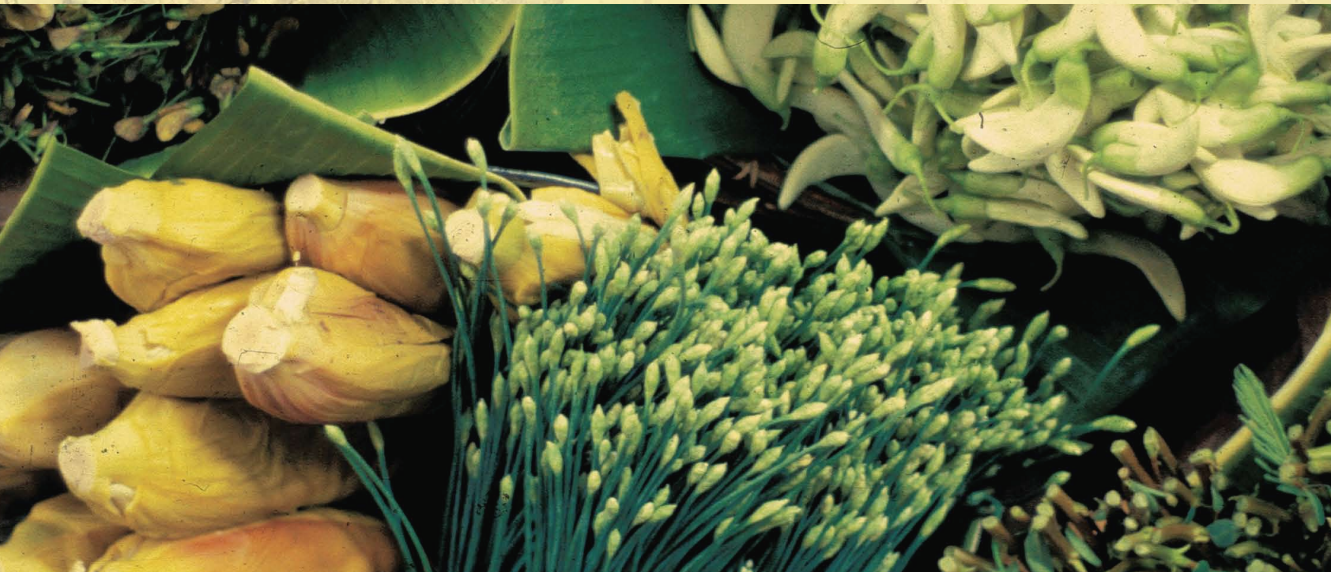




Global
Facilitation
Unit
for Underutilized
Species

The role of policy
in the conservation and extended
use of underutilized plant species:
a cross-national policy analysis





The role of policy in the conservation and extended use of underutilized plant species: a cross-national policy analysis

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"The role of policy in the conservation and extended use of underutilized plant species: a cross-national policy analysis" was prepared by the Global Facilitation Unit for Underutilized Species (GFU), in cooperation with the Genetic Resources Policy Initiative (GRPI).

This report, an effort of the GFU to set the scene and provide an instrument for policy and decision makers, presents a cross-national analysis of policies that hinder or promote the conservation and use of underutilized species. It is based on national policy studies undertaken in Ghana, Jordan, Nepal, Papua New Guinea, Peru, Uzbekistan, Vietnam and Zambia. These studies are published on the GFU web site (http://www.underutilized-species.org/search_by_family.asp?id=Policy%20analysis) and links to each study are included in the References section of this report.

A separate publication "An overview of the international regulatory frameworks that influence the conservation and use of underutilized plant species" is available in hardcopy or on line (www.underutilized-species.org/Documents/PUBLICATIONS/international_policy_analysis.pdf) and analyzes some of the important international policy instruments that affect the conservation and extended use of underutilized plant species.

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The Global Facilitation Unit for Underutilized Species (GFU)

This publication has been commissioned by the Global Facilitation Unit for Underutilized Species (GFU), created to ease and increase information and knowledge exchange in the field of neglected and underutilized species (NUS). GFU's mission is to promote and facilitate the sustainable deployment of underutilized plant species to increase food security and alleviate poverty among the rural and urban poor. Its objective is to support and strengthen organizations and networks working on different aspects of underutilized species through:

- providing improved access to information and financial resources;
- increasing public awareness on the role of underutilized species for improving livelihoods; and
- giving advice to policy-makers on how to create an enabling policy environment for the deployment of underutilized species.

By doing so, GFU aims at attracting an increasing number of assistance agencies, research institutions, extension services, policy- and decision-makers to include neglected and underutilized species in their development programmes (see www.underutilized-species.org).

The Genetic Resources Policy Initiative (GRPI) is a project whose objective is strengthen the capacity of developing countries to design comprehensive policy frameworks for genetic resources (see <http://www.grpi.org/>)

Introduction

This section provides an overview of the concept of underutilized species. Defining underutilized species and outlining the factors that contribute to their condition will provide a background to the topic under discussion, that is: the role of national policies in the conservation and use of underutilized species.

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What are underutilized species?

