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BIODIVERSITY ACCESS AND BENEFIT-SHARING IN ARID COUNTRIES AND THOSE WITH LOW DIVERSITY AND HIGH ENDEMISM

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1. INTRODUCTION

Attention is increasingly being given to the problems that prevent access and benefit-sharing (ABS) from being a useful tool for biodiversity conservation, sustainable use and equity. In April 2002, at the Sixth Session of the Conference of Parties to the Convention on Biological Diversity (CBD), parties adopted the Bonn Guidelines on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits Arising out of their Utilisation⁵. Five months later, at the World Summit on Sustainable Development (WSSD), the Johannesburg Plan of Implementation called for parties to promote the “wide implementation of the Bonn Guidelines”⁶, but also to “negotiate, within the framework of the Convention on Biological Diversity, bearing in mind the Bonn Guidelines, an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilisation of genetic resources”⁷.

Because biodiversity is found in inverse proportion to technological and industrial wealth, the biologically rich ‘South’ has argued that in order to allow companies access to its biodiversity – and indeed to justify the conservation of economically important biological resources in developing countries - the technologically rich ‘North’ must transfer technology and share benefits from commercialisation⁸. This is considered

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⁵ The Bonn Guidelines to the Convention on Biological Diversity, Conference of the Parties, Decision VI/24(2002), Annex.

⁶ Report of the World Summit on Sustainable Development (A/CONF. 199/20, 4 September 2002), Resolution 2, Annex, para. 44(n).

⁷ *Ibid*, para. 44(o).

⁸ Macilwaine, C. (1998) ‘When rhetoric hits reality in debate on bioprospecting’, *Nature* **392**:535-40; Sanchez, V. and Juma, C. (1994) *Biodiplomacy. Genetic Resources and International Relations*. African Centre for Technology Studies, Nairobi.

especially crucial given the historical accrual by colonial powers and Northern companies of benefits derived from the commercialisation of resources from the South. These sentiments underpin the new policy framework encapsulated in the CBD, and also form the context for implementation of ABS provisions of the CBD, and the treaty's third objective – to share equitably benefits arising from use of genetic resources⁹.

Much of the most active developing-country participation in the ABS debates and processes has emanated from the so-called 'megadiverse' countries, and in particular from a newly-formed 'like-minded, megadiverse' coalition, representing 15 of the most biologically diverse countries in the world¹⁰. Seventy percent of the planet's biodiversity and 45% of the world's population are found within the boundaries of the member countries of this group¹¹. Non-implementation of ABS provisions within the CBD and the voluntary nature of the Bonn Guidelines remain major frustrations for these countries, many of whom are targeted continuously, and often relentlessly, by Northern companies and their intermediaries seeking biological resources and traditional knowledge for commercial application¹².

But what of other developing countries that do not hold exceptionally rich repositories of biodiversity, and for whom ABS might not be an immediate priority? As acknowledged by the ABS expert panel set up under the CBD, there is "enormous difference in the circumstances of particular cases of access and benefit-sharing"¹³. A 'one size fits all' approach may well be inappropriate, and a presumption that all developing countries are biologically rich might result in practices, policies and instruments that are ultimately more onerous than helpful to developing countries. While standards, guidance and political support are clearly essential for ABS implementation, these must clearly address the needs not only of megadiverse countries, but also of countries with neither the resources, power nor interest to develop comprehensive ABS systems themselves.

⁹ Convention on Biological Diversity (adopted Rio, 1992, entered into force 1993). Discussions are currently underway regarding the necessity of international instruments to achieve ABS commitments and objectives. These matters are discussed in detail in the other information papers in this series, and in Chambers, W.B. (2003) "WSSD and an International Regime on Access and Benefit Sharing: Is a Protocol the Appropriate Legal Instrument?" *RECIEL* **12(3)**: 310-320.

¹⁰ The so-called Group of Like-Minded MegaDiverse Countries comprises Bolivia, Brazil, China, Colombia, Costa Rica, Ecuador, the Philippines, India, Indonesia, Kenya, Malaysia, Mexico, Peru, South Africa and Venezuela. The Group was formally constituted through the Cancun Declaration of February 18, 2002 as a "consultation and cooperation mechanism" to promote common interests and priorities related to the conservation and sustainable use of biodiversity. The development of an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilisation of genetic resources has been adopted by the group in its action plan as one of five areas of priority and action. See also www.megadiverse.org

¹¹ www.megadiverse.org. Note, too, recent thinking that challenges conventional thinking on biodiversity 'hot spots', and calls for multiple strategies that take account of environmental degradation and local social and economic conditions. Dickson, D. (2003) "UN advisor urges focus on environmental 'hotspots'." www.scidev.net

¹² SEARICE (2002). "The Bonn Guidelines of Access to Genetic Resources: Another false hope against Biopiracy?" *SEARICE notes, Translator series*; and Caillaux, J. and Ruiz, M. 2003. "Legislative experiences on access to genetic resources and options for megadiverse countries." http://www.megadiverse.org/armado_ingles/PDF/five/five5.pdf

¹³ Report of Experts on Benefit-Sharing Arrangements (UNEP/CBD/COP/5/8, 2 November 1999).

This paper aims to explore these issues in further detail, by drawing on the experiences of arid and/or low diversity countries with high levels of endemism, and attempting to look practically at the legal and institutional implications of ABS arrangements in these countries. Case studies are presented from southern Africa, Lebanon, and Burkino Faso. Section 2, which follows, provides an overview of the biological, social, and developmental characteristics of arid and/or low diversity countries and those with high endemism. Section 3 describes the commercial interest in arid countries and commercial activities in these countries. Section 4 looks at policy and legal approaches adopted to ABS by arid and /or low diversity countries and their relevance to these countries. Section 5 describes key ABS issues and needs of arid and/or low diversity countries, and Section 6 concludes the paper with a set of recommendations.

2. CHARACTERISTICS OF LOW DIVERSITY AND/OR ARID COUNTRIES AND THOSE WITH HIGH ENDEMISM

Countries seldom have a uniform set of characteristics that obviously classify them as having low or high levels of biological diversity. Clear distinctions are also made difficult by the fact that politically-defined regions seldom coincide with biologically-defined regions. For the purpose of this paper, however, we consider ‘low diversity’ countries to be those outside of the tropics, without significant tracts of rainforest, outside of any major centres of plant or crop diversity, and often having arid climates and vegetation types and high levels of endemism. Of course we recognise this definition to be loose and open to interpretation. Some countries may have pockets of high species diversity within their boundaries, or high levels of endemism, but overall low species richness and ecosystem diversity. Others may have few biomes within their country borders, but high species richness within these biomes. For the purposes of this paper a rigorous scientific characterisation is neither desirable nor appropriate. Rather, the intention is to draw attention to the different constituencies that may be affected by ABS, and the practical implementation of ABS in these countries.

Arid countries are often home to extraordinary and unique species and thus present a particular set of issues for ABS. Arid plant species produce a wide array of secondary compounds as protective agents against abiotic (*eg* drought) and biotic (*eg* herbivore grazing) stress. These compounds aid plants in adapting to environmental conditions, competing with other plants, warding off attacks by predatory insects or animals, or attracting pollinators or seed dispersers. Many of these compounds are of commercial interest as medicinal agents or industrial chemicals. Active constituents of the succulent plants *Hoodia* sp. and *Trichocaulon* sp., for example, have recently been patented by the South African-based Council for Scientific and Industrial Research (CSIR), and are currently under development as an appetite suppressant drug (Box 1). In another example, the desert shrub *Chrysothamnus nauseosus* (rabbit brush) produces high concentrations of natural rubber, resin for polymer plastics, and specific chemical

compounds for the chemical industry¹⁴. In the Sonoran Desert of Arizona, the secondary metabolites produced by desert plants and micro-organisms are the subject of extensive testing for their anti-tumour properties¹⁵.

Arid regions are often of particular interest for their agricultural resources. Agriculture, based on pastoral systems and dryland crop cultivation, frequently forms the backbone of economic activities in arid countries. In Burkina Faso, for example, 85% of the economically active population is employed in the agricultural sector. In Lebanon, up to 50% of the population is involved in agriculture or related activities. In Namibia and Botswana, the majority of rural people practice livestock farming and subsistence agriculture. Often, land that is farmed is suitable only for nomadic or rotational grazing due to poor surface water availability, erratic rainfall and infertile soils. Traditionally, nomadic pastoralists and other mobile peoples have utilised arid rangelands, moving animals long distances to find water and grass, and managing livestock as mobile, flexible assets that can provide multiple social, cultural and economic benefits. Such systems spread economic risks over a range of activities and also enable greater maintenance of species diversity¹⁶.

