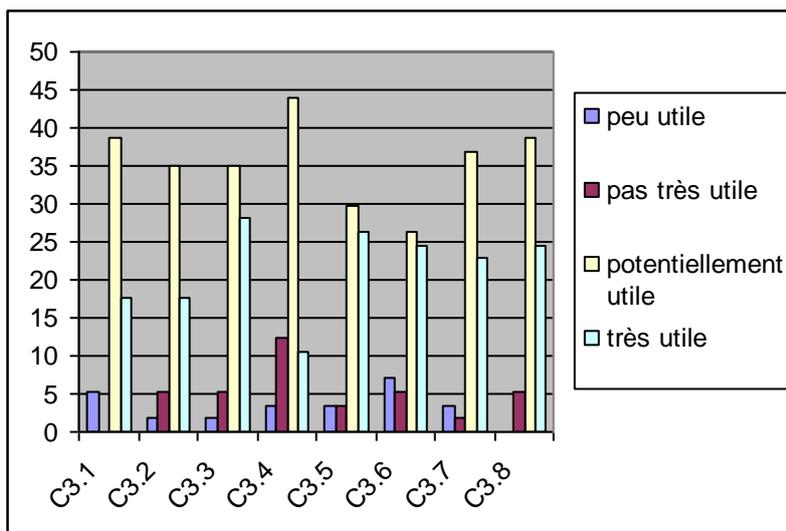
Generally speaking, it seems that the CBD is relatively well known but the associated administrative provisions, such as the national focal point or the clearing house mechanism are less well known. It also appears that the voluntary measures to implement the concepts are not viewed as very useful.

These conclusions are verified in the following table. While all of the proposed measures seem to be potentially useful generally, the surveyed persons consider that the development of compulsory codes of conduct governing the use of biodiversity is the most useful measure to adopt. Similarly, they consider that the initiation of a certification system for users complying with the compulsory rules of conduct is desirable for the correct application of ABS rules.

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<sup>20</sup> Question C2.

<sup>21</sup> See <http://www.cbd.int/decisions/default.shtml>



*Illustration 12: User viewpoints of 'government measures targeting users – Provisions encouraging compliance' (C3)*

Caption:

C3.1 The creation of a central clearing mechanism in Belgium, which would inform about the possibilities and conditions for access in other countries is useful for this approach. 3-0-22-10

C3.2 Initiation of standard international contracts on ABS. 1-3-20-10

C3.3 The development of compulsory codes of conduct governing the utilisation of biodiversity. 1-3-20-16

C3.4 Development of voluntary codes of conduct and guidelines governing the utilisation of biodiversity. 2-7-25-6

C3.5 Disclosure of the country of origin in the application of patents on products arising from the utilisation of biological resources. 2-2-17-15

C3.6 The creation of certificates for the genetic material. These certificates would be issued by the supplier country and required during cross-border movements. The certificate could also be required during the enforcement of patents. 4-3-15-14

C3.7 The initiation of a certification system for users complying with the compulsory rules of conduct. 2-1-21-13

C3.8 Assistance in the development and execution of projects aimed at promoting cooperation between users and the countries of origin. 0-3-22-14

As a result, the CBD is relatively well known in the research and collections sector (see § 4.6 and 4.7 above), whether public or private institutions are concerned. For sectors which are more focused on marketing, the CBD is little known or not known at all. This observation tends to show that the CBD is better known among stakeholders upstream in research and innovation (e.g. fundamental research), and less known among stakeholders located downstream in R&D (market development, commercial activities). There is no major difference linked to the public or private nature of the institution.

<b>CBD ABS provisions</b>	<b>Knowledge of legal measures</b>	<b>Trading and voluntary steps</b>	<b>Administrative measures</b>
<b>General knowledge of the CBD treaty</b>	Knowledge of the Convention : very good knowledge in the collections sector and good knowledge in the research sector (independently of the public/private distinction) (cf. question C1)		
<b>Knowledge of ABS provisions (Bonn guidelines)</b>	If the ABS is known, it is a good knowledge (C2.1)		If the administrative provisions of ABS are known, the knowledge is moderate (C2.2, C2.3)
<b>Opinion on the usefulness of ABS</b>	In general, ABS is considered as very useful (especially the measures stipulated in points C3.3., C3.5., C3.6. of the questionnaire)	Simply useful (C3.4. and C3.4.7)	Simply useful (C3.1, C3.2) with the exception of C3.8 (very useful)

*Table 1. Degree of knowledge of the CBD ABS provisions*

Let us now see how this knowledge translates in practice and the application of ABS provisions at national level.

## **5.2 The degree of application of the ABS provisions contained in Article 15 of the CBD and the Bonn guidelines**

The information collected below comes from questions B5<sup>22</sup> and B6<sup>23</sup> of the private questionnaire and questions D1<sup>24</sup> to D7<sup>25</sup> of the public questionnaire.

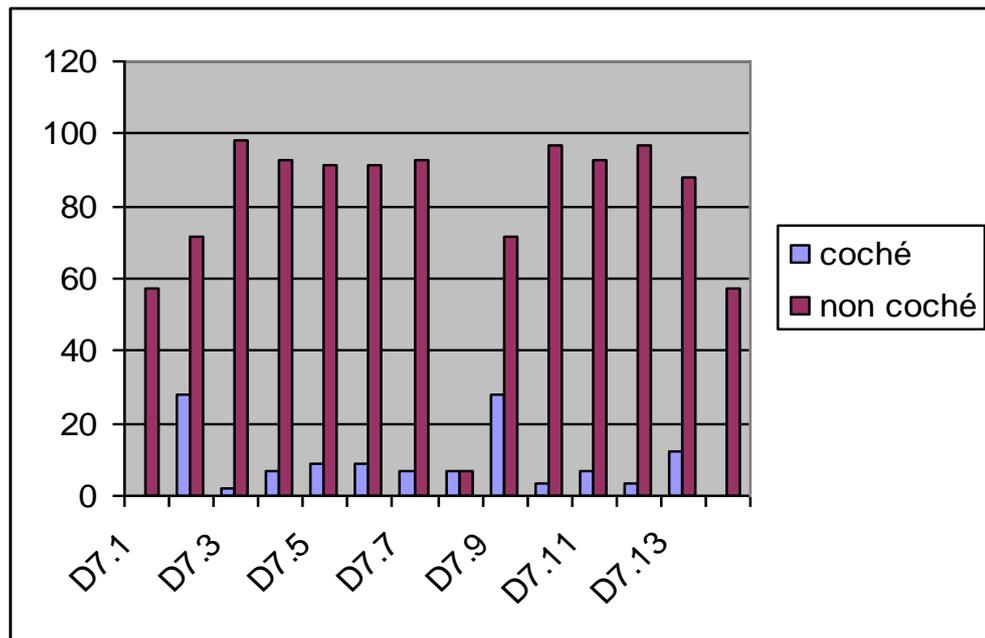
The implementation of ABS provisions is relatively strong as regards informed prior consent for access to resources. In contrast, it remains largely unapplied for benefit sharing. The most frequently used means for applying this prior informed consent is a research partnership with countries supplying the resources.

<sup>22</sup> Question B5 ‘Where do you obtain biological material?’

<sup>23</sup> Question B6 ‘How do you procure biological material?’

<sup>24</sup> Question D1 ‘What percentage of biological material does your institution collect in its country of origin?’

<sup>25</sup> Question D7 ‘Please tick the options which correspond to your usual procedure for obtaining biological material.’



*Illustration 13: Usual procedures for obtaining biological material ( D 7)*

Caption:

D7.1 Request for information at the Belgian CBD National Focal Point

D7.2 Request for information from your usual partners

D7.3 Request for information from the CBD National Focal Point of the biological material's country of origin

D7.4 The acquisition of information concerning the other national regulations and responsible authorities in the countries of origin

D7.5 Direct approach to the commercial suppliers and purchase of material from these suppliers

D7.6 Acquisition of biological material by independent means directly in the zones of interest

D7.7 Acquisition of biological material by implementing a previously reached agreement between the parties, based on factual information

D7.8 Independent international networks of genetic resources

D7.9 Establishment of cooperation for research with partners in the material's country of origin

D7.10 Establishment of commercial cooperation with partners in the material's country of origin

D7.11 Conclusion of contracts: Material Transfer Agreement according to terms mutually accepted with the owner of the resources

D7.12 Arrangement for access to resources and a sharing of the benefits arising out of their utilisation

D7.13 Contact with *ex situ* collections

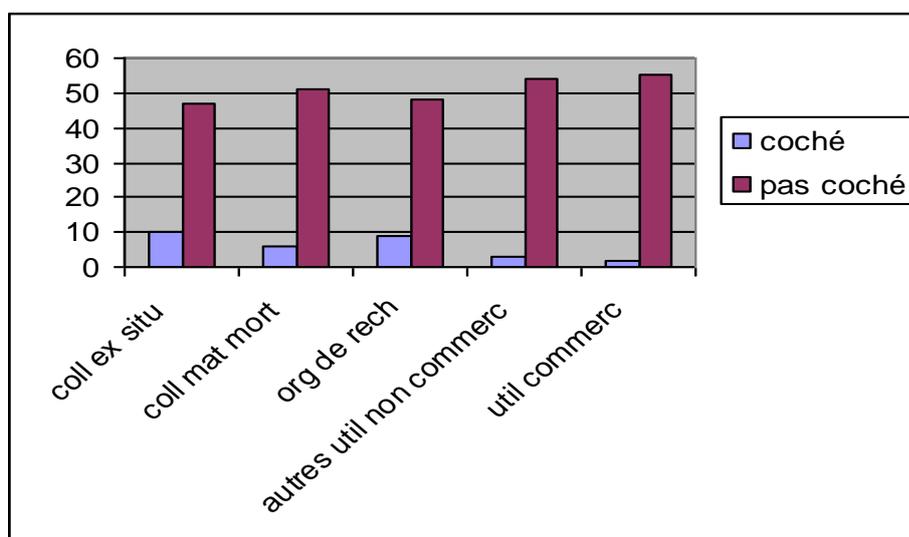
D7.14 Other

Non-indigenous biological material is generally obtained abroad (question B5 of the private questionnaire). It is obtained in different ways. It is either harvested directly in the material's

country of origin (19 answers)<sup>26</sup>, or it received from a supplier in the country where the material originates (20 answers)<sup>27</sup>, or it is obtained from suppliers established elsewhere than the country where the material originates (16 answers)<sup>28</sup>.

Whatever way the material is obtained, the most frequently used as a means for exchanging resources remains the cost-free nature of access<sup>29</sup> (31 answers), or a low cost linked to transport of the material (17 responses). There is little non-monetary compensation linked to the exchange of resources (6 answers), which shows that benefit sharing is not applied in this form. Finally, there is almost no access to resources through a combination of direct payments/expenses/royalties linked to the pre-development phase (3 answers). The latter result shows that the commercial value enhancement of research is low. As a result, the idea of developing a quasi market is unsuccessful.

When we asked which partners these institutions distribute the material to, the answers are almost always to collections, gene banks, botanical gardens or other research institutes<sup>30</sup>. There is hardly any distribution to commercial partners (2 answers). Once again, this result reflects the lack of commercial value enhancement of the output from research.



*Illustration 14: Distribution of biological material to other users (D.6)*

It seems that ABS measures are better applied by the stakeholders upstream in R&D compared with stakeholders downstream which are engaged in activities that are more directly linked to trade. But application is not optimum, however, as the measure linked to the sharing of benefits is not applied much. Access to resources and harvesting these resources

<sup>26</sup> Question D1.

<sup>27</sup> Question D3.

<sup>28</sup> Question D4.1.

<sup>29</sup> Questions B6, D2 and D5.

<sup>30</sup> Questions D6, B3.2 and D4.2.

appear to be concepts that are known and widely applied. Benefit sharing is substantially less so.