The term 'underutilized species' has been defined in a number of ways. One definition is: those species either cultivated or wild that have a great potential for agricultural development and production diversification, thereby ensuring food security, the preservation of cultural diversity and traditions, and the generation of income for people living in severe marginal environments (Uzbek Scientific and Production Centre of Agriculture 2006). Underutilized species have also been defined as those species that are of minor importance in terms of production, consumption and utilization, and are not fully exploited to contribute to the national economy (Aboagye et al. 2007). The Global Facilitation Unit for Underutilized Species (GFU) defined them as those '...with a potential, not fully exploited, to contribute to food security and poverty alleviation...' and that tend to have the following common features: a strong link to cultural heritage; poorly documented and researched; adapted to specific agro-ecological niches; weak or non-existent seed supply systems; traditional uses; and produced with little or no external inputs.

The above definitions vary in wording but seem to emphasize similar aspects, namely the issue of the species having potential and being not fully exploited. The definition tends to become descriptive when it mentions the nature of their potential. One definition mentions the potential to contribute towards food security and poverty alleviation (amongst others), another emphasizes contribution towards cultural diversity and traditions, while another mentions contributions towards economic development. This variation tends to suggest that the perception of utility of underutilized species is not uniform. Rather, it depends on who—which society or grouping—is defining it. On the other hand, the definitional element of underutilized species having potential or being not fully exploited, which is the underlying common thread in all the definitions, cannot have uniform meaning or application across countries because a species that is not fully exploited in one locality or country may be fully exploited in another. Furthermore, a species that is not fully exploited today may be fully exploited at some time in the future.

Underutilized species are probably best understood when they are considered within a specific locality and over a specific period of time.

What are the causes of underutilization?

The factors that contribute to certain species becoming underutilized are probably as varied in their nature as the elements in the definition described above. Generally speaking, multiple factors are responsible for a species being underutilized. Even when recognizing that the objective of this paper is to identify the role of policy in hindering or promoting the conservation and use of underutilized species, it should be equally recognized that policy is only one of the factors involved.

Why are some species underutilized? To understand the causes more clearly will entail classifying the factors into the following two categories: (i) agronomic factors that make it difficult if not impossible for certain species to be grown beyond the subsistence scale; and (ii) non-agronomic factors that have the effect of limiting production of certain species (usually related to social, cultural, economic or human intervention).

Agronomic factors are not usually mentioned in discussions about underutilized species yet they probably account for some of the most easily recognizable and logical reasons why some species or crops are not utilized to the same degree as others. Most underutilized plant species have characteristics that make them difficult to cultivate on a large scale due to some combination of (i) high costs of harvesting, (ii) high post-harvest costs and (iii) short shelflife (Santiago et al. 2006). One such species is cañihua (*Chenopodium pallidicaule*) in Peru. Cañihua has very small grains that do not ripen together. As a result, harvesting is arduous as each grain must be checked to determine its ripeness. Other crops, such as tarwi (*Lupinus mutabilis*), also found in Peru, require additional treatment to eliminate toxic substances such as alkaloids before they can be consumed. Considerable amounts of investment (in terms of money and time) are required to prepare these types of crops for consumption (Santiago et al. 2006). Some underutilized species, particularly fruits such as cocona (*Solanum sessiliflorum*), lose water quickly, thereby shortening their shelflife after harvest. These agronomic-related factors are a disincentive for farmers to grow these crops for more than local consumption. Costs associated with greater production are an inhibiting factor, which contributes to their becoming underutilized.

Non-agronomic factors that contribute towards the underutilization of certain species include lack of knowledge about the importance of these species for improvement of farmers' livelihoods. In Nepal, for example, many farmers are not aware of the value of traditional or underutilized food crops. As a result they do not make an effort to grow them even if the climatic conditions are favourable (ABTRACO 2006). Other factors include lack of organized and developed markets for underutilized crops and foods in both urban and rural areas, lack of research on developing underutilized species, lack of quality planting material for underutilized species, lack of post-harvest technologies and lack of extension services for the cultivation of these species.

Farmers generally decide what crops to grow based on what will bring them most income and/or meet their immediate household needs. Better established market channels (including producers' associations, bulk buyers, well-established standards, etc.) for the more common species (e.g. wheat, maize, sorghum) tend to encourage farmers to grow those crops when the environment permits. In the Altiplano of Peru, quinoa (*Chenopodium quinoa*) is practically the only grain crop with commercial potential that can be grown. Maize and wheat, for example, cannot be grown in that environment. Often a significant influencing factor contributing to the domestication and use of what we call underutilized species is the fact that the farmers growing them are located in marginal environments that do not allow them to adopt the more popularly utilized crops that have spread around the globe. In such cases, it is the absence of alternatives that has contributed to the use of underutilized species, and it is the increasing availability of possible alternatives that is one of the threats to their continued utilization at any level.

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Cultural factors also play an important role in influencing farmers' cropping decisions from year to year. In Zambia, for instance, cassava and finger millet are important crops among the Bisa-Tabwa people of the Lake Basin areas. The crops play a significant cultural role in the society (BCN 2006). Culture also plays a role in farmers deciding to discontinue growing and consuming certain species. Widespread perceptions exist in some countries that some underutilized species are 'poor people's food,' while exotic foods, either directly from or imitating those of western countries, are part and parcel of being 'elite'. These attitudes contribute to further neglect or abandonment of some species.

As the globalization of the world's economies continues to influence homogeneity at cultural and household consumption levels, the threat continues to grow that currently underutilized species used in small 'niches' around the world will be replaced or still further neglected.