Over centuries, farmers cultivating dryland crops have similarly evolved traditional cultivars resistant to drought, poor soils, salinity, and local pests. The selection and use of an array of cultivars with different traits is one of many ways in which to reduce crop failure. These stress-tolerant varieties are of great commercial interest for new agricultural applications. In the Arab Maghreb region of north-west Africa, for example, characteristics for resistance to drought and salinity are much sought after to improve agricultural production of important crops such as alfalfa, oats, wheat, barley, olives, vines and a range of fruit trees¹⁷. In the mountain-top habitats of Lesotho and South Africa, the resurrection plant *Xerophyta viscosa*, is able to survive for long periods without water, and is also highly tolerant of temperature extremes and high winds. Most remarkable is the plant's ability to rehydrate completely and resume its full metabolic functions within 24 to 72 hours of rain¹⁸. Scientists at the University of Cape Town in South Africa are using *X. viscosa* as a source of genes that code for proteins responsible for this resurrection phenomenon. The ultimate intention is to engineer stress-tolerant crop plants for sub-Saharan Africa¹⁹.

¹⁴ Weber, D.J., Hess, W.M., Bhat, R.B. and Huang, J., (1993) "*Chrysothamnus*: a rubber-producing semi-arid shrub," in: J. Janick and J.E. Simon (eds.), *New crops* (Wiley, New York) at pp. 355-357.

¹⁵ McGinley, S., (2001) "Looking for anti-cancer compounds in the Sonoran Desert," University of Arizona College of Agriculture and Life Sciences.

¹⁶ World Alliance on Mobile Indigenous Peoples (2003) "Briefing notes on mobile peoples and conservation," IUCN, WCPA, CEESP, TILCEPA, CMWG, Refugee Studies Centre, DICE, UNDP, WAMIP and CENESTA.

¹⁷ Brac de la Perriere, B., (2003) "International project 'Growing diversity': Summary of the project on the Maghreb Region in North Africa," found at www.grain.org

¹⁸ Farrant, J.M., (2000) "A comparison of mechanisms of desiccation tolerance among three angiosperm resurrection plant species," *Plant Ecol.* 151: 29-39.

¹⁹ Peters, S. (2003) "Resurrecting hope: drought tolerant crops," *Science in Africa* (October 2003). <http://www.scienceinafrica.co.za/2003/october/drought.htm>

High levels of endemism also often typify arid countries. Namibia, for example, is one of the world's driest countries, and contains the world's oldest desert, and an unusual and complex array of habitats, species and adaptations, many of them unique to the country and region²⁰. Africa's arid southwest zone is roughly centred on Namibia and is a major zone of evolution for melons, some families of succulent plants, and several invertebrate, reptile and amphibian species²¹. Namibia also includes part of three floristic regions: the Zambezi regional centre of endemism, the Kalahari-Highveld transition zone, and the Karoo-Namib regional centre of endemism. The Karoo-Namib Region, which stretches from southern Angola to the Eastern Cape (South Africa) includes at least half of its 7000 species as endemic²². The Arab Maghreb region in north-west Africa similarly includes high levels of endemism: of the more than 4000 species occurring in the region, at least 20% are endemic²³.

While arid environments have a suite of interesting biological and physical attributes, they are also most vulnerable to land degradation and desertification. Desertification carries huge economic, social and environmental costs for countries, among them a loss of soil productivity, loss of vegetation cover, reduced food production, reduced resilience to natural climate variability, and a loss of cultural diversity²⁴. For many arid countries, and more especially those in Africa, desertification is tied integrally to poverty, migration, food security, and development. Communities in dry areas with marginal, degraded land resources are among the poorest of rural communities, and development choices are usually extremely limited.

3. COMMERCIAL ACTIVITIES IN ARID / LOW DIVERSITY COUNTRIES AND THOSE OF HIGH ENDEMISM

An important question to ask is the value placed on resources from arid countries by companies seeking access to genetic and biological material. Although most countries of the world seem to have experienced some level of bioprospecting, in all most large-scale natural products programmes collect material from 20-30 countries, and most bioprospecting efforts to date have focused on a much smaller number of countries with high levels of species diversity rather than their less glamorous counterparts²⁵. Merck, for example, list species diversity as a key question to guide their selection of countries in which to conduct sampling²⁶. Monsanto, cited in Laird and ten Kate²⁷, states that "areas

²⁰ Barnard, P. (ed.) (1998) *Biological Diversity in Namibia: a country study*. Windhoek: Namibian National Biodiversity Task Force. 332 pp.

²¹ *Ibid.*

²² Cowling, R.M. and Hilton-Taylor, C. (1997) "Phytogeography, flora and endemism," in: Cowling, R.M.; D.M. Richardson, and S.M. Pierce, eds., *Vegetation of Southern Africa*, (University of Cambridge) at pp. 43-61.

²³ Brac de la Perriere, B. (2003) n. 17 above.

²⁴ See www.unccd.int

²⁵ Laird, S.A. and ten Kate, K. (1999) "Natural products and the pharmaceutical industry," in: *The Commercial Use of Biodiversity*. Ten Kate, K. and Laird, S.A. (Earthscan, London), at pp. 34-77.

²⁶ Borris, R.P. (1996), "Natural products research: perspectives from a major pharmaceutical company," *Journal of Ethnopharmacology* 51:29-38.

with lots of biodiversity are extremely important sites for collection”. Several other companies likewise reiterate the importance of collecting in regions of high biodiversity – and thus, chemical diversity²⁸.

While species diversity is an important criterion, a number of different approaches can be adopted for the sampling of natural products, most of which are used by companies to varying extents: Laird and ten Kate²⁹ describe four main approaches:

- random, where collections are conducted on a random basis to obtain a representative sample of local diversity;
- ecology-driven, where collections are based on an understanding of ecological relationships between species which might lead to the production of secondary compounds;
- chemotaxonomic, where collections are based on knowledge of taxa with important compounds; and
- ethnobotanical, where collections are based on local knowledge of species.

Clearly, all of these could apply in arid and low diversity countries, although in all likelihood the ‘ecology-driven’ and ‘chemotaxonomic’ approaches would be most relevant. Ethnobotanical leads are also crucial, evidenced by the case of *Hoodia*, where traditional knowledge of the plant led researchers directly to further investigation of the plant’s pharmaceutical potential as an appetite suppressant (see Box 1). Similarly, traditional knowledge led researchers to patent active constituents of plants in the succulent Mesembryanthemaceae family for the treatment of mental disorders. Different factors are also likely to come into play depending on whether genes or chemicals are being sought. Genes for pest- or drought-resistant crops, for example, would best be located through a targeted search, focused on geographical areas where certain traits are evident. However, a screening programme for useful chemicals, such as new pesticides or drugs, is more likely to find success in biologically diverse systems³⁰.

To varying extents, these interests are played out in arid countries. Namibia, for example, reports a high level of commercial interest in the country’s biodiversity, and wide-ranging enquiries about exploiting the potential of local species – from the country’s curcubits (melons) through to the venom of snakes, the urine of rodents, and the spectacular succulents of the *Sperrgebiet*. For the princely sum of US\$5000, an offer was recently made by a US institution to survey Namibia’s entire flora³¹! In South Africa (a megadiverse country with arid regions), arid species are included by the parastatal CSIR in a major bioprospecting project aimed at investigating most of the country’s 23 000 plant species for commercially valuable properties over the next ten years. *Hoodia*, which is an arid species found in and around the Kalahari desert of South Africa, Namibia, and Botswana, is one of the species under development by the CSIR. Arid species are also

²⁷ Laird, S.A. and ten Kate, K. 1999, n. 25 above.

²⁸ *Ibid.*

²⁹ *Ibid.*

³⁰ Ten Kate, K. and Laird, S.A (1999) *The Commercial Use of Biodiversity..* (Earthscan, London) at p. 213.

³¹ Krugmann, H. (2001) “Namibia’s thematic report on benefit-sharing mechanisms for the use of biological resources” Namibia National Biodiversity Programme.

collected in South Africa by the New York Botanical Garden as part of a Global Systematic Phytochemical Survey, initiated in an endeavour to systematically collect representatives of every vascular plant family in the world.