Typology of rights of use and decision-making concerned	Regulation of access and use of resources, article 15 CBD	Taken into account by Belgian players
Access and direct utilisation (conservation, utilisation in an experimental method, etc.)	Informed consent by the contracting party	Yes (cf. question D7.2)
Access and non-commercial utilisation of applications derived from the resource	Informed consent by the contracting party	Yes (cf. question D7.9)
Access and commercial utilisation of applications derived from the resource	Informed consent by the contracting party and contractual agreement on benefit sharing	No, no MTAs (cf. question D7.11), no commercial cooperation (D7.12 and D2.3 and D5.3)

*Table 2. Taking into account of CBD ABS provisions by Belgian stakeholders*

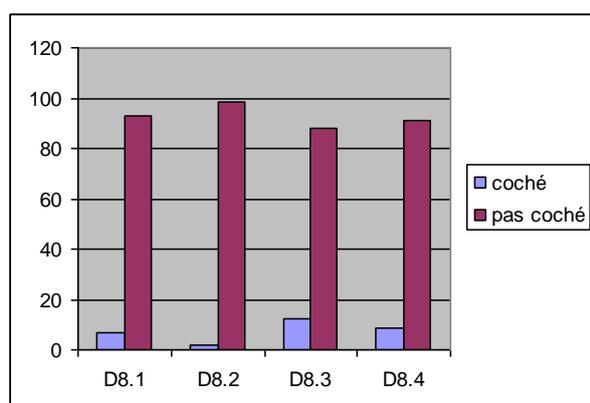
Let us now look at practices for exchanging material and the institutional models that exist for ABS.

### 5.3 Insight into the institutional models and practices for exchanging material in order to make a contribution to the current negotiations on implementing the Bonn guidelines

This information comes from the 29 ‘public’ questionnaires.

In order to gain the most complete insight possible of material exchange practices, we asked a series of questions on the stakeholders’ habits in their access to GR. We also considered it important to obtain information about international models for ABS.

We wanted to know whether these stakeholders apply national, regional or international codes of good conduct in their genetic resources exchanges.



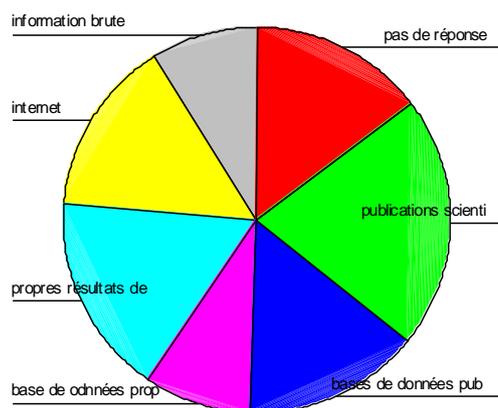
*Illustration 15: Application of codes of good conduct and/or good practices (D.8)*

Caption:

- D8.1 Code of good conduct/national good practice for the exchange of biological resources
- D8.2 Code of good conduct/regional good practice for the exchange of biological resources
- D8.3 Code of good conduct/international good practice for the exchange of biological resources
- D8.4 Other system of exchange/access

4 institutions answered that they apply a national code of good practice and only 1 stakeholder participates in a regional code of good conduct. The international codes of conduct are the most enforced (7 answers). 5 stakeholders apply other types of codes of good conduct, without stating which ones.

In order to understand how information is transmitted between the different stakeholders, we asked them which tools are used to acquire information. The most frequently used means for obtaining information on genetic resources remains scientific publications (18 answers). Databases and own results (14 answers) and public databases (13 answers) follow. We point out that the private databases of other organisations are never used. Promoting access to the latter could help to foster relations between downstream and upstream sectors and could help to enhance the value of the results of research and consequently benefit sharing.



*Illustration 16: Training tool used in the innovation process (E1)*

Caption:

- E1.1 Scientific publications in recognised international reviews
- E1.2 Public databases
- E1.3 Private databases held by other organisations
- E1.4 Own database
- E1.5 Own research results/informal source of information
- E1.6 Internet
- E1.7 Raw information: collection/data passport

To obtain a better understanding of the technologies used in research, we asked whether the stakeholders used genetic technologies for public domain research. 13 stakeholders answered yes, and 15 answered no<sup>31</sup>. These are mainly non-patented technologies entering into the public domain (e.g. traditional knowledge) (11 answers). Patents which have expired (3 answers) and general public licences (5 answers) are used relatively little used.

While being aware of the probable low level of response to this question, we wanted to know whether the stakeholders used genetic technologies for patented research<sup>32</sup>. 5 stakeholders stated that they use these patented technologies.

As a result progress can also be concentrated on the tools for the dissemination of and access to information, to develop exchanges of material and the results of research in the different sectors.

We asked whether the surveyed organisations held one or more collections of material<sup>33</sup>. 29 people out of 57 replied that they had at least one collection in their institution. This confirms that the research and collections sector is relatively developed in Belgium. The distribution between large and small structures is relatively homogeneous, as 12 institutions of fewer than

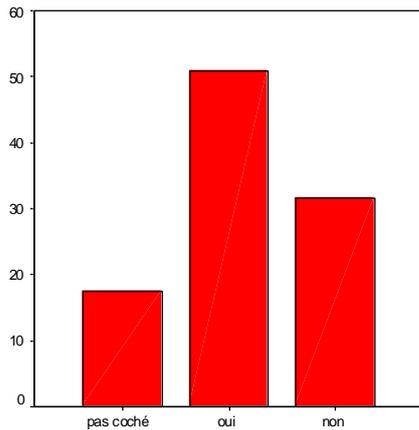
<sup>31</sup> Question E2.

<sup>32</sup> Question E4.1.

<sup>33</sup> Question B2.

25 employees state that they have such collections, compared with 13 institutions which have a staff of between 50 and 500 people.

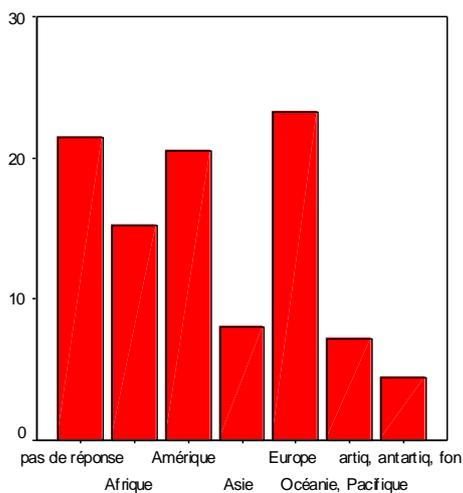
Of the 18 negative answers on possession of collections, we analysed the status of these institutions. 8 of these were declared as public bodies, and 10 as private institutions. As a result, this reinforces our observation that the division between the private and public sectors is not appropriate. This shows that the public sector, including collections, is more or less in the same position as the private sector.



B2.1

*Illustration 17: Holding of collections of biological material by the stakeholders ( B2)*

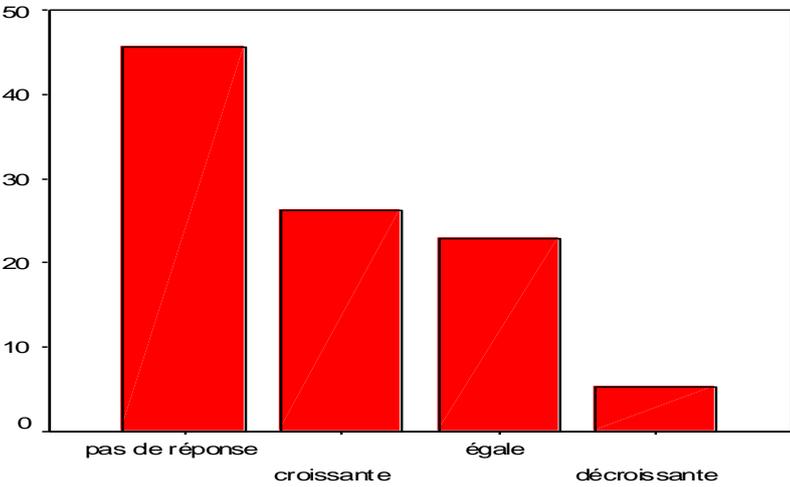
We also wanted to know which continent the genetic resources used by the surveyed organisations originated from. Question B3 clearly shows that there is little direct cooperation with Asia and Oceania/Pacific states. In contrast, access is more or less equal for Europe, America and Africa.



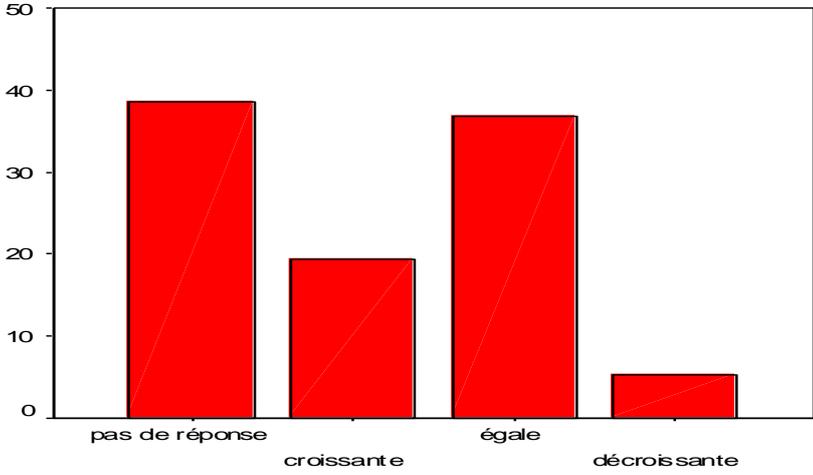
VAR00013

*Illustration 18: Continents where the resources originate (B3)*

We asked how the surveyed organisations characterise the development of their exchanges of genetic resources since 1992. As the illustrations below show, exchanges have been growing since 1992, but the growth rate is falling and the trend for exchanges is tending to stabilise.



B41992



B42005

*Illustration 19: Exchanges of genetic resources since 1992 and since 2005 (B4)*

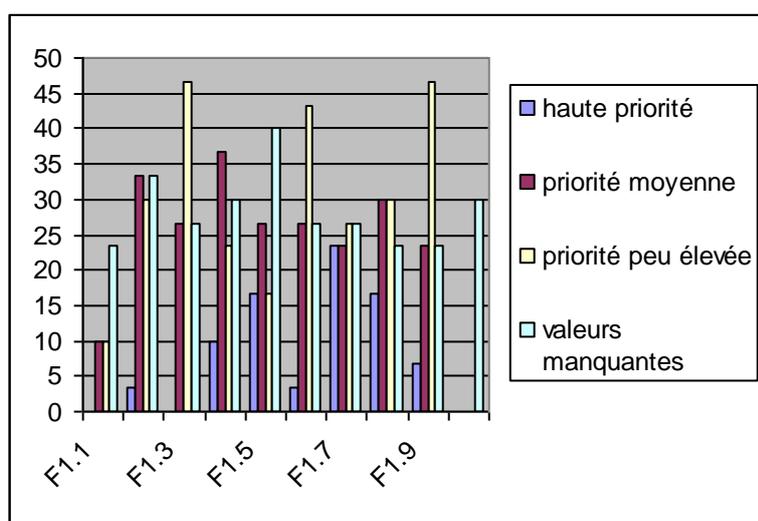
When we asked where the biological material originates<sup>34</sup> (question B5), 28 institutions stated that they obtain their biological material from the country where the material is harvested, either directly or through collections or other suppliers. Material is mainly exchanged<sup>35</sup> for free (24 answers out of 57), or with a generally low transport cost (12 answers). This means

<sup>34</sup> Questions B5, D1, D3.1 and D4.1.

<sup>35</sup> Questions B6, D2 and D5.

that exchange difficulties are not linked to the cost of the transaction, but perhaps the procedure itself.

We also considered it interesting to survey the stakeholders about the usefulness of public investments in life sciences. It seems that the establishment of a secure, simple legal framework is a necessity in the exchange of genetic resources. 14 stakeholders support the idea that establishing national legislation and regulations applying environmental policies (e.g. support policies, regulations on transport and manipulation, etc.) comprises a high or medium priority. Similarly, 15 stakeholders replied that the establishment of European legislation and regulations facilitating the application of environmental policies (e.g. support policies, regulations on transport and manipulation, etc.) is a high or medium priority.



*Illustration 20: Public investments in life sciences (F1)*

Caption:

F1.1 Promotion of fundamental and applied research 0-3-2

F1.2 Public collections of Germoplasms (e.g. with the aim of developing research or for the conservation/ maintenance of existing collections) 1-10-9

F1.3 Public databases (e.g. creation of new databases, facilitating access to existing databases, updating) 0-8-14

F1.4 Organisation of major initiatives to collect biological material through a project/an organisation /an international authority (e.g. International Plant Genetic Resources Institute - IPGRI) 3-11-7

F1.5 Organisation of major initiatives to collect biological material through a national project/an organisation/authority) (e.g. CLO: Flemish government policy investing directly in new technologies through the creation of a network linking all existing Flemish research centres, bio.be, etc.) 5-8-5

F1.6 Facilitate the establishment of partnerships and networks between collections of genetic resources in other countries 1-8-13

F1.7 Establish national legislation and regulations that facilitate the application of environmental policies (e.g. support policies; regulations on transport and manipulation, etc.) 7-7-8

F1.8 Establish European legislation and regulations that facilitate the application of environmental policies (e.g. support policies, regulations on transport and manipulation, etc.)