A combination of all the factors outlined above contributes to the underutilization of certain species. It is important to emphasize, however, that most of the agronomic factors relating to underutilization are crop-specific because they relate to the phylogenetic composition and agronomic characteristics of a particular plant. The non-agronomic factors, on the other hand, are not crop specific but generally affect the extended use underutilized species as they are so defined within a particular location and over a specific period of time.

What is the role of policy?

The rationale of this paper is based on the premise that underutilized species are not being utilized to the same degree as conventional species and, therefore, there is a need to identify the reasons why this is so as a first step towards ensuring their conservation and extended use. The preceding sub-section endeavoured to outline some of the major reasons why some species are underutilized. Policy has not been mentioned specifically as a factor contributing towards the underutilization of certain species, yet it has been highlighted in related discussions as a major influencing factor in the use of underutilized species.

Policy is a fluid governance tool whose effects are not easily identifiable within the matrix of societal activity. One may call it the 'hidden hand' behind some specific actions that affect our daily lives. In the context of underutilized species, the hidden hand of policy (or lack of policies where they could possibly have a significant impact) are most relevant vis-à-vis non-agronomic factors, such as lack of knowledge about the importance of underutilized species for livelihoods, inadequate transport networks, lack of organized and developed markets, lack of research, lack of quality planting material, and lack of extension services, amongst others. There appears to be an assumption when discussing this subject that if policy had adequately addressed these issues, these factors would not have negatively affected the extent of use of underutilized species. While this generalized statement sounds logical, it is nonetheless oversimplified and does not do justice to the role of policy and what it can and cannot achieve.

The general role of policy is to provide direction and guide decisions and actions in a particular area (Smith 2002). Government policies applied within specific sectors, on the other hand, are designed to avoid certain negative effects and to seek positive results in those sectors. In other words, the role of government policy is to achieve a specific pre-determined goal or objective through statements and mechanisms that guide action in a particular direction, thereby avoiding envisioned negative effects. If it was not government's intention or goal, for instance, to improve knowledge about the importance of underutilized species as part of its education policy or to organize or develop markets in their agricultural and economic policies, the non-existence of these issues in the policies can hardly be blamed on policy. It is a case of a policy gap rather than a policy failure, which may be addressed through policy reform. Moreover, the existence of an appropriate policy framework is not a guarantee that the desired result or goal will be achieved. Success of any policy depends on several factors that also have to do with policy implementation.

Policy is not a 'panacea' in itself. It is an important element in guiding action towards achieving a certain objective. However, for that action to occur depends on implementation related factors such as (i) knowledge or comprehension of the policy by the target group (ii) willingness of the target group to comply with the policy (iii) ability of the target group to comply with the policy and (iv) commitment to implementation by policy-makers, i.e. political viability (OECD 2002).

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Purpose of this paper

This report presents a cross-national analysis of policies that hinder or promote the conservation and use of underutilized species. It is based on national policy studies undertaken in Ghana, Jordan, Nepal, Papua New Guinea, Peru, Uzbekistan, Vietnam and Zambia. These studies are published on the GFU web site (www.underutilized-species.org) and links to each study are included in the References section of this report.

The study is based on a desk review of (i) the eight national policy review papers from the countries mentioned above and (ii) secondary literature in the area of policy and law. It also relies on background knowledge of international legal and policy frameworks set out in the companion paper entitled *Overview of the international legal and policy framework affecting the conservation and use of underutilized species* (Chishakwe 2008). The desk study identified similarities and differences in the policy gaps, potential and policy reform recommendations in the literature. It also involved analysis of similarities and differences.

This report isolates the critical factors or independent variables that account for national policy differences in the management of underutilized species. Studies of differences and similarities across different political, economic, cultural and social systems provide a general picture about the relationship between cause and effect and action and consequences. The generalization obtained from this methodology, while it admittedly has some shortcomings in terms of specificity, may nonetheless be particularly important for understanding some of the common policy-related problems which countries face in promoting the extended use of underutilized species.

The report is divided into five sections: (i) Introduction; (ii) Cross-national policy gaps; (iii) Cross-national policy strengths and opportunities; (iv) Policy failure; and (v) Recommendations.



Cross-national policy gaps

The national policy reports all recognize certain inadequacies in policies relevant for the conservation and extended use of underutilized species. The inadequacies or policy gaps are either policy statements that go against the spirit of conservation and extended use of underutilized species or do not mention the subject at all. While these inadequacies, by themselves, do not necessarily reflect policy failure, they do nonetheless indicate the existence of gaps that need addressing in order to meet the desired objective of conservation and extended use of underutilized species. The policy gaps are outlined below by sector.

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Gaps in sector policies

Agriculture

The policies that exist in the agriculture sector in the countries studied are generally strong on the aspect of conservation. While the emphasis is, admittedly, not usually on underutilized species per se, the generalized way in which the policy statements are drafted, makes them applicable to underutilized species. An example is Jordan's agricultural policy (National Strategy for Agricultural Development: 2000–2010) that protects agro-biodiversity including plants and animals. It does not specifically mention the conservation of underutilized species, although this can be inferred from the text. This may not be the best approach if underutilized species require additional, special attention, beyond that required for more commonly used species.