In Lebanon, the Lebanese Agricultural Research Institute is involved in several agreements, including a bilateral transfer agreement with the International Centre for Agricultural Research in the Dry Areas (ICARDA), and an agreement with Kew Gardens in which Kew covers the running costs of collections and training in the field. At the American University of Beirut, scientific research is being conducted as part of a bioprospecting project to investigate the scientific validity of traditional use of indigenous plants (see Case Study 2).

Bioprospecting in Burkina Faso is also prevalent, with particular interest in agricultural varieties (see Case Study 1). Historically, Burkina Faso was home to Sahel whippets, since exported to Europe and the USA by foreigners for use in cross-breeding and the development of new breeds of dog.

Box 1. Drugs from the Desert: the case of *Hoodia*³²

One of the first agreements ever to give holders of traditional knowledge a share of royalties from drug sales was recently concluded between the CSIR, a South African research institute and the San, indigenous peoples of southern Africa. The case concerns the development of an appetite suppressant (code-named 'P57') derived from a species of *Hoodia*, a succulent plant indigenous to southern Africa and long used by the San to stave off hunger and thirst³³. The appetite suppressant is considered to have the potential to become a 'blockbuster' drug and may be commercialised into a prescription medicine with an estimated market potential of \$1 billion - \$8 billion. Active constituents of the plant responsible for suppressing appetite have been patented by the CSIR, a South African-based statutory Board which represents one of the largest research organizations in Africa, accounting for about 10% of the entire African research and development budget³⁴.

In 1997, the CSIR signed a licensing agreement with Phytopharm plc, a small UK research-based pharmaceutical company, who in turn sold the rights to an exclusive global license for P57 to Pfizer, a US pharmaceutical company better equipped to take promising leads through the development phase (but that has recently withdrawn from the agreement). At the time no arrangement was in place to benefit the San for their traditional knowledge but through lobbying from NGOs and San-affiliated organisations the case became a high-profile story in the media. In 2003, agreement was reached between the CSIR and San on a financial benefit-sharing agreement, which – if the product is successful - will see the San receiving 6% of all royalties received by the CSIR, and 8% of the CSIR's milestone income received when certain targets are reached. Money will be paid into a Trust set up by the CSIR and the South African San Council to uplift the standard of living and well-being of the San peoples of southern Africa.

³² For a detailed analysis of this case see Wynberg, R. 2004. Can patents promote benefit-sharing? Use of San traditional knowledge of the *Hoodia* plant in development of an appetite-suppressing drug. *In prep.*

³³ White, A. and Sloane, B.L. 1937. *The Stapelieae* Vol III, 2nd edition, Pasadena, California.

³⁴ <http://www.csir.co.za> Updated 04 September 2002

The benefit-sharing agreement, although flawed³⁵, is extremely significant in its recognition of holders of traditional knowledge, but a number of other features make this case of particular interest for this study. First, it illustrates the importance of arid systems for yielding both interesting genetic and chemical resources, as well as valuable ethnobotanical leads through, for example, the specialised knowledge of the San. Second, it describes the problems of reaching a fair agreement in the absence of suitable legislation, and the difficulties of requiring prior informed consent from communities in the absence of strong and well-informed community institutions. Third and perhaps most pertinently, the case is instructive in that both the plant's distribution and traditional knowledge about its use extend across Namibia, Botswana and South Africa. While a unique agreement to share benefits has been reached between the San of Namibia, South Africa and Botswana, at national level the greatest benefits will accrue to South Africa, a megadiverse country. In many ways this is because of substantial investment by the CSIR (through state support) in the research and development of the product and registration of intellectual property. Research by the CSIR on *Hoodia* has been ongoing for the past 30 years, and forms part of its large bioprospecting programme aimed at investigating most of the country's 23 000 plant species for commercially valuable properties over the next ten years. The acquisition by the CSIR of technology such as nuclear magnetic resonance spectroscopy also made it possible to elucidate relevant molecular structures of *Hoodia*³⁶. Arid countries such as Namibia and Botswana would clearly be hard pressed to replicate such investments and are seriously handicapped by their lack of funds and technical capacity to establish institutional bases to negotiate seriously on ABS. Technical capacity, value-adding and financial support are thus vital components for any country aiming to maximise its benefits from bioprospecting.

4. POLICY RESPONSES TO ABS IN LOW DIVERSITY AND/OR ARID COUNTRIES AND THOSE WITH HIGH ENDEMISM

From the above discussion, it is clear that ABS is of great relevance to arid countries, but that strategic responses to the issue may differ, depending on the range of social, economic, political, developmental and environmental circumstances at play in respective countries. Of interest is that none of the countries investigated have yet to develop comprehensive strategic planning processes for ABS, an observation that is shared for megadiverse countries³⁷. For countries such as Burkina Faso, faced with desertification, crippling levels of poverty, and other pressing development needs, ABS issues unsurprisingly play second fiddle. But in other arid countries, limited development choices and unpredictable rainfall have led to increased recognition of the importance of alternative and diversified livelihood strategies such as wild product harvesting, bioprospecting, and ecotourism. Only 6.5% of Namibia's land, for example, is suitable for arable farming, and wild products form an important component of drought-coping

³⁵ See Wynberg, R. 2004. n. 32.

³⁶ CSIR Bio/Chemtek, 2001, "Adding value to South Africa's biodiversity and indigenous knowledge through scientific innovation". <http://www.csir.co.za>

³⁷ Caillaux, J. and Ruiz, M. 2003, n. 12 above.

strategies in poor rural communities.³⁸ Commercial use of the country's biodiversity for wildlife tourism and trade in biodiversity is receiving increasing political support, accompanied by the introduction of supportive laws and policies. Reflecting these differences, arid countries have adopted a mix of policy responses to ABS, with some pursuing the issue more actively than others.

In Lebanon, there has been active discussion on ABS and ongoing participation in the development of the Bonn Guidelines, both through the CBD-constituted panel of experts and ad-hoc Working Group on the matter. Lebanon's National Biodiversity Strategy and Action Plan (NBSAP) stipulates the need for laws relating to ABS, and the Environmental Protection Law (444 of 2002) calls specifically for the elaboration of a system to control access to genetic resources, manage natural resources, and conserve biodiversity. In response, a draft law has been prepared to regulate access to Lebanese biological and genetic resources, and the sharing of benefits from their use, but this has not yet been adopted (see Case Study 2). Lebanon has not developed a national strategy to protect traditional knowledge although the recently adopted Law for the Protection of the Environment addresses the importance of traditional knowledge in rural areas and stipulates that indigenous information must be taken into consideration in the absence of available scientific information. Existing intellectual property laws are however considered ill-suited to protect and promote use of traditional knowledge and *sui generis* legislation is currently under development.

Namibia too has participated actively in the development of ABS policy and legislation and considers ABS legislation to be a priority issue, more especially to prevent illegal prospecting and to ensure national and local benefits³⁹. ABS features prominently in the country's NBSAP, which stipulates as one of its strategic aims the need to "promote and control bioprospecting and biotrade to generate sustainable benefits for Namibia" (see Box 2). A related objective is to "demonstrate and promote the role of indigenous knowledge systems in biodiversity conservation and sustainable resource management, and establish opportunities for indigenous communities to share this knowledge with other parties". Draft legislation on ABS has been under development for some years, and promulgation is anticipated in 2004⁴⁰.

Burkina Faso, in contrast to the two countries described above, does not consider ABS a strategic priority and there has been little debate on the issue within the country. However, ABS does feature in the country's NBSAP, which refers to the "fair distribution of benefits obtained from the exploitation of genetic resources", with a particular focus on the distribution of benefits at national and local levels. However, although Burkina Faso has ratified the CBD, no legislation exists or is under development to regulate ABS (see Case Study 1). The need to preserve and protect traditional knowledge is similarly recognised by various programmes and action plans, but no legislative or institutional measures have been adopted to reach this objective.

³⁸ Barnard, P. (ed.). 1998, n. 20 above.

³⁹ S. Shikongo, Ministry of Environment and Tourism, Namibia, *pers. comm.*.