5-9-9

F1.9 Facilitate information for the public 2-7-14

F10 Other

It also appears that the organisation of regional networks (13 answers) and international networks (14 answers) of collections of material are considered very useful. This confirms the dynamism which exists in Belgium in the collections sector.

Typology of the rights of use and decision-making concerned	Preferred institutional models	Exchange of resources (described as growing since 1992, but with a falling growth rate (cf. B.4))
Access to and direct utilisation (conservation, utilisation in an experimental method, etc.)	Establishment of research cooperation with partner's in the material's country of origin, request to partners in the country of origin (cf. D9)	Frequent (cf. D6.1)
Access to and non-commercial utilisation of applications derived from the resource	Establishment of research cooperation with partners in the material's country of origin, request to partners in the country of origin (cf. D9)	Frequent (cf. D6.2 and D6.3)
Access to and commercial utilisation of applications derived from the resource	No direct, upfront payment/no awarding of royalties (cf. D5 and D2)	Almost no distribution to commercial partners (D6)

*Table 3. Institutional models and exchange practices adopted by Belgian stakeholders*

## **Chapter 6: Case studies**

The pilot interviews held at the start of the survey put us on the track to three findings relating to the exchange of genetic resources in Belgium. We considered it useful to go into greater depth concerning these questions through specific case studies. Three case studies were carried out to support these hypotheses.

### **6.1 The lack of government incentives**

The information from the pilot interviews suggests that there is a lack of government incentives in fields linked to the utilisation of genetic resources. Public administrative or research institutions lack financial and other support for access to foreign genetic resources and promoting the equitable utilisation of these resources. This lack leads to a failure to enhance the value of the results and efforts associated with public and private resource in areas linked to the utilisation of genetic resources from abroad. When this value enhancement exists, it nonetheless remains very poor.

#### **6.1.1. Identification of the problem**

When we surveyed certain people about ABS in Belgium in the framework of the pilot interviews and case studies, the majority answered that the lack of government incentives for research impedes the exchange of genetic resources and information and therefore indirectly ABS. These persons consider that incentives for research are a good way of promoting the conservation of GRs and compliance with ABS rules.

According to one of the interviewees, it is important to determine the competencies and duties of each Belgian institution clearly at regional and federal level because one of the reasons why exchanges have slowed down is the malfunctioning of the Belgian institutional system for phylogenetic resources (no specialist institution with specific, particular competence in the field, no national policy in the area and no '*de facto*' financial resources). Developing regional and/or federal coordination could thus partially lead to enhancing the value of individual, scattered efforts made in the area. But another person interviewed warned us against the risk of 'regional appropriation' of the results of research. Strictly regional investments could favour the partitioning or appropriation of information by region and thus limit exchanges of materials and information sharing.

In addition to these difficulties in collaboration/coordination between public institutions, there is also a lack of relationships between public and private research centres. Research results are little disseminated or poorly disseminated. The private sector often does not use the fruit of public research and vice versa. But promoting better cooperation would help to promote the conservation of GRs, the exchange of GRs and respect for ABS rules.

#### **6.1.2 Case studies at the 'Potato Sector Council'**

The 'Potato Sector Council' aims to propose a strategic plan covering the goals to be reached and the sustainable development policy to be adopted by the sector in the next 3/5 years to the

*Agence Wallonne pour la Promotion d'une Agriculture de Qualité (ABSQ-W) [Walloon Agency for the Promotion of Quality Agriculture]. This includes the development and promotion of differentiated quality products.*

Ten sector councils have been approved by the Walloon government so far. They comprise councils operating in the following fields:

- › The cattle sector
- › The pork sector
- › The poultry and rabbit farming sector
- › The sheep and goat farming sector
- › The milk sector
- › The large cultures sector
- › The potato sector
- › The biological agricultural sector
- › The edible products horticultural sector
- › The non-edible products horticultural sector

The Councils for the sectors are responsible for drawing up EQWALIS specifications for products or groups of products. These specifications can be approved by the Minister, following an opinion from the ABSQ-W brand Committee.

During the 'Potato Sector Council' meeting on 13 April 2006, we obtained some information about the regional and federal policy in terms of developing the market and concerning the promotion of agricultural research on potatoes. The purpose was to gain an idea of the role played by the regional and national governments in developing research and the Belgian potato market, as promoting research is perceived as a potential way of promoting ABS rules.

The members of the council mainly emphasised that the impetus for public or private research came from the researchers themselves and that there were very few government incentives to assist centres to develop national research on potatoes financially or otherwise. The Council stressed that this was not the case in France or the Netherlands, for example, where the governments support public and private research much more visibly and actively. One of the possible reasons is that the Belgian potato market is not very developed and is declining. Moreover, there are very few public or private organisations in Belgium which select or improve potatoes and which exchange genetic resources for this species. Nonetheless, the Council considers that the Belgian governments must provide a structured impetus to research centres, in whatsoever field, in order to promote the national market and the exchange of material, instead of reducing financial and other incentives due to the limited size of the market in this area. This would contribute to fostering the exchange of potato GRs with other countries and compliant application of international ABS rules.

It was noted that the research sector was very developed in Belgium<sup>36</sup> but that this does not translate into high commercial value enhancement of the output from this research<sup>37</sup>. Increasing national incentives could favour the marketing of products arising out of private and public research. This could also assist the dissemination and application of ABS rules.

The Council also emphasises that European cooperation by market between governments (potato market in this case) could comprise support for research and thus help the utilisation

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<sup>36</sup> Question A3.

<sup>37</sup> Questions A3, A4.

of the potato's genetic resources at national level. Clear and consistent incentives could facilitate the promotion of research by regional and federal governments.

Nonetheless, this finding must be qualified slightly. Even if it suspected that this information is applicable to other sectors (beet, maize, forestry, fish farming, etc.), it is necessary to obtain a much more in-depth study by sector and region to assert with certainty that this finding is verified everywhere in Belgium.

### **6.1.3. Conclusions**

Developing government incentives for public and private research and development in the potato sector would facilitate research. This could notably be done through financial, structural and political support. This would contribute to increasing demands for access to GRs from other countries. It could also promote the national potato market, especially if the national initiative is supported by a wider European cooperation programme. Increasing national incentives would favour the marketing of products arising out of private and public research. Developing government incentives for research is thus perceived as a way of disseminating knowledge of international ABS rules and their application at national level, as well as a means of boosting the national economy in this sector.

## **6.2 Role of informal networks in the harvesting and exchange of information and biological material**

### **6.2.1. Identification of the problem**

We know that biological resources are exchanged through formal, identified channels. The results of question D7 on the usual procedures for obtaining material show that the most frequently used means for accessing genetic resources are a request for information from usual or potential partners in the country of origin and the establishment of research cooperation with partners in the material's country of origin. The other procedures used include directly approaching commercial suppliers, the application of access agreements previously concluded between the parties, based on factual information, or independent international GR networks, such as the International Plant Exchange Network' (IPEN)<sup>38</sup>.

However, during the pilot interviews, several persons raised the importance of the role played by private persons/institutions in harvesting and exchanging biological material. Research professionals access species living throughout the world through networks of enthusiasts and fans of insects or plants. We have described these networks as 'informal networks' for accessing biological material. Yet, the role of these informal networks which facilitate the exchange of GRs is not acknowledged in the general literature on the exchange of GRs. According to the qualitative pilot interviews carried out at the start of this survey, it seems that these networks play a substantial role in the harvesting, conservation and exchange of genetic resources. By making a request to access a given specimen via an email to a colleague or acquaintance, for example, a researcher will activate the links in a chain of enthusiasts, private researchers, associations, NGOs, public researchers, etc. which, from contact to contact, will transmit the request for access to the person who is able to respond.

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<sup>38</sup> See illustration D7.

A case study emphasises the importance of the role played by these informal networks in the harvesting, conservation and exchange of biological material. It involves entomological biological resources (insects).

### **6.2.2 Case study in an evolutionary and functional entomology laboratory**

The evolutionary and functional entomology laboratory at the University Faculty of Agronomic Science at Gembloux supervises research on certain insects. The decision to undertake specific research is made by the researcher. He decides on what he will work on and it is up to him to find the biological material needed for his research. Depending on the type of material needed for his research, the researcher will contact a given body which holds this material. It can be another university research centre in Belgium or elsewhere, a museum, gene bank, etc. But the material occasionally cannot be found via a formal institution and it is necessary to harvest it in its natural environment. It is easy to understand that it is not always simple to visit the natural environment where the pursued insect is located. This is where informal networks of people working on this type of material intervene. A call or email to an acquaintance (researcher or enthusiast/fan) is occasionally sufficient for the person to find the sought material in his letterbox a few months later, without knowing the person who sent the material and without having taken particular steps or fulfilled administrative formalities.

It appears that this form of access to genetic resources is quite widespread in the research sector. But no literature mentions this means of access to the material. However, it appears that these networks are particularly active in Europe, in Germany for example.

The data which we identified concerning these networks are the following:

- It involves personal contact, from person to person with a knowledge of the sought material. These can be researchers, but are mainly fans or enthusiasts, conservation and education associations, NGOs etc.;
- The request is quite informal and is generally made by telephone or email, or even by word of mouth. The request for material often transits via several persons, which means that the person who asks for the material does not necessarily know the person/institution supplying the material;
- the requests are not 'exaggerated' in frequency and quantity of material, as a matter of respect for the contacted person/organisation and to avoid excessive demands on a network;
- there is no guarantee that the material will be collected and forwarded, nor that it will arrive in a sufficient quantity or in a good state. Nonetheless, it seems that the material is generally usable, supplied in a sufficient quantity and accompanied by information linked to the harvesting, the material's habitat and even the material itself.

### **6.2.3 Conclusion**

These informal networks appear to play an important role in the exchange of biological material and related information. They facilitate access to resources, and even allow access to biological resources that are not accessible through formal channels. As a result it is desirable to protect them, and even promote them, albeit without formalising them (which would make the system sluggish). This finding on the existence and role of informal networks in access to genetic resources deserves to be explored and developed in order to obtain a more complete insight into the situation relating to compliance with ABS provisions and consequently the

ability to use this information. These networks could also form a way of disseminating and promoting the ABS rules.

### **6.3 The lack of coordination and cooperation between the different stakeholders and users of genetic resources**

#### **6.3.1. Identification of the problem**

The genetic resources stakeholders are also keepers of these resources. The conservation of biological diversity makes it possible to request the exchange of biological material. This is why the CBD's first objective is 'the conservation of biological diversity<sup>39</sup>'. It was nonetheless surprisingly established in this study that many users of genetic resources do not necessarily link the CBD and ABS measures with some national or international measures to conserve genetic resources. We therefore considered it interesting to study a national conservation project more closely to highlight the weaknesses in terms of interaction, the exchange of information, and coordination between the different regional and national projects and research centres in Belgium.

During pilot interviews, the stakeholders mainly emphasise the need to support and develop the conservation of resources and research (whether public or private). The questioned persons systematically make a link between conservation and the exchange of GRs, but not necessarily between conservation and ABS measures in the CBD and the Bonn guidelines. Almost half of the people surveyed emphasised the importance of promoting conservation to favour the exchange of biological material by different means. Firstly, a suggestion is made to tighten and develop national, regional and international networks for exchanging genetic resources, starting with small local networks and increasing the relationships between international conservation and research centres. A proposal is then made to maintain gene banks, private and public collections and to update and make available all of the relevant information. Finally, an emphasis is placed on the need to limit and simplify regulations in the area.

It would therefore seem that efforts need to be made to disseminate and apply ABS measures better at national level and that these efforts could be grafted onto national projects to conserve biological material. We wanted to examine this path within the Veterinary Unit in the Faculty of Life Sciences at UCL.