The food security policies in the countries studied are intended to ensure that people obtain adequate food, through strategies to increase food production. However, some of the policies have an effect of inhibiting the production of underutilized species. This is an example of competition between policy choices that often results in trade-offs. In Nepal, for instance, one of the major food security policies, the National Agriculture Policy (2004), emphasizes the development of commodity-specific, large-scale agricultural production. This approach is expected to produce commercial crops on a large scale but it also has the effect of replacing the underutilized crops found in those localities with commercial crops, hybrid seeds and improved breeds. This policy is similar to the policy that contributed to the promotion of mono-cropped, high-input, uniform (hybrid) crops, such as maize, tobacco and cotton, in Zambia from the 1970s until recently (BCN 2006). In other countries, such as Peru, a food security policy, known as the General Law on Seeds, limits government support to certain vegetable species that can be used for financial purposes. While this policy may work in favour of underutilized vegetable species with a clear monetary or financial value, for species where the monetary or financial value is difficult to gauge, the reverse is true.

The same situation exists in Ghana. The relevant food security policy (the Food and Agriculture Sector Development Policy (FASDEP) of 2002) prioritized and ranked certain commodities according to their economic importance. The determining factors included (i) importance for food security and (ii) capacity for export diversification. The result is a focus on major crops at the expense of underutilized ones (Aboagye 2006). However, although the policy promotes major crops, it also promotes underutilized varieties of these crops. For instance, attention is given to some local varieties of maize such as 'Aburotia', 'Dobidi', 'Obaatanpa', 'Dadaba' and 'Mamaba'. Certain varieties of cassava are also included, such as 'Afisiafi', 'Gblemo Duade' and 'Abasa Fitaa'. The FASDEP has an emphasis on commodities that are considered to be a priority for the country's food self-sufficiency, especially cereals, starchy crops, legumes and vegetables. In the medium and long term, the emphasis is on commodities such as soybeans, exotic vegetables, coconut, shea nut, oil palm, mango, citrus, pawpaw and banana. Strangely, there is no mention of underutilized species despite their apparent potential for food security enhancement.

The tendency for national governments to concentrate on a few major crops does not only appear in food security policies but also features in policies for agricultural research and development. In Zambia, for example, public research and development (R&D) focuses on a few major, and mainly exotic, crops, with little formal R&D carried out for most of the traditional crops. The policy has promoted long-term investment in R&D programmes for maize and other cash crops such as cotton, coffee and tobacco. The extension services have also been tailored to support the growing of exotic, commonly used crops. Likewise, in Peru, underutilized species do not receive suitable characterisation or attention in research and conservation programmes (Thies 2000). Research is devoted to three crops – potato, maize and rice. The largest investments in technology development and distribution have also been devoted to these crops. The same policy is also found in Nepal, where the Nepal Agriculture Research Council (NARC)'s Vision for Agricultural Research refers to the use of commodity programmes that decide on the commodities to work on. The programme currently focuses on major crops such as rice, wheat and maize.

In some countries, laws relating to agriculture, land and development can affect the type of crops grown. In Uzbekistan, for instance, 80–85% of the country's agricultural area is covered by cotton and wheat as a result of land-use patterns occasioned by agricultural land policies. The main producers of raw cotton and wheat grain are individual farmers and *shirkats* (also known as collective farmers) who grow these crops with government support in the form of guaranteed government contracts.

In Vietnam, policies on land allotment for agricultural and forestry purposes partially restrict the development of underutilized plant species. A government decree (Decree No. 02–CP dated 15/1/1994) declared that certain lands should be allocated to organizations, households and individuals who will undertake specific business activities in the forestry, agricultural and fishery sectors. Since the reason for allocating the land is business, therefore creating a requirement of economic efficiency in the conduct of the business activities, some underutilized plant species that could not bring substantial economic returns were replaced by other economically viable crops (Binh 2006).

Education

The education policies of the countries studied, in general, do not mention the specific inclusion of underutilized species in school and university curricula. This is probably because, while there is indigenous knowledge about these species, little effort has been invested into their scientific research. Although the school and university curricula broadly allow for the teaching of agriculture, biodiversity and environmental studies at primary and secondary school levels and at university, these subjects or courses are not specific enough to convey the importance of underutilized species. In Papua New Guinea, for instance, all curricula allow for equal emphasis to be given to short-term crops, including the major food staples, and the major perennial crops which dominate agricultural export. However, there are no specific courses on underutilized species and the unexploited potential of the major food staple crops for downstream processing and marketing is not given any emphasis. In Ghana, the situation is similar. Although agriculture is taught as a subject from basic to tertiary level, it does not cover underutilized species. Agriculture is taught in all of the country's five public universities, including the University of Education, Winneba (Mampong Campus), which offers a Bachelor of Education and Diploma in Agriculture to train secondary school teachers.

In Nepal, unlike the other countries mentioned above, the subject of agricultural education is provided as an optional course in a few government schools. In other government schools and private schools, this subject does not exist. Even in those government schools that provide agricultural education as an optional course, the subject of underutilized species as a specific course is not included. Again, as in other countries, the emphasis is placed on major crops. However, the subject is receiving some attention in the curriculum of the Bachelor of Science in Agriculture, both at public and private institutes.

In Uzbekistan, a review of curricula at universities and institutes revealed that most of the lectures are focused on staple or major agricultural crops, such as grains (wheat [*Triticum* spp.], corn [*Zea mays*], rice [*Oryza sativa*]); fruits (apple [*Malus domestica*], pear [*Pyrus communis*], apricot [*Prunus armeniaca*], plum [*Prunus domestica*], peach [*Persica vulgaris*]); vegetables (tomato [*Solanum lycopersicum*], potato [*Solanum tuberosum*]); gourds (melon [*Cucumis melo*], cucumbers [*Cucumis sativus*], watermelon [*Citrullus lanatus*], pumpkins [*Cucurbita* spp.]); and others. The study of underutilized plant species occupies an insignificant place in current curricula, and teaching on these crops is limited to providing students with general information only.