⁴⁰ *Ibid.*

All of these examples point to the fact that the regulation of ABS is still at an embryonic stage in several arid countries, and that lessons for implementing policies and laws have yet to unfold. Nuances between different international instruments also still require proper articulation at national level, in both law and policy. The recently concluded International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), for example, adopted in November 2001 after seven years of negotiation, is in many ways of greater immediate relevance to arid countries than ABS provisions of the CBD given the importance of dryland and subsistence agriculture to these countries. The treaty establishes a multilateral system for providing access to seeds and germplasm for much of the world's food supply, as well as for fair and equitable sharing of the benefits obtained from their use. In some instances, crops such as sorghum and finger millet, which originate from arid countries, are included in the treaty's communal collection of 35 food and 29 feed crops, requiring samples to be provided by the national genebanks of ratifying countries. Samples held in the international agricultural centres of the Consultative Group on International Agricultural Research, are also to be placed in a treasury, and these would include arid species such as southern Africa's curcubits or renowned marula tree. Implementation of these and other agreements such as the Trade-Related Intellectual Property Rights (TRIPS) Agreement of the World Trade Organisation (WTO), which has considerable implications for farmers' rights and the sharing of knowledge and germplasm, present major challenges for arid countries, on top of more proactive initiatives such as the development of national ABS legislation.

Box 2. Elements of Namibia's National Biodiversity Strategy and Action Plan relating to Access and Benefit-Sharing

Strategic Objective 2.5. Promote and control bioprospecting and biotrade activities to generate sustainable benefits for Namibia.

- a) Improve national and local capacity to benefit from and control biotrade
 - assess and develop national scientific facilities and promote private enterprises able to add value to genetic resources
 - identify, using resource assessment and initial valuation techniques, potential biological resources for trade and product development, and determine whether cultivation / farming is feasible and desirable
 - conduct baseline study of the current and potential genetic resources industry, identifying economic flows, incentives, users, benefits and risks
 - develop negotiation skills among Namibian stakeholders to facilitate fair, informed and mutually beneficial agreements
 - identify and promote community-based mechanisms for the sustainable economic use of natural resources

- b) Raise public awareness of issues, costs and benefits of biotrade and bioprospecting
 - conduct training sessions on new policy and legislation at grassroots, community service organisation, regulatory agency and political levels
 - prepare and disseminate materials to target groups
 - assess training needs for training in regulatory, research and community aspects
 - integrate issues and case studies into tertiary curricula
- c) Promote effective cooperation at relevant level
 - harmonise access and benefit-sharing legislation with other some frameworks in the region
 - prepare case studies and develop other mechanisms for increased communication between relevant key stakeholders at local, national, regional and international levels.

5. KEY ABS ISSUES AND NEEDS

Arid countries (and, indeed, most developing countries) are clearly faced with a bewildering array of international initiatives to which responses need to be formulated, and a continual juggling and weighing up of priorities versus available resources. While the above discussion suggests that the regulation of ABS is still at an early stage, a number of common issues and needs can be identified – both in the regulation and practice of controlling ABS.

5.1 *ABS Legislation*

ABS legislation may not be an urgent development priority, but it is an essential tool to secure benefits for countries from their biodiversity and to prevent illicit activities. While some arid countries are well advanced in the development of ABS legislation, others need assistance to develop legal instruments that regulate bioprospecting and establish appropriate institutions. Lessons from around the world point to the importance of introducing legislation that is simple and flexible – but rigorous and robust – and which builds on current institutional arrangements rather than creating new bureaucracies. Countries need assistance not only in developing ABS legislation, but also in streamlining their responses to a range of related legal initiatives. Few arid countries have developed comprehensive legal frameworks to protect traditional knowledge, and responses to the ITPGRFA or TRIPS are still embryonic. The importance of dovetailing such initiatives wherever possible is especially pertinent in situations where legal, technical and administrative capacity is constrained.

5.2 *Governance in Remote Areas*

More broadly, the governance of natural resources in arid regions presents major administrative and technical problems, both because resources are often dispersed over vast areas, and because of the remoteness and inaccessibility of these areas. A key constraint is the ability to monitor and enforce harvesting and trade policies, particularly

in more remote areas. In many instances, insufficient capacity exists within government, requiring innovative approaches to be adopted, including self-policing and monitoring by communities. This in turn requires capacity-building programmes at the local level, and an enhancement of existing extension services. Devil's claw, for example, is a medicinal plant widely harvested in southern Africa for the international trade. The plant yields significant social and economic benefits, yet the vast areas over which it occurs, combined with a lack of knowledge as to its population status, and low levels of capacity and community organisation makes its effective management especially difficult (Box 3). Similar constraints are presented for many other arid-zone species.

Obtaining the prior informed consent of communities to collect their biological resources and/or knowledge is also more difficult to implement and monitor under these circumstances. For mobile communities with no fixed abode, prior informed consent is extremely difficult, but not impossible to physically administer. However this implies the existence of strong community institutions, and a uniform and well-informed understanding as to the purpose of the collection.

5.3 Land Tenure and Ownership

Land tenure is a central issue in most arid countries, where communal systems of tenure are generally most prevalent, and more appropriate than systems based on individual tenure. Communal lands typically fall under customary regimes, where rules governing access to biological resources (in the broadest sense) and cultural taboos are often far better understood and implemented than statutory measures⁴¹. Oral cultures and practices are the primary medium for communication, and approaches to property are likely to be very different from western norms, and more firmly embedded in a community collective than in a monopolistic, individualistic and privatised system. This is an extremely important context for the development and implementation of ABS laws. Chishakwe and Young⁴² point out the difficulties countries have had in developing a workable legal framework that clarifies ownership of genetic resources. Because a definition of 'genetic resources' is ambiguous, it has been hard to legislatively determine who has rights to dispose of, give access to, or receive benefits from such resources. Where customary laws apply at the community level, the situation is even more fraught. ABS legislation clearly needs to take into account the impact of different systems of land ownership on the way in which resources can be accessed and used.

⁴¹ See, for example, Wynberg, R., Laird, S., Botha, J., den Adel, S. and McHardy, T. (2002) "Policy Issues with Regard to the Management, Use and Commercialisation of Marula," DFID report. 62pp. <http://www.nerc-wallingford.ac.uk/research/winners/>

⁴² Chishakwe, N. and Young, T.R. (2003) "Access to genetic resources, and sharing the benefits of their use: international and sub-regional issues," (published in the ABS Project series). .

5.4 *Overlapping Responsibilities and Coordination*

In the arena of ABS, arid countries share with other countries the problems of overlapping responsibilities of different Ministries and government departments, sometimes leading to different policy approaches being adopted to the same issue. However, this is less pronounced than in countries with more complex bureaucracies and institutions, suggesting that policy coherency may be more easily achieved in low diversity and/or arid countries. In Namibia, for example, PGRFA are included within the country's draft ABS law, whilst in South Africa territorial disputes between different Ministries have led to the recently adopted Biodiversity Act explicitly *excluding* agricultural biodiversity from its ambit, despite the legislative vacuum that exists for PGRFA and farmers' rights. While problems of overlapping mandates between different Ministries may be less pronounced in arid countries, the prevalence of communal systems of tenure suggests that overlapping responsibilities between traditional organisations and modern state administrative structures is likely to be an obstacle towards legal coherency and coordination. As is the case for other countries, an important challenge is to improve communication between decision-makers, researchers, NGOs and communities

5.5 *Shared Resources and Regional Approaches*

The extensive nature of arid systems suggests that many biological resources and traditional knowledge systems are likely to be shared between countries. This highlights the importance of regional initiatives to provide policy guidance on benefit-sharing for shared resources and knowledge. The *Hoodia* case (Box 1) describes a rather unique situation where shared resources and knowledge were acknowledged through benefit-sharing arrangements to reward the San in Namibia, South Africa and Botswana. In this case, the existence of suitable institutions and goodwill between parties allowed for an amicable agreement to be reached, but it is doubtful that these circumstances can be replicated in every case.

5.6 *Building Capacity, Enhancing Biodiversity Knowledge and Increasing Awareness*

Capacity building for ABS has emerged as a major need for countries throughout the world⁴³. Arid countries share with other developing countries the need for capacity building on a wide range of aspects of ABS, and among a range of different stakeholders, from local government officials through to research institutions, communities, NGOs, and policy-makers. Key needs include contract negotiating skills, legal drafting skills, and technical skills to enhance inventory and biodiversity assessment work. Assistance is also needed to train officials to enforce and implement laws, and more broadly to strengthen organisational structures at community level. While training is crucial, equally important is for learning to be translated into experience and for this experience to be maintained as

⁴³ Assessment of user and provider experience, identification of approaches to involvement of stakeholders, and complementary options. UNEP/CBD/EP-ABS/2/2, 17 January 2001.

part of a dedicated body of expertise, rather than it being diverted to other tasks. An important question for arid countries is the extent to which they engage in such activities, and at which point the costs of undertaking these actions outweigh the benefits that bioprospecting can realistically deliver.