#### **6.3.2 Case study in a veterinary unit laboratory in the life sciences faculty at the Catholic University of Louvain**

According to the first report by the Veterinary Unit for the creation of a domestic biodiversity platform in the Cryo bank project financed by the Region of Wallonia:

'In 1996, Belgium, like 168 other countries across the world, undertook to preserve its biodiversity by ratifying the United Nations Convention on Biological Diversity of Rio de Janeiro. These agreements stipulate that an inventory of the actions taken and the results obtained will be compiled by each of the States in 2010.

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<sup>39</sup> CBD art 1.

Belgium has established an infrastructure and programmes to respond to the demands of these agreements, notably with NATURA 2000. However, all of the means implemented only cover wild fauna and flora. Little has been planned so far for our domestic patrimony. However, this forms an integral part of the Rio agreements. Many countries, via the FAO, assign this major importance both for the present and for the future.

While ‘Steunpunt Levend Erfgoed vzw’, a non-profit association, aims to preserve our local species in Flanders, nothing structured exists in Wallonia with the exception of a few isolated researchers and enthusiasts. In order to remedy this, a global plan covering information, conservation, studies and the development of Walloon domestic species was proposed to the cabinet of Minister Lutgen at the start of 2006. This plan called ‘Livestock of Wallonia’ proposes a set of coordinated, original actions aimed at preserving our domestic biodiversity. These actions will associate scientific research closely with different conservation programmes in the field.

The first stage in this plan is to create a scientific platform that brings together researchers from the different Walloon Universities working in this field. This scientific platform will have the task of safeguarding the seriousness and scientific quality of the implemented projects. It will also be a *place for exchanges between researchers from different Walloon Universities.*’ (our emphasis)

This inventory shows the importance of conservation of the patrimony of national and European regional biological diversity. This observation is confirmed by the predominance of the roles played by the research and collections sectors in Belgium<sup>40</sup>. It is consequently clearly established that conservation and the exchange of GRs are two indissociable components and both have to be promoted.

During our meeting with the Veterinary Unit team, the inadequacy of collaboration and coordination between the different public and private national and regional projects appeared as a recurring difficulty complicating the smooth progress of the project.

This illustrates the lack of coordination as well as the lack of an exchange of information, material and results between organisations of all scales. The results of this survey concerning the lack of value enhancement of research results tends to reinforce that this finding on conservation applies to the exchange of GRs.

### 6.3.3 Conclusion

This case study therefore emphasises that the players make a link between conservation and the exchange of GRs, but that does not necessarily imply a link between the ABS measures in the CBD as well as the Bonn guidelines and conservation. Future government efforts aimed at improving the dissemination and application of ABS measures at national level could be grafted onto national projects to conserve biological material, as it appears that in Belgium, GR stakeholders are more sensitive to the ‘conservation’ section than to the ‘ABS’ section of the CBD. It seems that it is easier in Belgium to promote respect for ABS rules through the channels of conservation and research. Thus, developing cooperation and coordination between research centres, public and private institutions, and commercial or other

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<sup>40</sup> Questions A2 and A3.

organisations to foster the value enhancement of research results could be a means of disseminating international ABS rules and promoting compliance with them.

It was noted above that the research and collections sectors were very developed in Belgium<sup>41</sup> but that this does not translate into a high commercial value enhancement or otherwise of the output from this research<sup>42</sup> (including dissemination of the information and working techniques). As a result, we think that promoting coordination and collaboration between organisations and sectors could not only favour the smooth progress of projects in Belgium and the marketing of products derived from private and public research, but also promote international ABS rules and their application at national level effectively.

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<sup>41</sup> Question A3.

<sup>42</sup> Questions A3, A4.

## Chapter 7 – Report on the *ad hoc* meeting of experts

The meeting enabled us to:

- compare the surveys carried out in Germany, France, Great Britain and Belgium;
- submit proposals for certification and identification systems to the persons in charge of these surveys, managers of groups of users and academics working on the ABS regime.

### 7.1 Comparison of the German and British surveys

Firstly, it is important to specify that a distinction must be made between the surveys in Great Britain and Germany, which closely resemble the goals and approach of the Belgian survey (i.e. measure the degree of knowledge and adoption of the CBD's ABS provisions) and the French survey, which essentially aims to evaluate the use of resources economically.

#### 7.1.1 Comparison with the surveys in Germany and Great Britain

Two important points emerge from the comparison of the surveys, the first at the methodology level and the second in terms of results.

At a methodological level, the three surveys (German, British and Belgian) were faced with the difficulty that the population of stakeholders concerned was unknown at the outset. The essential difference in the Belgian survey is its willingness to adopt a broad approach to all of the potential stakeholders concerned by the regime.

In particular, the Belgian survey questioned both stakeholders that know the international ABS regime well and those without a good knowledge of the regime. This has an advantage and a disadvantage. The advantage is that it enabled us to note that some stakeholders who do not know the CBD have an implicit knowledge of some components in the regime which are important for their activity, despite everything, such as the global strategy for plant conservation in the case of botanical gardens or the use of material transfer agreements in the case of culture collections. The disadvantage is that the absence of response rate for other more targeted questions on the adoption of the Bonn guidelines (such as question D8 'do you develop codes of conduct?') is quite high, as a large proportion of the stakeholders surveyed said that they were not directly affected by the treaty. Thus, this choice reduces representativeness for some answers, but allows a very 'broad' approach to all of the stakeholders concerned and gives a better insight into the effective access and benefit sharing practices used by all of the stakeholders.

At the level of the results, we were able to note the importance of the absence of legal security in all of the surveys. It is interesting to observe the differences between the sectors, which intersect in the different countries, and in particular the more informed nature of the agricultural research sector in general. In contrast, it appears that the Belgian survey is the only survey which emphasises the importance of informal networks in the exchange of material. However, this comparison between the results of surveys would deserve a more detailed analysis, as the meeting of the *ad hoc* group of experts held on 23 June at the FPS Environment premises in Brussels was just a preliminary step.

## 7.2. Comparison with the French survey

The French survey pursues a different goal from the surveys in Belgium, Germany and in Great Britain. Its objective is to carry out an economic evaluation of the utilisation of genetic resources in France, essentially among large companies. The idea was that a better understanding of economic stakes will allow a more informed debate and open up new prospects for obtaining industrial support in developing the regime.

### 7.2.1 Summary of the position of the group of experts on the proposals for a certificate of origin, tracking systems and property rights

#### Certificate of origin

The certificate of origin (source, country of origin or legal provenance) is viewed as one of the essential components of an ABS system<sup>43</sup>. It is currently being studied in the context of negotiations on ABS by the *ad hoc* working group, to whom the Conference of the Parties on the CBD has given an official mandate to study its practical and technical feasibility.

The starting point for the discussion on the certificate with the group of experts was to analyse practical experience. In this context, the system established by Australia as a supplier country appears to be an interesting case. It is a portal where someone can register at the time of accessing a resource in Australia as a user. This registration entitles the person to a certificate of origin, which includes informed consent and an agreement to share benefits, but also obliges the contracting part to respect the commitments taken on when accepting the certificate. At the cost level, operation of the portal requires an investment of approximately 60,000 Euros. The contribution requested for obtaining a certificate is 50 Euros for the private sector (the system is free for the public sector).

This example generated several reactions. Firstly, it appears that a system like this is clearly important to increase the legal security of transactions involving the exchange of resources between private firms and supplier countries. In practice, the private sector demands ‘fit for use’ biological material, i.e. which fulfils all of the technical and legal criteria that allow direct use without having to take further steps. In contrast, in the case of the public sector, it must be possible to establish weaker constraints if the resources are intended for research and conservation (even if this means combining it with an *ex post* certificate as in the examples of identification systems described below). Then it is necessary to be able to consider different types of certificates, depending on the type of resource and origin. For example, in the case of plasmids, the term origin does not mean much, as the genetic material which makes up plasmids can come from numerous different locations. In this case, it is more appropriate to talk of the source.

Finally, in general, it appears important to recognise while establishing a certification system that the needs of the private sector (‘fit for use’ material) and the public sector (obligation to satisfy the constraints of the ABS regime but no direct interest) are very different. This is why an identification system combined with a code of conduct, as described below, appears to be better suited to the specificities of the public sector. It is also important to specify (as we saw

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<sup>43</sup> The essential components of an ABS system are: a system to identify resources (*tracking system*), a certificate of origin, a mechanism to share benefits, informed consent, a uniform material transfer agreement and measures to check implementation (*compliance measures*).

in the results of the survey) that in the case of the public sector, many resources are collected in the context of cooperative research agreements which include informed consent about the utilisation of the resource, although it is limited to non-commercial use in the majority of cases.

### **Tracking system**

Tracking systems are also an essential component of the ABS regime. They are a prerequisite for any certification system, because the latter assumes an ability to identify the flow of a genetic resource through the chain of innovations leading from the supplier to the user. At the same time they are less strict than the certification system, because there is not necessarily any informed consent about a possible commercial use of the resource at the time the numerical identifier is created. In practice, informed consent is common, especially in situations where the resource is only used for research purposes without marketing. However, as we shall see, the tracking system is compatible both with informed consent at the time of creating the identifier (therefore *ex ante*) and with informed consent at the time when the resource leaves the research and collection networks for use in processes to develop commercial products (therefore *ex post*).

At the Belgian level, two types of identification systems, which have been placed in use, can be considered as an application of the principles in the ABS regime: the IPEN system for botanical gardens and the numerical identifier system for culture collections.

The IPEN system used by botanical gardens is a well established system that allows the allocation of a unique numerical identifier to each entity which enters a botanical garden. Moreover, the numerical identifier stipulates whether there are restrictions on use imposed by the depositor (code 0 if there are no restrictions, code 1 if there are restrictions). This system is used in a network of botanical gardens that are members of the IPEN system, which guarantee both the quality of the biological material and the rigorous nature of the identification system. Ultimately it is the inclusion of the numerical identifier in a quality management system which justifies the adoption of the system and guarantees its usefulness.

The numerical identifier system in the context of culture collections is a system used by global culture collections, with a standard acronym for each collection that is a member of culture collections organisation and a strain number assigned at the time of deposit in the collection. There are well established procedures to verify duplicates between collections (synonymy rules between strain numbers) and the identifiers make it possible to find a set of information about the resource, such as the country of origin, the collection conditions, bibliographical references for publications about the resource, etc.

During this group of experts meeting, a major part of the discussion dealt with the contribution of these identification to the ABS regime. The identification system itself does not contribute to implementing the regime's objectives, but in practice these systems are used hand in hand with codes of conduct on ABS. More specifically, in the case of the network of botanical gardens that are members of IPEN, compliance with the ABS regime is organised through a code of conduct, which requires informed consent for any commercial use of the resource and equitable sharing of benefits (the code of conduct for Kew Gardens, London, [www.kew.org](http://www.kew.org)). Thus, once a resource leaves the network of botanical gardens (where it is solely used for research purposes), the user only has access to the resource subject to seeking prior informed consent from the provider operating where the resource kept in the botanical garden

originated. It is an *ex post* certificate system that only applies in the case of use outside the network of botanical gardens. In the case of culture collections, the situation is relatively similar. Here compliance with the ABS regime is implemented through material transfer agreements, through which the user undertakes to share the benefits fairly with the supplier country if the resource is used commercially. However, the harmonisation of practices is less advanced than in the case of the code used by members of the IPEN system, but on the other hand, the application of the code of conduct is more universal, given that it potentially targets all of the culture collections which are members of the worldwide organisation (and not just the members of a more limited network).

Obviously in the two cases, this type of system is only applied rigorously in the framework of endemic resources, specific to certain unique ecosystems. In the case of resources which can be found in several countries, it is necessary to adopt either an effective rule of provenance (therefore the country which actually supplied a given strain, e.g. in the context of a cooperation research agreement), or a rule to share benefits fairly among all of the potential suppliers (if possible), or to act by creating a multilateral fund (if the transaction costs are not exorbitant).

### **Property rights systems**

The consensus of the group of experts was that the intellectual property rights system was not an appropriate tool *per se* for implementing informed consent and benefit sharing as stipulated by the international ABS regime. In fact, proof of informed consent, whether in an *ex ante* system (certificate of origin) or in an *ex post* system (tracking system with a material transfer agreement) does not depend on the existence or not of a property right. In contrast, it could be a tool which facilitates implementation of the regime, like through a clause which encourages the disclosure of the country of origin during the deposition of patents (cf. the Norwegian system, Switzerland's proposal to WIPO, the EU proposal concerning the disclosure of the source, and Belgian legislation L 2005-04-28/33 published on 13-05-2005, Article 15 §1st (6)).