The education policies of some countries make a distinction between the formal and informal education systems. The formal system is characterized by modern values and is associated with the elite, while the informal education system is characterized by traditional values. This dichotomy in the education policies has the effect of creating two classes of people with different perceptions and values, even in conservation, farming and dietary habits (Samuel 1999). In Zambia, for example this type of dual education system led to two ways of thinking

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among the population which led to a division in food cultures between the 'elite's exotic food' associated with the successful people and the 'villagers' traditional food' which is linked to the 'unsuccessful' people. This system perpetuates the notion that underutilized species are inferior.

Health and nutrition

The policies on public health and nutrition in the countries studied are generally geared towards ensuring that people consume nutritious food to maintain and enhance their standards of health. However, the policies place emphasis on ensuring the consumption of balanced diets based on crop groups without specifying the nutritious crops and their alternatives, which would provide an opportunity for some underutilized crops to be included.

In Uzbekistan, the relevant public health and nutrition policy and law (the Health Protection of Citizens Law of 1996) limits the definition of nutrition to a case where a stable quantity of food that meets the scientifically proved standards is balanced with food products of a high nutrient value. It recommends the consumption of crop groups such as vegetables, fruits and gourds without mentioning particular crops. So, nutritious underutilized crops and plants such as nut-bearing trees (e.g. walnut [*Juglans* sp.], pistachio [*Pistacia vera*], almond [*Amygdalus communis*]) and fruit trees and berry plants (e.g. cherry plum [*Prunus divaricata*], apricot, hawthorn [*Crataegus* sp.], barberry [*Berberis vulgaris*], sea-buckthorn [*Hippophae* sp.], dog rose [*Rosa canina*], and wild apple), which have considerable nutritional value and strengthen the immune system, are not included. At times, this approach also leads to the excessive consumption of other foods to compensate for certain micronutrients that may be absent from the recommended crop groups. In Uzbekistan, for example, agricultural production does not meet the physiological needs of the local people with regard to potatoes, gourds, fruit, and grapes. The lack of these products is compensated for by an excessive consumption of bread (1.74 times), vegetable oil (2.3 times) and rice (6.3 times) (USPCA 2006). This also affects the diversity of crops grown for consumption.

The same policy structure is found in countries such as Peru and Papua New Guinea. In Peru, for instance, the Healthy Food and Nutrition policy and strategy does not mention the importance of underutilized crops in contributing to nutrition. Rather, it highlights the importance of promoting healthy eating and appropriate nutrition-behaviour patterns, especially for people who are at serious nutritional risk. While this policy, like the health and nutrition law in Uzbekistan, creates a basis or framework for underutilized crops and species to be incorporated into people's diets, it does not 'go the extra mile' in highlighting the specific nutritional value of these crops and species, leaving their fate to the discretion of the policy implementers. Without adequate public awareness and education about the nutritional value and importance of underutilized species and crops among policy implementers, it is hard to conceive how these crops can be promoted and incorporated into people's diets.

Investment

The public investment policies in the countries studied strive to provide correctional mechanisms where market forces fail to provide a 'level playing field' as a result of external factors that may lead to distorted markets, amongst other things (Escobal 2000). Small-scale farmers, who usually suffer from high transaction costs necessitated by their low production scale, are the main producers of underutilized crops and species. Public investment is one way of providing them with an opportunity to ensure the economic, social and environmental viability of their farming efforts. It is in this way that underutilized crops can be promoted. However, the amount of public investment that is allocated for agriculture in general, and underutilized species in particular, in some countries is not proportional to the sector's contribution to the national economy. In Zambia, where agriculture accounts for 18% of GDP, the agriculture sector has been receiving less than 2% of the national budget in terms of public investment since the 1990s. While the reasons for the low allocation is often explained in terms of competing interests with other national needs such as education and health, it nonetheless provides an indication of the government's priorities.

Another type of public investment is government subsidy. Depending on how government subsidy is applied, it can either promote or inhibit the conservation and extended use of underutilized species. In Nepal, for the past 30 years the government has subsidised production of a certain rice variety through the Nepal Food Corporation (a government parastatal) which distributes the rice to areas where it is not a staple. This has led to locally adapted, underutilized crops being shunned by these communities who prefer the cheaper government-subsidised rice. The neglected, underutilized crops found in these areas include locally adapted tubers, roots, grains, cereals, legumes, vegetables, fruits and several cereal crops such as barley, awnless barley (*uwa*), buckwheat, proso millet (*Panicum miliaceum*) and foxtail millet (*Setaria italica*).

Private investment policies (involving both foreign and domestic investment) are also intended to ensure the promotion and facilitation of investment for local enterprises. Like public investment, private investment can also be an opportunity for enterprises, including small and medium businesses and farmers, to access financial resources for producing and commercializing underutilized species. The main obstacle in accessing private investment by local farmers, however, does not necessarily lay in the national investment policies themselves, but in the institutional policies of the specific investment providers, such as banks. In some countries, bank policies require collateral or a strict viability plan which most local farmers do not have. In Papua New Guinea, it is extremely difficult, if not impossible, for smallholder farmers using land in traditional, customary or communal ownership, to obtain credit from a bank or other credit providers.