Continued work is needed to enhance the status of biodiversity knowledge in arid countries. Few countries have in place a taxonomic inventory of their genetic resources, and this makes it difficult both to evaluate commercial potential and to monitor trade at points of entry and exit. Countries are also generally unaware of the extent to which bioprospecting occurs in their boundaries, and of ways in which foreign institutions and companies are using their resources and knowledge. These are important information gaps that require redress.

Greater awareness of ABS issues, and of the lost economic opportunities associated with illicit bioprospecting, is also a need within arid countries, more especially at the political level. In Namibia, a change in political will has been instrumental in catalysing the development of ABS legislation.. In the Arab Maghreb region, a lack of awareness on the part of those in power is seen to be an important hurdle precluding the development of legislation for agrobiodiversity⁴⁴.

5.7 Adding Value, Research and Development

If arid countries are to move beyond simply being providers of raw materials and knowledge, there is a need to enhance their technical capacity to add value to resources, through enhanced manufacturing facilities and infrastructure, and increased research and development. Whether this is an appropriate strategy for all arid countries is, however, questionable. For countries struggling to provide basic services, an expensive national strategy to promote value-added products from biodiversity is unlikely to be the most efficient use of scarce resources, and a more prudent approach may be to form alliances and partnerships with trustworthy neighbours and responsible foreign partners.

While such matters fall within the scope of national strategic decision-making, they also have implications for the nature and scope of ABS legislation and suggest that countries need to consider carefully the implications of implementing cumbersome systems for ABS. Moreover, they point to the need for countries to assess more broadly legal frameworks for trade in biodiversity, including for non-timber forest products traded regionally and internationally in bulk, and not as 'genetic resources'. Improving the legal and policy framework for the trade and conservation of such resources could well deliver significant development benefits for low diversity countries, often reliant on trade in a few significant species.

⁴⁴ Brac de la Perriere, B. (2003), n. 17 above.

5.8 Integrating ABS into Development Priorities

Finally, systems for ABS in arid countries are likely to be most effective and workable if they are simple, flexible and well integrated into ongoing development programmes and policies. Implementing a complex ABS regime is a costly exercise, both in terms of the human and financial resources required. Experiences over the past decade suggest that as a development strategy, bioprospecting delivers limited benefits and, contrary to popular opinion, is unlikely to provide significant financial benefits to either high or low diversity countries. On the other hand, non-monetary benefits can be significant, especially with regard to the building of scientific and technical capacity^{45,46}. This suggests that arid countries need to be cautious when regulating for ABS, and mindful of the ‘transaction costs’ of introducing and implementing new laws and institutional arrangements.

Box 3. Devil’s Claw – the Difficulties of Governance in Remote Areas⁴⁷

Devil’s claw (*Harpagophytum procumbens*) is a medicinal plant species that occurs widely in the sandy soils of the Kalahari desert in Botswana, Namibia and South Africa. Roots of the plant are commonly used to treat rheumatism and arthritis and this has led to a growing international trade over the past fifty years, mostly from Namibia to Germany. Traditional knowledge was the basis for initiating Western interest in the plant at the turn of the twentieth century, thus marking one of the first and certainly one of the most significant ‘biopiracy’ incidents in southern Africa. Devil’s claw production takes place in some of the most inhospitable and arid parts of the region, considered marginal for conventional agricultural production. Livelihood options are thus extremely limited, and the 9 000 or so devil’s claw producers represent some of the most marginalized communities in southern Africa, characterised by extremely low levels of education, acute poverty, and limited access to income-earning opportunities.

For the most part, devil’s claw is extracted in the communal areas of Namibia, Botswana and South Africa. Most of these areas have suffered a long and chequered history under years of colonial and apartheid administration and, more recently, through a suite of problematic government policies. In Botswana, for example, the 1975 Tribal Grazing Land Policy and 1991 National Agricultural Development Policy have been central in diminishing access of rural people to natural resources, reserving communal areas instead for grazing, to accommodate increased beef production. This has been accompanied by the privatisation and fencing of communal grazing areas. The increasing enclosure of communal lands through private fencing is also a trend in Namibia, stemming partly from a legal vacuum with regard to the ownership and management of these areas. The lack of tenure security is a major constraint precluding the more effective management of devil’s claw in Namibia, where communities face difficulties in excluding others from extracting the resource on their lands. In contrast, a conducive policy environment exists for the management of devil’s claw and a variety of laws and policies aim to control its exploitation and trade in the region.

⁴⁵ Wynberg, R. 2003. A review of benefit-sharing arrangements for biodiversity prospecting in South Africa. In: *Developing Access and Benefit-Sharing Legislation in South Africa. A Review of International and National Experiences*. pp. 56-80. IUCN, Pretoria.

⁴⁶ Rodriguez, S. 2002. Bioprospecting has failed – what next? Sprouting UP. *Seedling* October 2002, GRAIN publications.

⁴⁷ Wynberg, R. 2003. Achieving a fair and sustainable trade in Devil’s Claw (*Harpagophytum* sp.). In: *Forest products, livelihoods and conservation: Case studies of NTFP systems. Volume 2 - Africa*. Centre for International Forestry Research, Indonesia.

Although the commercial harvesting of *Harpagophytum* can have negative ecological impacts, evidence points towards the excellent potential of the plant as a resource that can both be harvested sustainably and yield significant social and economic benefits. However, this requires the implementation of appropriate management practices and plans, at local, national and regional levels. The vast areas over which the resource occurs, combined with patchiness of the resource, a lack of knowledge as to its population status, and low levels of capacity make effective management especially difficult.

6. CONCLUSIONS AND RECOMMENDATIONS

Arid countries have a unique set of social, economic and environmental attributes but share many of the constraints faced by high diversity countries in implementing ABS systems. At the international level, there are distinct benefits that an international, legally-binding ABS regime could offer arid countries, especially in cases where no legislation exists and where there is insufficient expertise to negotiate contracts⁴⁸. Specifically, there would be advantages for standardising the terminology that is used in national ABS legislation, for stipulating the basic elements that require inclusion in material transfer agreements, and for setting criteria for access protocols and prior informed consent procedures. Including such components within a legally binding protocol under the CBD seems to be an approach that would guarantee a certain level of protection for provider countries. A legally-binding international tool is also likely to bring much-needed funding to arid countries, enhanced political support and awareness, and greater momentum to the issue.

Drawing on discussions in this paper, the following recommendations are made:

1. ABS regulatory systems in arid countries should be simple, effective, clear and not draining on the national fiscus.
2. National ABS policies and laws come at a cost that arid countries cannot afford on their own. Financial support is needed from the international community to enable the development and implementation of effective ABS systems in arid countries.
3. Institutional and legal arrangements for ABS should combine and/or dovetail requirements of both the Convention on Biological Diversity, and those of the International Treaty on Plant Genetic Resources for Agriculture and other related international agreements.
4. Different Ministries working on issues relating to ABS need to ensure that policy responses are integrated and coherent.
5. The elaboration of international and national ABS laws needs to take into account the fact that communal tenure and rights systems are often most prevalent in arid countries, and that customary law frequently applies in such areas. ABS legislation needs to recognise that resources are accessed and used in different ways under different systems of land ownership.
6. Further attention should be given to the development of regional initiatives to provide guidance on benefit-sharing for resources and knowledge shared between countries.

⁴⁸ Chambers, W.B. 2003, n.7 above

7. ABS capacity building is an important need for a range of different stakeholders in arid countries but efforts need to be focused and tailored in accordance with the benefits that bioprospecting can realistically deliver.
8. Wherever possible, ABS awareness-raising and capacity-building initiatives should be integrated into ongoing development projects and programmes, rather than being pursued as stand-alone projects.
9. Special effort should be given to supporting arid countries in inventory work to describe and catalogue local biodiversity.
10. Greater effort needs to be given to investigating the type of legal regime that applies to trade in non-timber forest products and its relationship to ABS legislation.
11. The limited financial rewards to be gained from bioprospecting suggest that on its own, financial gain is not a sufficient reason to initiate comprehensive ABS laws and programmes in low diversity countries. Broader benefits obtained from ABS, including those relating to conservation, research and development, need to be an integral part of ABS policies and laws.
12. Many of the concerns of arid countries are shared by other developing countries with higher levels of diversity. Continued South-South cooperation is a vital action to strengthen institutional and human resource capacities and to ensure the development of appropriate international instruments and tools.