## Chapter 8 –Recommendations

### *8.1 General recommendations for an improved taking into account of the needs and problems of GR stakeholders*

Our study of Belgian stakeholders in the exchange of genetic resources enabled us to highlight a series of general problems encountered during the application of ABS regulations. This diagnosis leads to a series of general recommendations arising from the survey:

**Recommendation 8.1.1.** Exploit Belgium’s strengths better, i.e. the dynamism which exists in the research sector and *ex situ* collections of genetic material sector;

**Recommendation 8.1.2.** Build on the 3 findings from the case studies: the lack of government incentives, the importance of incentives addressed to stakeholders in informal networks and the lack of coordination between the different authorities which regulate the exchange of genetic resources (where the stakes of research policy, foreign trade and environmental protection meet) to improve understanding of the subject and the transfer of knowledge on conserving GRs and ABS;

**Recommendation 8.1.3.** Promote links and relationships between types of sectors and between sectors downstream and upstream of the R&D chain, e.g. by developing public or private institutional partnerships or partnerships to collect genetic resources with institutions in the resources’ countries of origin.

These general recommendations concern all of the public policies on regulating the optimum utilisation of genetic resources and therefore form an essential component of any ABS policy which seeks to be efficient and legitimate. We have also formulated a series of specific recommendations below linked to knowledge and implementing the provisions of the ABS regime.

### *8.2 Specific recommendations to improve stakeholders’ knowledge and information on the exchange of genetic resources as a tool for implementing the international ABS regime.*

In close cooperation with the stakeholders concerned, our study made it possible to determine specific recommendations for improving knowledge of and information held by GR stakeholders in Belgium, recommendations aimed at facilitating and promoting the implementation of the ABS measures from the CBD and Bonn guidelines. The analysis of our results leads to two series of specific recommendations.

#### *a. The documentation and information about the exchange of resources*

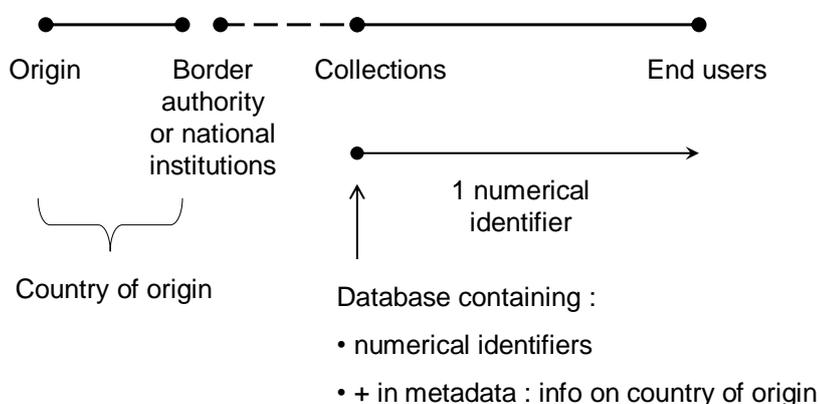
Documenting the exchange of material would facilitate the implementation of ABS measures. Including the country where the material originates in the documentation would allow the identification of the competent legal entity for implementing and applying ABS regulations for the harvested material. This is compatible with a certificates of source/legal provenance/origin system in the supplier country, but also with other recognised international mechanisms.

One of the main difficulties of a documentation system acknowledged in the survey is the cost of transactions arising from such a system. This is why we propose a system with two components: a first ‘universal’ component which involves a permanent numerical identification of the resource in the innovation chain (*tracking system*) (**recommendation 8.2.1.**) and a second ‘specific’ component which involves adopting the most appropriate international ABS mechanism for the sector, based on a choice (**recommendation 8.2.2.**).

**Recommendation 8.2.1.** The first component could be inspired by the *Integrated Conveyance System* from the Mosaics project, as presented in the group of experts meeting. With this in mind, the tracking system could be based on the following guidelines:

- A simple and universal system based on a unique, permanent identifier attached to the resource. The identifier can be created at the time the resource is deposited in a collection (as is already the case in the IPEN and MOSAICS system), at the time of collection or again via a national registration system (as happens in the system implemented in Australia, but on a voluntary basis);
- Encoding of the identifier in a database. The fields of this database (*metadata*) would also contain information on the country of provenance of the resource (so it is possible to identify the legal entity responsible for allocating the numerical identifier);
- No other regulatory constraint would be attached to the tracking system. Implementation of ABS provisions would be facilitated by this universal system, but depends on complementary mechanisms which can differ from one sector to another. These mechanisms are the subject of the second component of the documentation system.

### Recomendation 4.1. : Documenting the flow of resources



*Illustration 21: Documenting the exchange of material through numerical identification*

**Recommendation 8.2.2.** Once a resource identification system (*tracking system*) is in place, the realisation of the ABS regime goals can be applied via different complementary systems. In our study, we have identified two systems which would be the most appropriate for stakeholders upstream of the innovation chain and stakeholders downstream of the chain of innovation respectively:

- A first system entails acquiring a certificate in the supplier country on accessing the resource for the first time. In return for a small contribution for registration, a certificate can be obtained from a central registration authority (which can be a simple Internet portal), which commits the user to obtain informed consent from the supplier and to share benefits fairly in the case of commercial use. It appears that this type of certificate is mainly useful for a commercial user who is trying to obtain a source *in situ* directly. In particular, it permits increased legal security for the company engaged in the transaction.
- A second system involves acquiring informed consent at the point when a commercial user accesses a resource which is kept in a culture collection, a botanical garden or another conservation organisation *ex situ*. At the time of accessing the resource the user signs a material transfer agreement which obliges him to adhere to the provisions of the ABS regime. It appears that this system is mainly useful for users of resources for commercial purposes, because it allows the person to obtain and use the resource without any cumbersome informed consent procedure covering commercial use or an *ex ante* agreement on sharing benefits, while contributing to the application of ABS provisions through a rigorous tracking system.

This double recommendation (of a simple universal identification system and a range of specific mechanisms) would help to create or bolster the legal certainty needed by private and public stakeholders involved in R&D downstream in the chain. This would allow them to assess cases where benefit sharing would apply on accessing material from intermediate stakeholders in the innovation chain (research centres and collections) or directly upstream (collection in the country of origin).

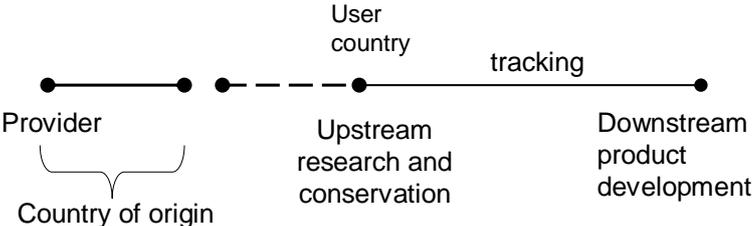
This recommendation would develop trust between suppliers and users of genetic material (where culture collections are often intermediaries), by making transactions more transparent.

***b. Policies of free access in the countries which use resources***

One of the main difficulties linked to implementing appropriate ABS regulations is the high cost of transactions in the system. Researchers would be most penalised by a system where the transaction costs are high, as research is expensive and yields little or nothing directly. This justifies supplementing provisions on benefit sharing (which particularly target downstream research) with provisions creating incentives for stakeholders upstream in the R&D process. This could be done *inter alia* by developing:

**Recommendation 8.2.3.** A policy of access to and disseminating biological material that is facilitated within public research institutions (universities, public culture collections, etc.) by elaborating directives by sector, as is the case for the ‘National Institute of Health’ in the United States, for example. These directives could contain measures that make it possible to guarantee that resources held by public institutions remain in the ‘public property’ domain for all research use upstream in the innovation chain (research infrastructure).

**Recommendation 8.2.3. : policy of free access and diffusion in upstream activities**



- institutional policies for sharing of data and resources
- non-restrictive license policies for upstream research activities

*Illustration 22. Institutional policies for access to resources and data in research upstream of the innovation chain*

**Recommendation 8.2.4.** In the case of genetic material downstream in the innovation chain (i.e. with properties that are already known, which can be used to develop commercial products), we recommend a policy of ‘licences’ and ‘benefit sharing’ with two components: a component of non-restrictive dissemination of the genetic material and the associated information for non-commercial or ‘humanitarian’ research and a policy with an exclusive, restrictive licence contract for all research pursuing a commercial application.

## Chapter 9 – Conclusions

Our study responded to two main requests from FPS Environment, i.e. to identify the real or potential Belgian users of genetic resources and to collect useful information for the constitution of a national policy on access to and sharing genetic resources. But we have added a third dimension to our survey: it also provides an insight into institutional models and practices for exchanging material, with the aim of making a contribution to the current negotiations on implementing the Bonn guidelines. These results supply the information basis needed to improve and create exchanges between national institutions and users. They also allow a more complete and stronger integration of users in procedures to negotiate and implement ABS measures in Belgium.

The methodology adopted during this survey, targeted at the quality of information, enabled us to obtain precise, reliable data. During the pilot interviews, the information drawn from these different meetings led us to develop three findings. These findings have been examined in greater detail in 3 case studies. They are confirmed by the general results of the survey questionnaires.

The first finding is that there is a lack of government incentives for ABS in Belgium. Developing government incentives for public and private research and development would facilitate research and favour the marketing of products resulting from both private and public research. According to the persons surveyed, these two objectives are essential for facilitating the dissemination of information on the international ABS regime, promoting the conservation of GRs and respect for and application of ABS provisions at national level.

The second finding recognises the existence and important role played by informal networks in the exchange of resources. These informal resources facilitate access to resources abroad and allow access to biological resources which are not accessible through formal channels. It is therefore desirable to protect these and even promote them, albeit without formalising them. This finding concerning the existence and role of informal networks in access to genetic resources deserves to be explored and developed to obtain a more complete insight into the ABS situation and so that this information can be used.

Finally, the third finding highlights the lack of coordination/cooperation between the different public and private organisations which have access to genetic resources originating abroad. As a result, we think that promoting coordination and collaboration between organisations and between sectors could not only promote the smooth progress of projects in Belgium, and the marketing of products from private and public research, but also facilitate the disclosure and application of international ABS measures.

The main recommendations from our study result from these qualitative interviews and the detailed analysis of the questionnaire sent to a random sample of GR stakeholders. We formulated and discussed a series of 3 general recommendations and 4 specific recommendations:

- 1.1 Exploit Belgium's strengths better, i.e. the dynamism in the research sector and *ex situ* collections of genetic material;
- 1.2 Develop incentives that take account of the stakeholders in informal networks and the need to coordinate between the different authorities in charge of exchanging genetic resources;

- 1.3 Favour the links and relationships between types of sectors and between sectors downstream and upstream of the R&D chain;
- 2.1 Document the flow of genetic resources by a simple, universal system, based on a unique, persisting identifier attached to the resource;
- 2.2 Develop an ABS sector differentiated by sector;
- 2.3 Develop a policy for access to and the dissemination of biological material facilitated inside public research institutions;
- 2.4. For genetic material downstream of the innovation chain, we recommend a policy of ‘licences’ and ‘benefit sharing’ with two components.

Thanks to the *ad hoc* meeting of the group of experts, we were able to:

- 1) compare the surveys held in Germany, France, Great Britain and Belgium. At the level of the results were able to confirm the importance of the absence of legal security. It is also interesting to observe the differences between the sectors which intersect in the different countries, in particular the better informed nature of the agricultural sector in general. Nonetheless, only the Belgian survey highlights the importance of informal networks in the exchange of material. However. This comparison between the results of the surveys deserves a more detailed analysis.
- 2) submit proposals for certification systems and identification systems to the persons in charge of these surveys, managers of user groups and academics working on the ABS regime.

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**Annex 1: 'Public' and 'private' questionnaires**

The number of answers ticked by institutions which answered the survey is indicated for each question. If there is no figure in front of a proposal, this means there are no answers. There may be a total number of answers higher than 57 (total number of institutions which replied) as some questions offer a multiple choice. In the case of all of the questions shared by the two questionnaires, the number of answers is in the public questionnaire. Thus, only questions B5 and B6 are completed in the private questionnaire.