National tax policies have an impact on the macro-economic climate of the countries studied. They have a direct effect on the application of investment policies. In Vietnam, for example, the tax regime limits the production of crops that do not have high economic value to farmers. Through the application of Government Decree No. 73/CP (25/10/1993) relating to tax classification according to land use, high taxes are levied on productive agricultural land, thereby forcing farmers to grow crops with high economic value to offset the tax burden. This has had an effect of reducing the diversity of crops grown to the detriment of underutilized crops with low economic returns.

Marketing and export

Policies on marketing, like policies on investment, are intended to correct the effects of external factors that distort markets. However, unlike investment policies that are directed at the production segment of the market chain, marketing policies are intended to influence the post-harvest stages, such as distribution and disposal. In the context of agriculture and underutilized species, one of the effects of these policies should be to encourage distribution, disposal and consumption of underutilized species through the removal of existing barriers such as tax on market infrastructure that promote major crops and the creation of demand for these crops.

The marketing policies related to agricultural products in the countries studied generally have this thrust. However, they use the same strategies and approaches for all agricultural products and make no distinction between conventional and underutilized crops. Moreover, the approach in most of the policies is designed to address conventional rather than underutilized crops. This has a negative effect on the consumption of these crops. In Vietnam, for example, the relevant marketing law (Ordinance No. 04PL/CTN of 2000) encourages farmers to increase commodity quality, production and business efficiency of their enterprises. It provides for the protection of the legal rights and benefits of production and business organizations and individuals and consumers. It also creates favourable conditions for international technical, economic and trading cooperation. This law was designed for major crops, produced through large-scale agricultural production, that already have demand in the market. This is shown by its focus on increased commodity quality and increased production, which entails high production costs that small-scale farmers cannot afford. It does not make provision for small-scale farmers and the creation of demand for minor crops.

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The same approach of non-explicit inclusion of underutilized species in marketing strategies and approaches also exists in the export and trade policies of most of the countries studied. The policy and regulatory frameworks for export and trade in these countries allows for the export of pre-determined crops or products that consist of mainly conventional crops. At times, the list of crops is based on bilateral trade agreements. This situation restricts the export and trade of underutilized species or products produced from those species. In Uzbekistan, the relevant regulations (i.e. the Regulation on 'Preparation of the State Program on the Development of Export Potential' and the Regulation on 'Establishment and Development of a System for the Wholesale Markets on Purchase and Sale of Agricultural Products') allow export of agricultural products to be carried out under bilateral contracts. The farmers who wish to export their local crops, some of which are underutilized, are not given export licences because their crops are not in the list of export products stipulated in the bilateral agreement. This has led to an unenviable situation where the farmers and local traders export their crops to neighboring countries like Southern Kazakhstan and Russia without licences and therefore illegally.

The issue of export of underutilized species is sometimes linked to product quality standards. Some countries have strict food standards that can make it difficult for certain products to enter their markets. In Peru, for example, the Strategy Document on Foreign Trade notes that 70% of all exports from the country are traditional export products, while 30% are non-traditional products. Of these, only a very limited percentage represents exports from underutilized species. The main reason for this was identified as product quality not meeting the standards of importing countries.

Challenges in policy implementation

Goggin (1987) noted that the discussion of whether a policy is effective or not can be divided into two questions or issues, namely '...the content of the policy itself, and the incapacities of the organizations and the people in the implementation system'. The preceding sub-section attempted to deal with the first issue, i.e. the content of the policy itself. The focus was on the gaps that exist in the texts of the various policies. Goggin's second question or issue – capacity to implement policies – will be the focus of this sub-section. The fact that a policy contains statements that are intended to avoid certain foreseen negatives in order to achieve a pre-determined objective does not necessarily mean that the objective will be achieved. The discussion here is based on past empirical studies on the subject of policy implementation.

In several examples from the countries studied a policy clearly sets out its intent but the intent does not transform into action or achieve the set goals. In Zambia, for example, the government's nutrition policy aims to ensure the alleviation of malnutrition and hunger. It includes several strategies and action points, one of which is endorsement of the 'Alleviation of All Forms of Hunger and Malnutrition' at the International Conference on Nutrition (ICN 1992) through adoption of the World Declaration and Plan of Action for Nutrition. However, despite this policy, Zambia still has acute micro malnutrition problems. Vitamin 'A', iron and iodine deficiencies are prevalent and are considered a public health problem. The national survey of 1997 indicates that 65.7% and 21.5% of children and women, respectively, had ≤ 20 mg/dl serum retinal levels; and 6.2% and 11.6% of children and women, respectively, experienced night blindness. These figures place Zambia in severe clinical and sub-clinical Vitamin 'A' deficiency according to the WHO population-affected cut-off points. Iron deficiency affects 65% of children, while 42% of women of reproductive age are anaemic with a higher proportion of affected children in rural areas (72.4%) compared to urban areas (56%)(National Survey 1998).