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Case Study 1. ABS in Burkina Faso

By Amidou Garane

OVERVIEW OF THE BIOLOGICAL, SOCIAL AND INSTITUTIONAL CHARACTERISTICS OF BURKINA FASO

Situated in West Africa, Burkina Faso is a land-locked country of 274 000 km² which shares its frontiers with six countries: Niger in the East, Mali in the North and North-West, Côte d'Ivoire, Ghana, Togo and Benin in the South. Burkina Faso became an independent state in 1960 and today has a population of 12 million inhabitants with a density of 33 inhabitants per square kilometre. The rate of population growth per annum is 2,6%. The economy of the country is essentially based on agriculture and cattle-breeding which employs 85% of the active population. Burkina Faso is amongst the most poverty-stricken countries in the world with an Index of Human Development (IHD) of 0,330 which places the country in 173rd position out of 175 countries. Life expectancy lies at 45,8 years and the percentage of children in full-time education is 22% (UNDP, World Report on Human Development, 2003: 240).

This Sahel country is characterised by low rainfall and is affected by desertification. It is also characterised by a tropical Sudano-Sahel climate in which a long dry season alternates with a short rainy season. The country is fed by a weak hydrographical network consisting of three basins: the Volta, the Niger and the Comoé.

Desertification is Burkina Faso's principal problem, and since the mid-1970's, the country has faced recurrent waves of drought. This has hampered its economic and social development. In part, desertification has natural causes, but today it is due largely to human impacts and poverty. Burkina Faso is active both at the international (Convention to Combat Desertification) and domestic levels (adoption of a National Action Plan to Combat Desertification and a National Fund against Desertification) in its efforts to combat desertification.

Burkina Faso has a fairly rich biodiversity but it has been poorly studied up to now and few systematic studies have been done. The national monograph lists 3796 natural species, including 2389 animal and 1407 plant species (Ministry of the Environment and Water affairs – National Monograph on the Biological Diversity of Burkina Faso, 1999:25). Numerous threats are posed to the country's biological diversity and several species are threatened. This is largely a result of natural (drought, climate change) and human factors (ecosystems and habitat degradation due to continued agricultural expansion, unsuitable farming methods and practices such as bush burning, nomadic farming; demographic pressures, overexploitation of resources) (Ministry of the Environment and Water Affairs, National Strategy and Action Plan for Biological Diversity in Burkina Faso: 42).

THE RELEVANCE OF ACCESS AND BENEFIT-SHARING TO BURKINA FASO

Extent of bioprospecting

Bioprospecting exists in Burkina Faso although its extent is hard to judge. Certainly individual researchers, companies and foreign research centres conduct research on the genes of animal or plant species of importance to Burkina Faso.

National research institutes have participated in collecting the majority of ecotypes of sorghum, millet, maize and other cereals present in Burkina Faso for the benefit of national and foreign laboratories, but there are no means of following up on use of these samples.

There is no doubt that elements of biodiversity extracted from Burkina Faso by foreign institutions have today been put to lucrative use. They have probably furnished large profits to the bioprospectors without any benefit going to Burkina Faso, the country of origin. There are, however, no official statistics on this matter.

Numerous reasons explain the difficulty in evaluating the extent of bioprospecting:

- Bioprospecting takes place without any legal control, and often in secret. Specimens and genes harvested are rarely declared and it is at present relatively easy to extract genes and remove them secretly from the country
- There are no efficient control mechanisms for bioprospecting
- It is difficult to control bioprospecting because so little is known of the biodiversity.

Only official scientific bioprospecting can be relatively easily controlled, including that done in partnership between official structures and industrialised countries. Such co-operation exists between the research centres of Benin, Burkina Faso and Niger and northern research centres in the resources of the frontier parks to the west of the Niger River in the framework of a sub-regional project financed by the European Union and entitled “Protected Ecosystems of Sudano-Sahelian Africa” (ECOPAS).

Drivers of commercialisation

A number of factors favour the demand for certain genetic products and underpin bioprospecting:

- Strong demand by western industries (pharmaceutical and agri-food);
- An increasing demand for exotic products (for the European market in particular). The peoples of northern Burkina Faso remember well the research and exportation to Europe and the USA of Sahel whippets by non-Africans; these whippets (hounds) were used for numerous purposes, including for cross-breeding to create new breeds of dog.

Legal and institutional approaches Burkina Faso has adopted to deal with ABS

Burkina Faso has adopted a number of legislative and regulatory instruments to ensure the sustainable development of its biological resources, including:

- Act 014/9/ADP of 23 May 1996 – the Agrarian and Land Tax Reform Act of Burkina Faso
- Act 05/97/ADP of 30 January 1997 – the Environmental Code of Burkina Faso
- Act 06/97/ADP of 31 January 1997 – the Forestry Code of Burkina Faso
- Act 002-2001 AN of 8 February 2001 – the regulatory Act for the Management of Water in Burkina Faso

None of these laws, however, require benefits derived from use of biodiversity to be fairly distributed – neither do they articulate any mechanisms or procedures for benefit-sharing.

The National Biodiversity Strategy and Action Plan refers to the “fair distribution of the benefits obtained from the exploitation of genetic resources” (Ministry of the Environment and Water Affairs, National Strategy and Action Plan of Burkina Faso regarding Biological Diversity: 53). It states that benefit-sharing should include all biological resources, not just genetic resources, and that benefits derived from the direct or indirect use of biological resources should be redistributed amongst interest groups (in varying proportions). (Ministry of the Environment and Water Affairs, National Strategy and Action Plan of Burkina Faso regarding Biological Diversity: 53).

Benefit-sharing in the NBSAP is seen specifically from a national and internal point of view, although some references are made to the international level. Most attention is given towards identifying the interests of different communities and other actors and social groups. This will depend largely on the needs and level of investment of each.

The CBD remains the only instrument which could be the juridical base for benefit-sharing at an international level. The CBD, which was ratified by Burkina Faso on 2 September 1993, has the force of law in accordance with the Burkina Faso Constitution of 11 June 1991.

Strategic approaches adopted to ABS

Although ABS is an important factor in the management of biological resources, it does not yet constitute a major priority for Burkina Faso. Illegal or unregulated access to biological resources is recognised as a phenomenon to which solutions must be found, but is not yet considered as a major question or priority area for which strategic responses must be evolved. A national priority implies the definition of clear and ambitious objectives, the application of specific measures to achieve them and a schedule of mechanisms for follow-up which can track progress achieved.

When compared to other environmental issues such as desertification, or other biodiversity issues (wetlands, GMOs), ABS does not constitute a strategic priority for the country and has not particularly surfaced as a matter for national debate and study. No national programme or action plan, seminar or national debating forum has been dedicated exclusively to the distribution of benefits linked to the exploitation of genetic resources on the international level.

The following reasons could explain this situation:

- Ignorance of the extent of the phenomenon and of the importance of the benefits which it generates for foreign bioprospectors;
- Lack of information about the size of the losses suffered thus far by the country (especially in economic terms);
- The belief that Burkina Faso is a country poor in biodiversity; and
- The existence of greater perceived challenges for the country than ABS (*eg* desertification).

Engagement with international processes around ABS and biodiversity

Burkina Faso is a signatory to numerous Conventions aimed directly and indirectly at the conservation of biodiversity. These include the United Nations Convention to Combat Desertification, the Convention on Biological Diversity and the Cartagena Protocol on Biosafety.

The country participates internationally in the application of these Conventions through attendance of meetings of the Conferences of the Parties and other support groups. However, Burkina Faso's participation in these international initiatives has not always achieved the necessary efficiency. On the international front, Burkina Faso does not have the power to influence decisions taken in these forums. At the national level, information obtained from meetings is not sufficiently broadcast and distributed and there is little feedback to other actors in the conservation and biodiversity sector (*eg* other administration bodies, NGO's and the private sector).