'Public' questionnaire

**Section 1: Profile**

**A: Identification of the different groups of users**

<b>Question A1: What type of body/institution do you belong to?</b>		
A 1.1: organisation	Private	<b>16</b> Commercial <input type="checkbox"/> Non commercial <b>1</b> Ex-situ private collection <b>2</b> Private collection of dead biological material <b>4</b> Private research centre <input type="checkbox"/> Other.....
A 1.2: organisation	Public	<b>7</b> University – Fundamental research centre <b>5</b> University – Applied research centre <input type="checkbox"/> National and/or regional research institute <b>2</b> Ex-situ public collection <b>2</b> Public collection of dead biological material (e.g. herbarium) <b>4</b> Museum <input type="checkbox"/> Other public institution.....
A 1.3: Other		<input type="checkbox"/> Specify.....

Continue with question A 2

<b>Question A2: What sectors does your organisation/institution belong to?</b>	
A 2.1: Healthcare sector	<b>0</b> Pharmacy

	<p>4 Medicinal plants</p> <p>2 In vitro diagnostics</p> <p>1 Bodycare and cosmetic products</p> <p><input type="checkbox"/> Other: .....</p>
A 2.2: Agricultural sector	<p>5 Vegetable selection/improvement</p> <p>2 Animal selection/improvement</p> <p>3 Horticulture</p> <p>0 Fish farming</p> <p>2 Forestry</p> <p><input type="checkbox"/> Other: .....</p>
A 2.3: Processing industries	<p>4 Food industry</p> <p>1 Animal feed industry</p> <p><input type="checkbox"/> Other: .....</p>
A 2.4: Crop protection	<p>5 Control of pests and diseases</p> <p>2 Diagnostics</p> <p>0 Phytopharmaceutical industry</p> <p><input type="checkbox"/> Other: .....</p>
A 2.5: Biotechnology	<p>0 Energy</p> <p>0 Materials</p> <p>0 Biocatalysts</p> <p>0 Chemical industry</p> <p><input type="checkbox"/> Other:.....</p>
A 2.6: Research sector	<p>12 Biology</p> <p>2 Chemistry</p> <p>0 Medicine</p> <p>3 Bio-medicine</p> <p>1 Pharmaceutical research</p> <p>10 Agriculture</p> <p>4 Biotechnology</p> <p>1 Phytopharmaceutical research</p>

	<input type="checkbox"/> Other: .....
A 2.7: Ex-situ collections	<b>3</b> Botanical garden <b>4</b> Zoo, Aquarium, Museum <b>3</b> Herbarium <b>5</b> Gene bank <b>3</b> Collection of micro-organisms/cells <b>7</b> Collection of dead material <b>1</b> Private collection <b>1</b> Association (NGO, non-profit organisations) <input type="checkbox"/> Other: .....
A 1.8: Other	Specify:.....

Continue with question A 3

<b>Question A3: Does your organisation use biological resources in any way whatsoever?</b>	
<b>21</b> Yes, for fundamental research.	Continue with q. A 4
<b>10</b> Yes, to develop marketable products.	Continue with q. A 4
<b>4</b> Yes, for research on and the development of intermediate products.	Continue with q. A 4
<b>23</b> Yes, for collection, conservation and distribution.	Continue with q. A 4
<b>16</b> Yes, for education.	Continue with q. A 4
<b>12</b> Yes, to perform diagnostics.	Continue with q. A 4
<b>1</b> Other:.....	Continue with q. A 4
<b>0</b> No	Continue with q. C

Continue with question A 4

<b>Question A4: Have you placed new products on the market or created a patent or obtained a protective right to a new plant variety following research on biological resources?</b>	
<b>3</b> Yes, products (including technologies)	<b>3</b> Patents underway
<b>3</b> Yes, patents	<b>1</b> Acquisition underway to a protective right to a new plant variety
<b>1</b> Yes, protective rights to a new plant	<b>1</b> No proposals

variety	
1 Products underway	<input type="checkbox"/> Not relevant

Continue with question A 5

<b>Question A5: What is the total number of staff in your organisation? (or an approximate figure)</b>					
<input type="checkbox"/> Specify the number if you know it.....					
<input type="checkbox"/> Not relevant					
23 < 25	3 25-49	6 50-99	10 100-499	1 500-999	1 999 and over

Continue with question A 6

<b>Question A6: Of the total number of staff, can you estimate the number of persons working on biological resources in your research or Research and Development department (e.g. taxonomic and analytical research, manipulation, etc.)?</b>					
12 < 10 %	9 10-24 %	8 25-49 %	1 50-74 %	7 75 % and over	1 Not relevant

Continue with question A 7

<b>Question A7: Since 2002, the Conference of the Parties on the Convention on Biological Diversity has initiated new negotiations on an 'international regime for access to genetic resources and the fair and equitable sharing of benefits' arising out of their utilisation. Would you be interested in participating in the national and international process of negotiating this new ABS regime?</b>	
3 Yes, I wish to participate in the negotiations on the new international ABS regime.	35 No, I do not wish to participate in the negotiations on the new international ABS regime.

Continue with question B

## B. Identification of the biological material

<b>Question B1: What type of biological material do you use?</b>
13 Animal genetic resources
16 Vegetable genetic resources
13 Fungi, mushrooms, yeasts, etc.
10 Bacteria

9 Non-independent organisms (plasmids, viruses, etc.)
3 Other, please specify.....

Continue with question B2

<b>Question B2: Does your organisation hold one or more collections of biological material?</b>	
29 Yes	18 No
How many accessions do they contain?.....	
How many new accessions were collected last year?.....	
How many of these new accessions come from Belgium?.....	

Continue with question B3

<b>Question B3.1: Does your organisation use biological resources from Africa?</b>	
<input type="checkbox"/> Yes      Continue with this question	<input type="checkbox"/> No      Continue with question B 3.2
10 West Africa	
11 East Africa	
11 Central Africa	
9 North Africa	
11 South Africa	

Continue with question B3.2

<b>Question B3.2: Does your organisation use biological resources from America?</b>	
40 Yes      Continue with this question	<input type="checkbox"/> No      Continue with question B 3.3
10 Central America	
17 North America	
13 South America	

Continue with question B3.3

<b>Question B 3.3: Does your organisation use biological resources from Asia?</b>	
45 Yes      Continue with this question	<input type="checkbox"/> No      Continue with question B 3.4

8 Central Asia
9 East Asia
12 South-East Asia
8 South Asia
8 Western Asia

Continue with question B3.4

<b>Question B3.4: Does your organisation use biological resources from Europe?</b>	
37 Yes      Continue with this question	<input type="checkbox"/> No      Continue with question B 3.5
13 Eastern Europe	
24 Western Europe	

Continue with question B3.5

<b>Question B3.5: Does your organisation use biological resources from Oceania and the Pacific?</b>	
9 Yes      Continue with this question	<input type="checkbox"/> No      Continue with question C
7 Oceania	
2 Pacific	

Continue with question B3.6

<b>Question B 3.6: Does your organisation use biological resources from the Antarctic, the Arctic or the deep seas?</b>		
12 Yes      Continue with this question	<input type="checkbox"/> No	Continue with question C
5 Antarctic	4 Arctic	3 Deep seas

Continue with question B4

<b>Question B 4: How do you characterise the development of exchanges of biological material by your organisation in recent years?</b>			
Since 1992	15 Growing	13 Same	3 Decreasing
In the past 5 years	11 Growing	15 Same	3 Decreasing

In the past year	10 Growing	17 Same	3 Decreasing
------------------	------------	---------	--------------

Continue with question C

***Section 2: Knowledge of/and position on the Convention on Biological Diversity***

**C: Level of information held by users concerning current basic international conditions for the utilisation of biological resources**

**Question C1: Do you know of the United Nations Convention on Biological Diversity (CBD)? Please tick the relevant answer for you.**

1 Yes, perfectly	9 Yes, relatively well	13 Not very well	9 No
------------------	------------------------	------------------	------

Continue with question C2

**Question C2: Do you know the meaning of the following terms?**

Please tick the choice that matches you	Yes, exactly	Yes, quite well	Not very well	No
Bonn guidelines	2	6	9	20
Clearing House Mechanism	3	8	6	21
National Focal Point/National Competent Authority	5	8	7	20
Access and benefit-sharing	2	9	7	21
Global Strategy for Plant Conservation	3	6	10	20

Continue with question C3

**Question C3: At international level, different ‘government measures targeting users – provisions encouraging compliance’ are currently being discussed. These measures encourage an increased taking into account of users in the ABS process. From the user’s viewpoint, how do you assess the usefulness of the different proposals? Do you have other suggestions?**

Please tick your view for each point.

The creation of a central clearing house mechanism in Belgium, which would provide information about possibilities for and conditions of access in other	10 Very useful	22 Potentially useful	0 Not very useful	3 Of little use	14 No answer
--	----------------	-----------------------	-------------------	-----------------	--------------

countries is useful for this approach					
Comment: .....					
Initiation of standard international contracts relating to ABS	10 Very useful	20 Potentially useful	3 Not very useful	1 Of little use	14 No answer
Comment: .....					
Development of compulsory codes of conduct governing the utilisation of biodiversity	16 Very useful	20 Potentially useful	2 Not very useful	1 Of little use	9 No answer
Comment: .....					
Development of voluntary codes of conduct governing the utilisation of biodiversity	6 Very useful	25 Potentially useful	7 Not very useful	2 Of little use	8 No answer
Comment: .....					
Disclosure of the country of origin in the application of patents to products arising out of the use of biological resources	15 Very useful	17 Potentially useful	2 Not very useful	2 Of little use	12 No answer
Comment: .....					
Creation of certificates for genetic material (certificate of origin/source/legal provenance). These certificates would be issued by the supplier country and required during cross-border movements. They could also be required during the application of patents (e.g. by offer legal security to users purchasing via intermediaries)	14 Very useful	15 Potentially useful	3 Not very useful	4 Of little use	11 No answer
Comment: .....					
Initiation of a certification system for users complying with compulsory rules of conduct (e.g. material	13 Very useful	21 Potentially useful	1 Not very useful	2 Of little use	12 No answer

purchased according to CBD criteria/and the Bonn guidelines). The goal is to improve the image of users.					
Comment: .....					
Assistance in developing and executing projects aimed at promoting cooperation between users and countries of origin	14 Very useful	21 Potentially useful	3 Not very useful	0 Of little use	10 No answer
Comment: .....					

Continue with question D

### ***Section 3: Practices concerning the exchange of biological resources***

#### **D: Collecting and supplying biological material**

<b>Question D1: What percentage of biological material does your institution collect in its country of origin?</b>					
7 < 10 %	1 10-24 %	1 25-49 %	1 50-74 %	10 >75 %	2 Do not know

Continue with question D2

<b>Question D2: How do you procure biological material when you collect it in its country of origin?</b>
14 Free/cost linked to collection
5 Low transport cost
0 Combination of direct payments/expenses lined to the pre-development phase/royalties
4 Non-monetary compensation. Please specify.....
5 Other .....

Continue with question D3

<b>Question D3: What is the percentage of raw biological material that you receive from suppliers established in the country where the material originates?</b>		
Please describe the type of suppliers which are your partners (e.g. ex-situ collections, gene banks, private persons): ..... .....	11 < 10 %	2 < 25 %
	0 < 50 %	2 < 75 %
	3 > 75 %	3 Do not know

Continue with question D4

<b>Question D4: What percentage of raw biological material do you receive from suppliers established outside the country where the material originates?</b>		
Please describe the type of suppliers which are your partners (e.g. ex-situ collections, gene banks, private persons): ..... .....	7 < 10 %	4 < 25 %
	3 < 50 %	0 < 75 %
	2 > 75 %	3 Do not know

Continue with question D5

<b>Question D5: How do you acquire biological material when you receive it?</b>	
10 Free/own cost linked to collection	
7 Low transport cost	
1 Combination of direct payments (upfront)/expenses linked to the pre-development phase/royalties	
4 Non-monetary compensation. Please specify.....	
5 Other .....	