In Jordan, the National Environmental Strategy of 1992 was formulated to address the country's environmental problems. The goals of the strategy include to (i) maintain biological diversity by protecting the various species of animals, plants and micro-organisms in their different environments; and (ii) establish reserves as a top priority in the wildlife and habitat sector so as to provide a basis for re-introducing threatened animals and plants and restoring the balance of (the components of) the natural environment. This policy statement provides an opportunity for the conservation of biodiversity including neglected species. The problem, however, is that, despite the existence of this policy since 1992, underutilized or neglected species are still at a great risk of erosion and depletion. While the policy is potentially a significant basis for promoting the conservation of underutilized species, the challenge seems to be in implementation.

It is perhaps imperative in analysing the role of policy in promoting the use of underutilized species to also ask the questions: Why do some well intended policies not achieve their goals? What are the challenges being faced in implementing these policies? Garn (1999) stated that the success of policy implementation mainly depends on four key factors, namely; communication, financial resources, implementer attitudes, and bureaucratic structure. These factors affect policy implementation at the policy-makers' level (i.e. central government/top level). They determine how the policy-makers or government will implement the policy. Hull and Hjern (1987) identify another set of factors, which affect policy implementation at the target group level (i.e. the local level implementers/bottom). These are contextual factors that can dictate the nature of the policy outcomes created at the top of the implementation pyramid. Sometimes contextual factors can completely dominate the rules created by the central government.

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Based on the factors mentioned above, it seems that in order for government to effectively implement a policy it has to:

1. Have clear communication channels between various government institutions and with other stakeholders such as the target group, civil society organizations, and private sector. This should ensure that the policy goals and the various action plans for achieving them are known and well understood by the various institutions and it may also foster closer institutional collaboration.
2. Allocate adequate financial resources from the national budget for implementing the policy. Even if it does not have adequate resources, it should at least demonstrate commitment by allocating some funds towards the implementation of the policy. This provides a basis for attracting additional and augmenting financial investment for the policy from the private sector and other stakeholders.
3. Be optimistic about the objectives of the policy and the action plans to achieve them. This means that the government should have 'bought into' the rationale behind the policy and be convinced that the objectives fit into its overall vision for the country's development.
4. Reduce bureaucracy within the relevant implementing government ministries and department. This will greatly reduce the cost of implementation.

On the other hand, it seems that in order for the target group, who are the implementers of the policy on the ground, to successfully implement the policy they have to:

1. Clearly understand the policy goals, strategies and activities in order for them to understand their role in implementation. This will help them to position themselves in the policy implementation pyramid.
2. Be given freedom to adapt the policy to local conditions. This will ensure that the policy is relevant to the target population and produces practical and useful outcomes. It is at this level that policy directly affects people and therefore it is important to have the policy right for the context. The implementation strategy at this level should allow for adaptation to local difficulties and contextual factors (Matland 2001).

While the success of a policy depends on the ability and capacity of the government to dispense of its policy implementation obligations, it also depends, to a significant extent, on the skills of the local implementers who can adapt the policy to local conditions.



Cross-national policy strengths and opportunities

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Policy strengths and opportunities in sector policies

While it is apparent that policy gaps are inhibiting the conservation and extended use of underutilized species, it is equally true that opportunities exist to develop policies to promote the conservation and use of these species. These opportunities come in the form of policy statements that have the potential to promote the conservation and extended use of underutilized species if minimum adjustments are made to make the links to these species more specific and clear. The policy opportunities, therefore, may prove particularly useful when discussing policy options for reform because most of them provide a basis for minimum adjustment to meet the desired goal of conservation and extended use of underutilized species¹.

Agriculture

The agriculture policies in the countries studied are generally strong in the area of conservation. While some of the policies do not specifically mention conservation of underutilized species per se, their inclusion is inferred based on the fact that, by definition, underutilized species are biological resources. It would be more appropriate if the policies made direct reference to underutilized species, underscoring what it is about them that requires special attention, and including directions for what forms that attention should take. Be that as it may, the policies, as they are, provide a helpful basis upon which underutilized species can be better conserved. In Peru, Law No. 26839 on Agro biodiversity broadly provides for the preservation and sustainable use of biological diversity including agro biodiversity. Interestingly, the law highlights the preservation of native species, which may also include underutilized species. The relevant regulation that implements this law provides for the development of a 'Strategy for agricultural development' which will lay the basis for analysing the specific needs of conservation communities, particularly in the Amazonian and Andean regions. Interestingly, the regulation encourages the placing of native species on the national and international market. These policy statements, at least, are linked to the conservation and use of underutilized species, and, at most, provide a clear opportunity for underutilized species to be further promoted. The law has not been fully implemented yet and it remains to be seen how it will be implemented.

The National Agriculture Policy (2004) of Nepal has similar policy opportunities. The policy aims to conserve and sustainably utilize natural resources and biodiversity, which, by definition, also include underutilized species. In this regard, it proposes the development of gene banks and *in-situ* conservation activities. Quite uniquely, it emphasizes the promotion of low-weight, high-value agricultural products in remote areas. The policy has the potential to encourage small-scale farmers in those areas to grow underutilized crops that meet the requirements. The national policy also proposes competitive agricultural research and development (R&D), and emphasizes the registration and promotion of traditional and indigenous agricultural products and related technology. This may be particularly important for developing geographical indication criteria for the products of underutilized species in the context of product marketing. Although the policy statements highlighted above do not specifically mention underutilized species, they nonetheless create an enabling environment for their conservation and extended use.