Approaches taken by Burkina Faso towards the protection of traditional knowledge

Customary knowledge and traditional practices in biodiversity conservation are fundamentally important for Burkina Faso and deserve to be protected. They have been practised since the beginning of time and have to a large extent allowed biodiversity in the country to be effectively conserved. This knowledge is usually of interest to foreign bioprospectors because traditional knowledge often guides their research. Information is obtained as to how people put biodiversity to use. However, foreign bioprospectors are often not ethical and use subterfuge, exploit ignorance and also are prepared to use corruption to achieve their ends.

Traditional knowledge benefits from the intrinsic protection offered by the nature of the knowledge itself. Because this knowledge is largely transmitted by oral means, it is not

accessible to everyone and thereby benefits from a specific protection. This explains why until now it has been quite well preserved. Today, however, there is a growing risk that this natural mechanism no longer will play its role effectively as a result of the increasing interest of educated elites who belong to the traditional communities to reduce to writing the customary knowledge and practices. These “children of the earth” expose the community’s traditional assets and could result in important information being divulged.

As yet, there is no specific legal protection in Burkina Faso of traditional knowledge. Although the need to preserve traditional knowledge is affirmed by national authorities, and by various programmes and action plans (Ministry of the Environment and Water Affairs, National Strategy and Action Plan of Burkina Faso regarding Biological Diversity) there are no normative or institutional measures adopted to reach this objective.

Hurdles encountered in implementing ABS

Burkina Faso faces several hurdles in the application of ABS:

- Insufficient knowledge of national biodiversity despite recent efforts (notably in the framework of the National Monograph on Biological Diversity in Burkina Faso in conformity with the Convention on Biological Diversity). This gap in research is due largely to a lack of finances;
- Insufficient awareness by the Burkina Faso authorities of the economic losses or risk of losses linked to foreign bioprospecting;
- Inadequate juridical means and an absence of legal instruments specifically aimed at the regulation of bioprospecting;
- Inadequate institutional measures and the absence of institutions specifically tasked with the regulation of bioprospecting;
- Ignorance by local people (often the only ones to come into contact with bioprospectors) of the implications of genetic resource conservation and opportunities for benefit-sharing.

ABS NEEDS OF BURKINA FASO

Technical needs

- Continued action to develop a taxonomic inventory of all genetic resources. It will be necessary to evaluate the potential of known or prospective genetic resources of the different components of biological diversity;
- Creation of a data base on the potential of the country’s biodiversity which may be of interest to foreign countries and capable of generating benefits to be shared;
- Follow-up evaluation of the state of national genetic resources and in particular those being researched by foreigners.

Legislative needs

- The drawing up of specific national legislation for ABS in Burkina Faso. This should define areas of co-operation, set up instruments such as contracts or protocols of collaboration whose aim should be development, the modalities for the sharing of benefits, and the means to strengthen the scientific and technical capacity of national research institutions particularly in the sphere of genetic engineering;
- Creation of a juridical framework for the protection of traditional knowledge and practices in biological diversity.

Institutional needs

- Adoption of a programme of action or a national strategy for ABS (priority actions, budgets, planning schedules)
- Establishment of specific institutions tasked with the surveillance of the application of juridical measures for ABS.

Educational needs

- Inform and sensitise all stakeholders at the national level as to the importance of protecting against anarchic bioprospecting and ensuring fair benefit-sharing;
- Fully include local populations in ABS initiatives because they are often in contact with the bioprospectors who misuse them in order to obtain precious information. Communities should, for this purpose, be properly represented in co-operative and decision-making bodies at a national level.

CONCLUSIONS AND RECOMMENDATIONS

- Since it is correctly not considered to be a country with a high level of biological diversity, Burkina Faso has a major interest in ensuring a sustainable conservation of these genetic resources and a better participation in the sharing of benefits resulting from the exploitation of its national genetic patrimony.
- Better participation by Burkina Faso in the sharing of benefits arising from use of the country's biological diversity requires a real policy effort. This should stem from the establishment of a national ABS strategy.
- No national ABS policy can achieve its objective without the support of the international community through the existing international conventions. Any national ABS policy comes at a cost (financial and technical) that this country cannot afford on its own, given the multiple demands it faces for development. The international community should make ABS one of its priorities and obtain for the country additional financial inputs.
- Local actors play a key role in conservation and ABS strategies and must be given due consideration in benefit-sharing arrangements.

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Case Study 2: ABS in Lebanon

By Walid Nasser and Lina Haidar

AN OVERVIEW OF THE BIOLOGICAL, SOCIAL AND INSTITUTIONAL CHARACTERISTICS OF LEBANON

Biological Characteristics of Lebanon

Lebanon, a country of a total surface area of only 10,425 km², is an integral part of the Mediterranean Basin, which provides a variable wealth of habitats with its islands, coastal lands, rivers and high mountains. This small country has a biological wealth that is related to its geomorphology and microclimates. Over 9119 species have been identified, estimated to be 20% of the total existing number and including 4633 plant and 4486 animal species (NBSAP, 1998). Roughly three quarters of the total surface area of Lebanon is mountainous, with extremely variability in climatic conditions, soils and socio-economic status. Lebanon's diverse topography gives rise to many microclimates, and several types of habitats, including altered habitats. These are favourable to the occurrence of many plants and animal species. However, steep terrains are prone to soil erosion, and ultimately land degradation, if poorly managed. Moreover, the ecosystems in Lebanon have narrow ranges, and are thus vulnerable to changing environments. The coastal zone of Lebanon is particularly vulnerable to urban encroachment and loss of habitat. Overpopulation (400 inhabitants/km²) is considered a key threat to the country's biodiversity (NBSAP, 1998).

Social Characteristics of Lebanon

The war and its consequences have led to a general deterioration in social conditions, and an increase in the number of people who cannot satisfy their basic needs. A large number of the Lebanese families live below the threshold of poverty. The Lebanese monthly minimum salary is US\$200. Only a small percentage of the population has access to education. A high proportion (30-50%) of Lebanese society is involved in the agricultural sector, or related activities.

Institutional Characteristics of Lebanon

Lebanon is a republic with a democratic parliamentary system and is administratively divided into eight provinces or governorates (Mohafazat), which are in turn sub-divided into smaller administrative units called districts (Caza'a). The political system in Lebanon is based on the separation of executive (represented by the President of the Republic and the Council of Ministers, each responsible for specific sectors), legislative (parliament) and judicial powers. The Lebanese Legal system is a civil law system, based on codes and statutes. Precedents in Lebanon have a limited, non-binding effect. A substantial

number of development and environmental NGOs also exist in the country, and these are expanding both in size and efficiency.

THE RELEVANCE OF ACCESS AND BENEFIT-SHARING TO LEBANON

The extent to which bioprospecting occurs in Lebanon

Government has not initiated any bioprospecting activities, but the Lebanese Agricultural Research Institute (LARI) and the American University of Beirut (AUB) are involved in bioprospecting projects. At the American University of Beirut (AUB), scientific research is being conducted to investigate the scientific validity of traditional use of selected indigenous plants which offer medicinal, aromatic and ornamental values. The Lebanese Agricultural Research Institute (LARI) is involved in research topics that include biotechnology, biodiversity, plant production and protection, plant nutrition, soil and water sciences, poultry and livestock production and others. LARI was also the executing agency (Jordan, Palestine, Lebanon, Syria) in a regional five-year project (“The Conservation and Sustainable Use of Dry-Land Agro-Biodiversity”), in which experts characterized the floristic richness and studied the genetic diversity and potential uses of selected species.

Most research and academic institutions in Lebanon lack the infrastructure to handle biotechnology. Some academic institutions and LARI are in the early stages of developing biotechnology techniques, but these measures are restricted to projects. However, through grants from USAID and ASHA, AUB is equipped with the latest technologies and has initiated international collaborations to study the potential utilization of alternative plants. The National Council for Scientific Research is the main supportive institution for biotechnology research in Lebanon.

Drivers of Commercialization

Lebanon has not adopted any incentives for the commercialization of biological or genetic resources. However, Lebanon has entered into bilateral treaties with some of its neighboring countries (Egypt, Syria, Jordan, and Saudi Arabia), to exempt medicinal and non-medicinal plants from import duties. Lebanon has also entered into a bilateral treaty with the EU to exempt plant exports to Portugal from customs duties.

Legal, Institutional and Strategic Lebanese Approaches concerning the Access and Benefit-Sharing

Legal Approaches

Law No. 444 for the Protection of the Environment (July 29, 2002), calls for the elaboration of a system to control access to genetic resources, manage natural resources, and conserve biological diversity. Besides this law, Lebanon has not taken any direct regulatory measures to control ABS.