Continue with question D6

<b>Question D6: Does your organisation distribute biological material to other users/collectors? (Specify the applicable percentage for each option)</b>	
To public or private collections: 11 Ex-situ collections 6 Collections of dead material	<input type="checkbox"/> For patents .....% <input type="checkbox"/> Safety duplication .....% <input type="checkbox"/> Donation for conservation and utilisation ....% <input type="checkbox"/> With transport costs .....% <input type="checkbox"/> Unknown
10 To research organisations. Specify..... ..... ..... .....	<input type="checkbox"/> For patents .....% <input type="checkbox"/> Safety duplication .....% <input type="checkbox"/> Donation for conservation and utilisation ....% <input type="checkbox"/> With transport costs .....% <input type="checkbox"/> Unknown
4 To other non-commercial users Specify.....	<input type="checkbox"/> For patents .....%

..... ..... ..... .....	<input type="checkbox"/> Safety duplication .....% <input type="checkbox"/> Donation for conservation and utilisation ....% <input type="checkbox"/> With transport costs .....% <input type="checkbox"/> Unknown
3 To commercial partners/users Specify.....	<input type="checkbox"/> .....% <input type="checkbox"/> Unknown

Continue with question D7

<b>Question D7: Please tick the options which match your usual procedure for obtaining biological material. (multiple entries possible)</b>	
0	Request for information from the CBD National Focal Point in Belgium
16	Request for information from your usual or potential partners in the country of origin
1	Request for information from the CBD National Focal Point in the biological material's country of origin
4	Acquisition of information on other national regulations and responsible authorities in the country of origin. Please specify the source of this information: .....
5	Direct approach to commercial suppliers and purchasing of material from these suppliers
5	Acquisition of biological material independent means directly in the zones of interest
4	Acquisition of biological material by implementing an agreement previously concluded between the parties, based on factual information (informed agreement; international agreements implementing the CBD)
4	International independent networks of genetic resources (e.g. International Plant Exchange Network - IPEN). Specify .....
16	Establishment of research cooperation with partners in the material's country of origin
2	Establishment of commercial cooperation with partners in the material's country of origin
4	Conclusion of contracts: Material Transfer Agreement (MTA) according to mutually agreed terms with the owner of the resources (international agreements implementing the CBD)
2	Arrangements to access resources and to share benefits arising out of their utilisation
8	Contact with ex-situ collections
0	Other .....
<input type="checkbox"/> No declaration	

Continue with question D8

**Question D8: Does your organisation respect codes of good conduct/or good practice? (Multiple choice possible)**

- 4 National codes of good conduct/good practice for the exchange of GRs
- 1 Regional codes of good conduct/good practice for the exchange of GRs
- 8 International codes of good conduct/good practice for the exchange of GRs
- 6 Other exchange/access systems. Specify.....

Continue with question E

***Section 4: Public life sciences infrastructure***

**E: Use of public infrastructure or information and technologies in the public domain**

**Question E1: What information tool do you use in your innovation process?**

- 19 Scientific publications in recognised international reviews
- 13 Public databases (gene banks, Global Biodiversity Information Facility GBIF database, etc.)
- 1 Private databases operated by other organisations
- 10 Own database
- 14 Own research results/informal sources of information
- 12 The Internet
- 8 Raw data: collection/passport data
- 0 Other

Continue with question E2

**Question E2: Utilisation of general technologies for research (e.g. ‘screening’ technologies, genetic markers, etc.). Do you use technologies which are in the public domain?**

<b>14</b> Yes      Continue with this question	<b>15</b> No      Continue with question F
--	--

**If yes, what types of technologies in the public domain do you use?**

- |  |  |
|--|--|
| <input type="checkbox"/> Patents that have expired | <b>2</b> Not often<br><b>1</b> Sometimes<br><b>0</b> Often |
|--|--|

<input type="checkbox"/> General public licences	1 Not often 1 Sometimes 3 Often
<input type="checkbox"/> Non-patented technologies entering the public domain (e.g. traditional knowledge)	0 Not often 1 Sometimes 11 Often

Continue with question E3

<b>Question E 3 Use of general technologies for research (e.g. ‘screening’ technologies, genetic markers, etc.). Do you use patented technologies?</b>	
5 Yes                      Continue with this question	24 No                      Continue with question F
<b>If yes, what types of patented technologies do you use?</b>	
<input type="checkbox"/> Specify .....	0 Not often
.....	1 Sometimes
.....	1 Often

Continue with question F

**F: Needs relating to public infrastructure (information/biological resources) or technologies in the public domain**

<b>Question F1: Public life sciences investments should be concentrated on:</b>	
Type of public investment:	Degree of priority
<input type="checkbox"/> Promoting fundamental and applied research	20 High priority 3 Medium priority 0 Low priority
<input type="checkbox"/> Public collections of Germoplasms (e.g. aimed at developing research or for the conservation/maintenance of existing collections)	10 High priority 10 Medium priority 1 Low priority
<input type="checkbox"/> Public databases (e.g. creation of new databases, facilitating access to existing databases, updates)	15 High priority 8 Medium priority 0 Low priority

<input type="checkbox"/> The organisation of major initiatives to collect biological material via an international project/an organisation/authority (e.g. International Plant Genetic Resources Institute - IPGRI)	7 High priority 12 Medium priority 3 Low priority
<input type="checkbox"/> The organisation of major initiatives to collect biological material via a national project/an organisation/authority (e.g. CLO: Flemish government policy investing directly in new technologies by creating a network link existing Flemish research centres, bio.be, etc.)	6 High priority 8 Medium priority 5 Low priority
<input type="checkbox"/> Facilitate the establishment of partnerships and networks among collections of genetic resources in other countries.	14 High priority 8 Medium priority 1 Low priority
<input type="checkbox"/> Establish national legislation and regulations which facilitate the application of environmental policies (e.g. support policies, regulations on transport and manipulation, etc.)	8 High priority 8 Medium priority 7 Low priority
<input type="checkbox"/> Establish European legislation and regulations which facilitate the application of environmental policies (e.g. support policies, regulations on transport and manipulation, etc.)	9 High priority 10 Medium priority 6 Low priority
<input type="checkbox"/> Facilitate information for the public	15 High priority 7 Medium priority 2 Low priority
<input type="checkbox"/> Other ..... ..... .....	0 High priority 0 Medium priority 0 Low priority

Additional suggestions from you:

.....

.....

.....

.....

.....

.....

.....

Thank you sincerely for the time spent answering this questionnaire. We wish to remind you that this information will be handled while respecting the principles of confidentiality.

‘Private’ questionnaire

The ‘private’ questionnaire is made up of the same sections 1 and 2 as the public questionnaire. Two questions have been added in section 1 ‘Profile’, part B ‘Identification of the material’ (cf. below).

***Section 1: Profile***

**B. Identification of the biological material**

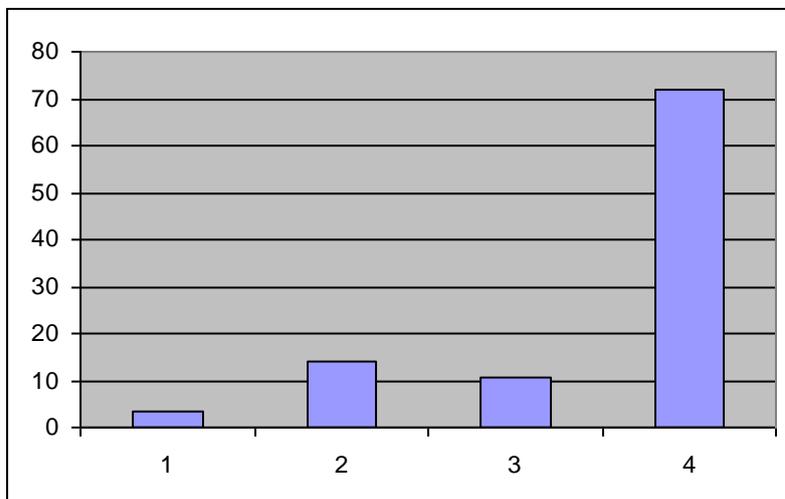
<b>Question B5: Where do you obtain biological material?</b>
2 Through a Belgian body which collects biological material abroad and redistributes it in Belgium
9 Directly from a different country
5 Other, please specify.....

Continue with question B6

<b>Question B6: How do you procure biological material?</b>
7 Free/inherent cost linked to collection
5 Low transport cost
2 Combination of direct payments (upfront)/expenses linked to the pre-development phase/royalties
0 Non-monetary compensation. Please specify.....
6 Other .....

**Annex 2: Useful illustrations which not included in the body of the text**

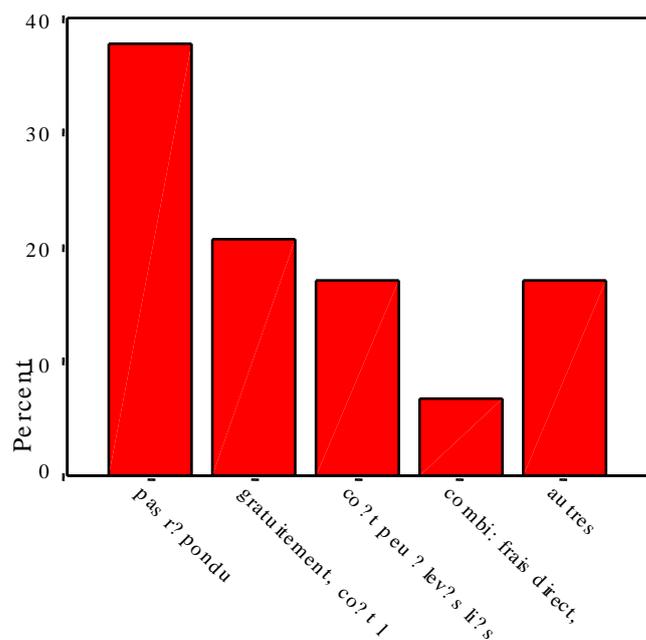
**Illustration 23: Origin of the biological material (B5)**



**Caption:**

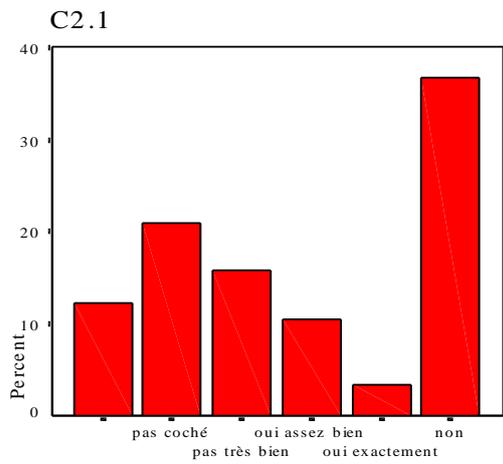
- 1 Belgian organisations
- 2 Directly from abroad
- 3 Other
- 4 Not ticked

**Illustration 24: Means of acquiring biological material (B6)**

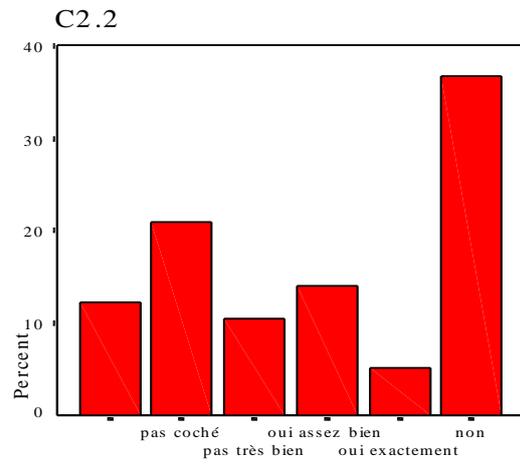


VAR00001

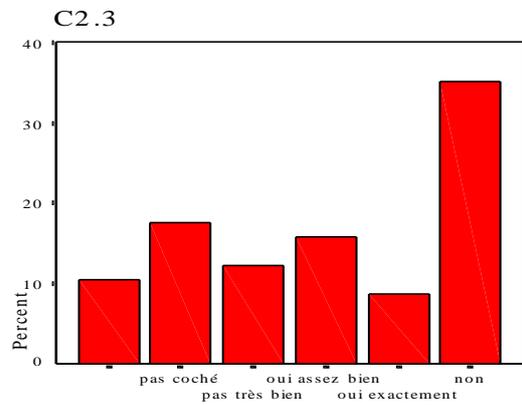
*Illustration 25: Knowledge of the different terms and concepts (C2)*



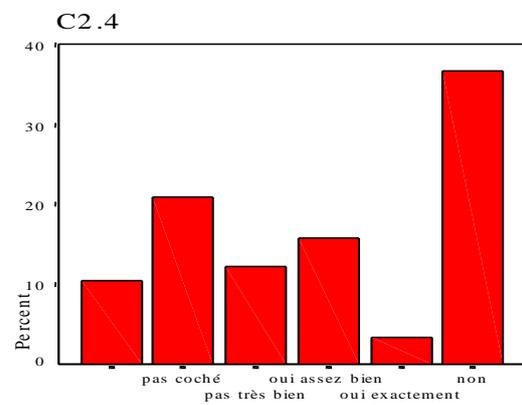
C2.1



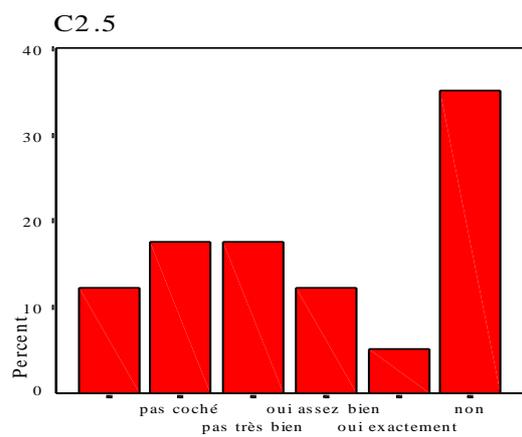
C2.2



C2.3



C2.4



C2.5

*Illustration 26: The usefulness of government measures for institutions that are unaware of the CBD (C1 and C3)*

Individuals who are unaware of the CBD

	C3.1	C3.2	C3.3	C3.4	C3.5	C3.6	C3.7	C3.8
	0	0	0	0	0	0	0	0
	4	3	4	3	4	3	0	3
	3	3	3	3	3	3	3	3
	0	4	4	4	4	3	4	4
	4	3	3	2	0	4	3	3
	3	0	3	3	4	4	4	4
	0	0	3	3	0	0	0	3
	0	0	4	2	4	4	0	0
	0	0	3	1	0	0	3	3
	0	0	0	0	1	1	1	3
	0	0	3	0	0	0	0	0
	3	3	0	3	3	3	0	3
	0	0	0	0	0	0	0	0
	3	3	3	3	0	0	3	3
	3	3	3	3	3	3	3	3
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
<b>Total</b>	<b>23</b>	<b>22</b>	<b>36</b>	<b>30</b>	<b>25</b>	<b>26</b>	<b>24</b>	<b>35</b>

Caption:

- 0 Not ticked
- 1 Of little use
- 2 Not very useful
- 3 Potentially useful
- 4 Very useful

C3.1 The creation of a central clearing house mechanism in Belgium, which would inform about the options for and conditions of access in other countries is useful for this approach.

C3.2 Initiation of standard international contracts on ABS.

C3.3 The development of compulsory codes of conduct governing utilisation of biodiversity.

C3.4 The development of voluntary codes of conduct and guidelines governing the utilisation of biodiversity.

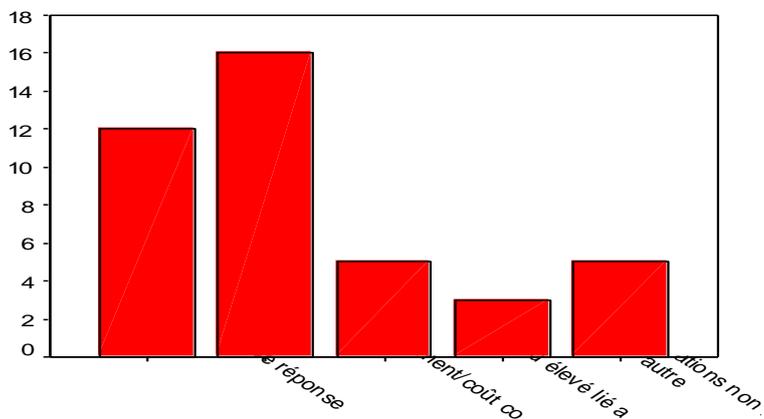
C3.5 Disclosure of the country of origin in the application of patents on products arising out of the utilisation of biological resources.

C3.6 The creation of certificates for the genetic material. These certificates would be issued by the supplier country and required during cross-border movements. They could also be required during the application of patents.

C3.7 Initiation of a certification system for users complying with compulsory rules of conduct.

C3.8 Assistance in the development and execution of projects aimed at promoting cooperation between users and the countries of origin.

*Illustration 27: Types of agreement for the acquisition of biological material (D2)*

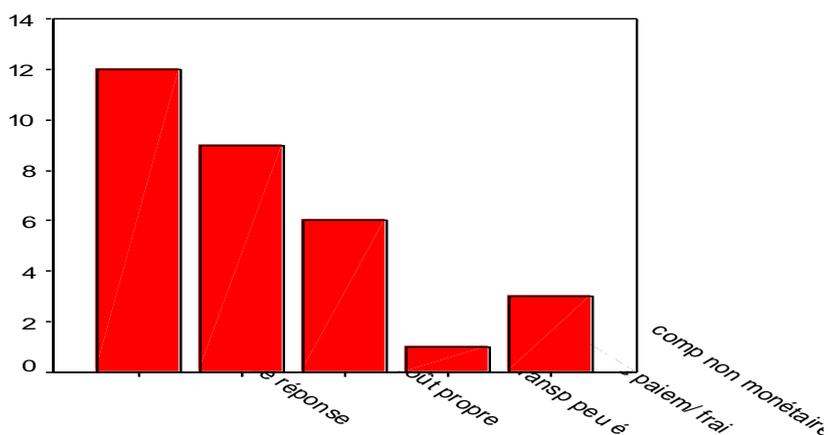


VAR00001

Caption:

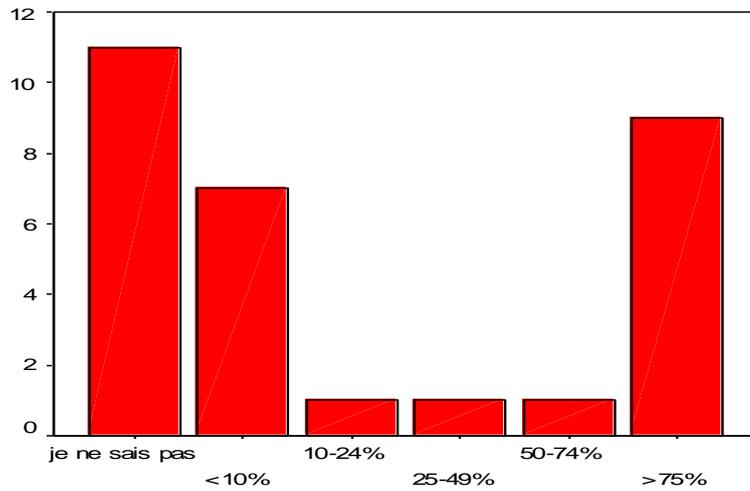
- D2.1 Free/cost linked to collection
- D2.2 Low costs linked to transport
- D2.3 Combination of direct payments/expenses linked to the pre-development phase/ royalties
- D2.4 Non-monetary compensation

*Illustration 28: Means of acquiring the biological material received (D5)*



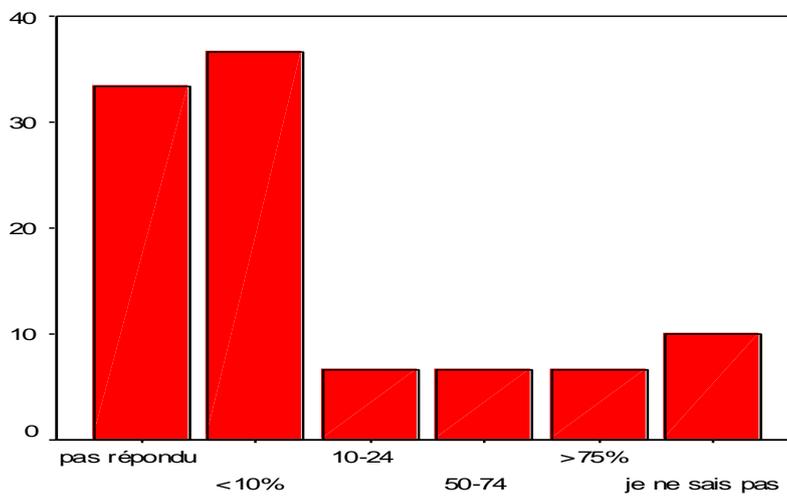
VAR00002

*Illustration 29: Percentage of material collected in its country of origin (D1)*



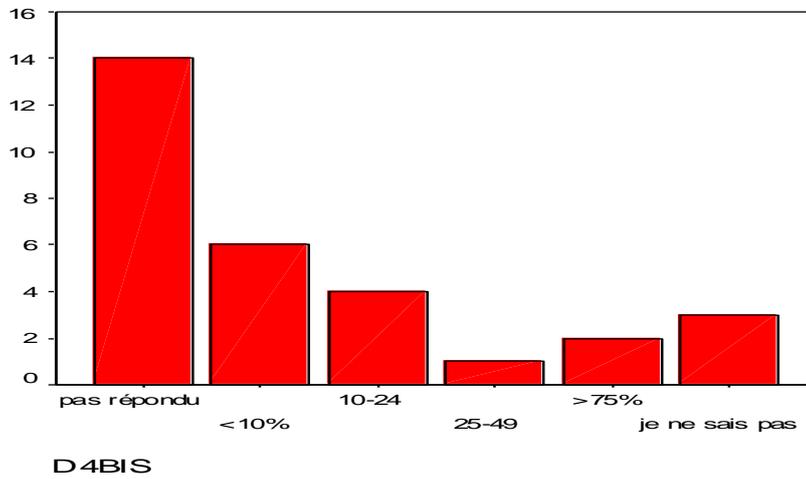
D 1

*Illustration 30: % of raw biological material received from suppliers established in the country where the material originates (D3)*

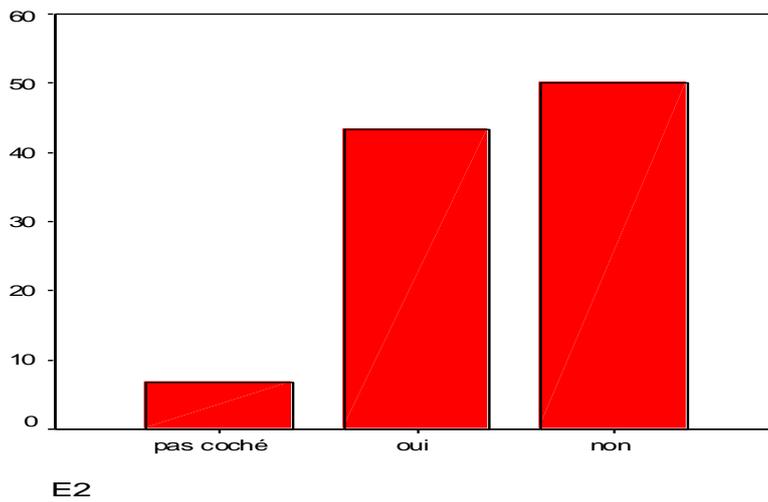


D3BIS

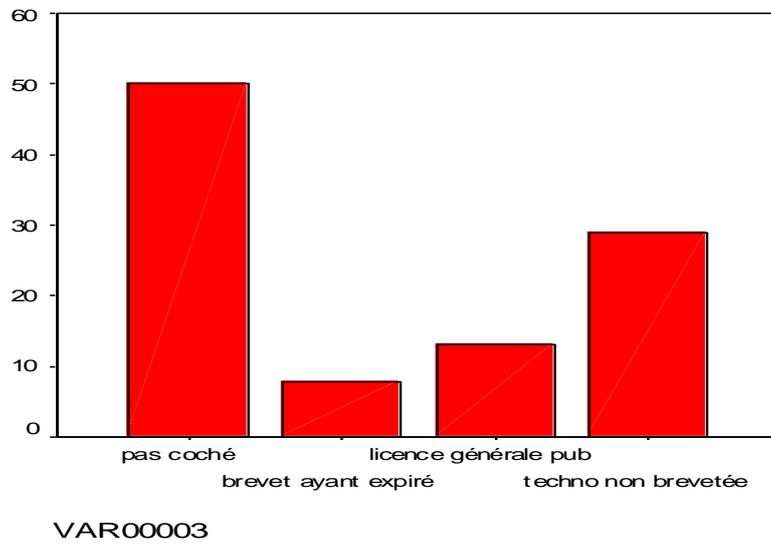
*Illustration 31: % of material received from suppliers outside the country where it originates (D4.1)*



*Illustration 32: Utilisation of public domain technologies for research (E2)*



Which ones:



*Illustration 33: Utilisation of patented technologies for research (E4.1)*