However, the American University of Beirut together with the Ministry of Environment have worked on a joint project, together with a drafting team from Walid Nasser & Associates, to prepare **draft legislation**. The objectives of the draft law are to regulate access to Lebanese biological and genetic resources, to conserve and sustainably use biological and genetic resources and their components, and to fairly and equitably share benefits arising out of their utilization. The draft law applies to biological and genetic resources occurring both *in-situ* and *ex-situ*. One of the draft law's major principles is the sovereignty of the State over biological resources. The State exercises this right in the name and for the benefit of local communities. The Bonn Guidelines have to some extent guided the content of the draft law.

The draft provides for the Department of Natural Resources of the Ministry of the Environment to be responsible for the implementation and enforcement of provisions, in coordination with other relevant ministries. Any person or entity wishing to access the biological and genetic resources of Lebanon is required to file an application with the Department of Natural Resources. After approval, the applicant is required to sign an ABS Agreement with the Ministry of Environment, and the landowner or owners and/or the local communities where the biological and genetic resources are located. The signed agreement would constitute the applicant's official authorization to access the biological and genetic resources. Four types of agreements are provided for in the draft law: (1) academic research agreement, (2) conservation of biological and genetic resources agreement, (3) commercial research agreement, and (4) commercial exploitation agreement.

The draft law requires that scientific, medical, pharmaceutical, commercial, or legal results derived from use of the resources should be shared with the State and the relevant landowners or communities. This should be included in the ABS Agreement, which would also describe the allocation of both monetary and non-monetary benefits and ways for these to be shared.

In addition to these initiatives, there also exist various national laws, not directly related to ABS, but which have relevance.

- Patent Law 240 (August 7, 2000) provides that "A patent shall be issued for each invention relating to: (...) Newly innovated or discovered botanical product (i) which differs from known similar varieties by a significant and stable characteristic, or by a number of characteristics which, collectively, constitute a new botanical variety, (ii) which is homogenous as regard to all its characteristics, and (iii) which is consistent and stable, i.e. it remains in conformity with its initial definition at the end of each production cycle".
- Forest Law (January 7, 1949) provides that harvesting of grass (...) from woods requires authorization from owners or from the Department of Forests.
- Forest Protection Law (July 24, 1996). In the application of this law, several ministerial decisions were enacted to consider certain natural areas of Lebanon as protected areas.
- Law 367 (August 1, 1994), regarding the exercise of the profession of pharmacists provides that "the trade in medicinal plants (...) is limited to pharmacists", and

- also that only pharmacists can prepare, extract or change the specifications of the medicinal plants, and that only pharmacists can sell resulting products.
- Decree No. 11710 (January 22, 1998), establishes a Committee at the Ministry of Health to regulate the importation of “Natural Medicinal Products”, and food additives.
 - Law 157 (October 2, 2001), to create a syndicate of importers of “Natural Medicinal Products and Food Additives”.

Institutional Approaches

No specific national ABS programs or institutions are in place but there are some relevant private or public programs.

- The **Lebanese Agricultural Research Institute** is involved in several agreements: (1) a bilateral transfer agreement with ICARDA based on access and benefit sharing and (2) an agreement with Kew Gardens wild species’ collection, in which Kew covers the running costs of collections and training in field.
- A **workshop** was held at the **American University of Beirut** in June-July 2003, concerning intellectual property rights, ABS and the draft law. This workshop was conducted in collaboration with local lawyers, NGOs, Ministry of Environment as well as international consultants.
- Since 1996, the Lebanese government has been involved in a **Protected Area Project**, a collaborative initiative between the ministries of Environment and Agriculture and other national and international organizations (IUCN and UNDP). Its overall objective is to conserve endemic and endangered wildlife and their habitats, incorporate wildlife conservation as an integral part of sustainable human development, strengthen the institutional capacity of government agencies and non-governmental organizations, and promote national reconciliation.
- Several **universities** in Lebanon offers a variety of environmentally oriented programs, and are engaged in biodiversity research.
- **NGOs** across Lebanon have played an important role in promoting and conserving natural habitats and ecosystems. Among these NGOs are AFDC (Shouf forests), Greenline (Al-Rihane), Guards of the Environment targeting newly liberated areas in South Lebanon, and individual private initiatives. However, many NGOs are young and consequently need to build their own capacities.

Strategic Approaches

The government of Lebanon has prepared a National Biodiversity Strategy and Action Plan (NBSAP) as part of its obligations under the CBD. The NBSAP for Lebanon represents the only national agenda on biodiversity and provides the framework for biodiversity initiatives. One of the medium term actions provided for in the NBSAP is to

“develop and follow on the necessary legislation for biodiversity conservation such as the official endorsement of the NBSAP, official declaration of the National Biodiversity Committee *and laws relating to access and benefit sharing*.”

Lebanon’s Commitment with the International Processes around Access and Benefit-Sharing and Biodiversity

Lebanon adopted and signed the CBD in December 1994 and has attended all the meetings of the CBD. Lebanon has been integrally involved in developing the Bonn Guidelines and participated in the panel of experts on ABS in 2000, as well as the first meeting of the ad hoc open-ended group on ABS, in October 2001.

Lebanon has also signed the UN Convention to Combat Desertification but has not ratified the Treaty on Plant Genetic Resources for Food and Agriculture.

Lebanon currently holds observer status at the WTO but has as yet not signed the TRIPS Agreement. However, Lebanon is currently negotiating its membership within the WTO.

Lebanese Approaches concerning Traditional Knowledge

Lebanon has not developed a national strategy to provide protection for traditional knowledge. Furthermore, the traditional intellectual property laws are ill-suited for the protection of traditional knowledge. A *sui generis* legal system is required to protect and encourage the use of traditional knowledge. The Ministry of Economy is currently attending meetings in this regard, and it is hoped that legislation will soon address these issues. However, the recently adopted Law for the Protection of the Environment has addressed the importance of traditional knowledge in rural areas and stipulates that indigenous information must be taken into consideration in the absence of available scientific information.

On the national level, the Ministry of Agriculture has facilitated the marketing of many traditional products and the Ministry of Environment has launched the Protected Area Project calling for the involvement of local communities in management. The Council of Development and Reconstruction has also launched a project with the support of the EU to give support to local communities to promote traditional practices used for production purposes.

HURDLES ENCOUNTERED IN IMPLEMENTING ACCESS AND BENEFIT-SHARING IN LEBANON

Although the draft ABS law has not yet been adopted or passed, the following difficulties in implementation can be foreseen:

- Landowners have different understanding and knowledge as to their rights and the Lebanese system.
- There are possible overlapping responsibilities between the Ministry of Agriculture and the Ministry of Environment.
- Biological and genetic resources are spread in various places in Lebanon and there are no isolated communities where such resources are found exclusively. The distribution of benefits could become problematic and require more in-depth thinking to ensure this is done in a fair and equitable way between the various communities.

Lebanon faces numerous challenges to conserve its resources:

- The country lacks training and specialists in the fields of taxonomy, genetic resources, conservation, ecology, resource management, forestry and planning.
- There is a lack of co-ordination and law enforcement incentives, as well as insufficient integration of environment and development in national planning and project execution.
- Existing communication between the scientific community and policy makers is insufficient.
- There is a lack of awareness about ABS issues in public institutions. NGOs play an important role in the biodiversity field, but many of them are young and consequently need to build their own capacities.

LEBANON'S NEEDS FOR ACCESS AND BENEFIT-SHARING

Research to identify, study, conserve and use species is needed. Institutions have to be strengthened to carry out these activities. Training is badly needed in the fields of taxonomy, genetic resources, *in-situ* and *ex-situ* conservation, ecology, resource management, forestry, planning and data processing. There is a need to develop a regional rather than national program to regulate access to genetic resources. Finally, the issue is still at its early legal stages, and legislation needs urgently to be finalised and adopted.

CONCLUSIONS AND RECOMMENDATIONS

The new ABS law should be as flexible as possible to facilitate the investment, encourage bioprospecting and protect biodiversity. The law should address the following challenges: balancing conflicting interests (investors, farmers, government...), benefit-sharing between all the actors, preventing the depletion of the biological resources, and resolving

overlapping responsibilities of various ministries. Finally, there is a need to launch an awareness campaign among the decision makers and the public at large.