The lack of agricultural research policies that specifically focus on underutilized species was identified as a gap in the agriculture sector. However, some countries have begun to undertake agricultural research that focuses on underutilized species despite the lack of an enabling policy. Admittedly, these are not national policies as such, however they act as empirical demonstrations for policy-makers to observe and consider. In Uzbekistan, two projects were identified as focusing on underutilized species research. The first undertook the following research studies: (i) 'Development of new varieties and study of recently-introduced and local varieties of fruit crops and grapevine adapted

¹ The concept of minimum adjustment is associated with questions relating to whether the adjustments are (i) feasible (ii) the manner through which they will be effected and (iii) the existence of alternative options for improvement.

to the various climatic zones of Uzbekistan, resistant to pests and diseases, high productivity and high fruit quality' (study of local varieties of quince (*Cedonia oblonga*), persimmon (*Diospyros kaki*), fig (*Ficus carica*), pomegranate (*Punica granatum*) on their resistance to biotechnical stresses); and (ii) 'Selection of varieties and forms of pistachio (*Pistacia vera*) for establishment of commercial plantations in various forest growing areas'. The second project is undertaking a research study on (i) integrated resistance of local varieties of quince (*Cedonia oblonga*), persimmon (*Diospyros kaki*), fig (*Ficus carica*) and pomegranate (*Punica granatum*) to biotic and abiotic stresses of the environment and (ii) cultivation of planting material of *Juniperus zeravshanica* with closed root system'.

In Papua New Guinea, research activities are also being undertaken, notwithstanding the lack of clear national policies in this area. The National Agricultural Research Institute (NARI) of Papua New Guinea undertakes research on food crops and on minor or emerging cash crops, with particular emphasis on assisting smallholder farmers. Its mission is to promote innovative agricultural development in the country through scientific research, knowledge creation and information exchange in pursuit of its vision of prosperous agricultural communities. The country has a rich biodiversity which includes a wide range of underutilized species of plants for food and agriculture, both planted and wild. Some of the latter are suitable for domestication and this is the focus of NARI's current research on *Canarium* nuts. NARI's research portfolio includes work on the genetic resources, breeding, and pests and diseases of the major staples and on crops or varieties suitable for neglected or difficult environments, such as atolls and those with declining soil fertility or prone to drought or frost, either as emerging economic crops such as pyrethrum or with identified capacity to cope with adversity. New work is focusing on a wide range of grain legumes such as cowpeas, mungbeans, pigeon peas, chickpeas, winged beans and lupins, as well as soya beans.

It was noted above that the food security policies in the countries studied tend to encourage the production of major crops at the expense of underutilized species. That notwithstanding, some countries are beginning to reform their food security policies to include the use of underutilized species. In Zambia, for instance, there were virtually no specific national agricultural policies before 1995. The Agricultural Sector Investment Programme of 1995 became a policy guideline which emphasized maintenance of the agricultural resource base, the application of sustainable conservation farming methods and crop diversification—especially towards the utilization of ecologically adapted crops and plants. This led to the promotion of a significant number of underutilized species, although these were not specifically mentioned in the policy. Subsequently, the agricultural policy of 2004 acknowledged the importance of underutilized plants under its food security objective, which states the need to promote the production of diversified crop species, including cereals, legumes, roots and tubers. The other food security objective stresses the need to increase and diversify agricultural exports, including those derived from minor crops, such as essential oils, species and vegetables. In terms of enhancing crop production, the agriculture policy provides diversification and maintenance of agro-biodiversity as some of its key strategies. This includes the need to develop measures to conserve and utilize locally available agro-biodiversity.

Education

Although most of the countries studied have no clear national policies that cover inclusion of underutilized species in the curricula of universities and colleges, the subject is still being taught in some universities. This is obviously because these institutions recognize the importance of the subject. In Ghana, for example, even though there is no course on underutilized plant species as such, some universities have been requesting germplasm of underutilized species from the national gene bank for their research (Aboagye 2003). The requested germplasm includes *Sphenostylis sternocarpa*, *Voandzeia subterranea* and *Phaseolus lunatus*. The national gene bank has also trained students from agricultural colleges and universities in management of plant genetic resources, including, in the recent past, topics on underutilized species. The resolve of these universities to include the topic of underutilized species in university curricula, despite the lack of supporting policy, is an indication of how important the subject is. This, in turn, illustrates the value and significance of the topic to policy-makers.

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The same situation exists in Uzbekistan. The relevant law (Law on Education 1997) provides for the broad teaching of agriculture while concentrating on major crops such as wheat, corn, rice, apple, pear, cucumber, watermelon etc., without specifically highlighting the teaching of underutilized species. However, despite the existence of such a restrictive policy and legal framework in respect of underutilized species, some schools conduct their research on underutilized crops independently. Such research is based mainly on a review of national and foreign reference data. The research on underutilized plant species was identified on the following topics: (i) prospects for the use of barberry (*Berberis sp.*) in the national economy; (ii) use of laginaria (*Lagenaria seceraria*) fruits for the production of traditional national products in farms and households; (iii) some issues concerning the processing of alycha (*Prunus cerasifera*) fruits; (iv) study of jujube (*Ziziphus jujube*) propagation with green cuttings; (v) peculiarities related to the cultivation of saffron (*Crocus sativus*) and caraway (*Carum carvi*) seeds and (vi) study of the physiological peculiarities of sea-buckthorn (*Hippophae rhamnoides*) development in Samarqand Province.

Some of the countries have policies that encourage the study of native species in university and school curricula. Native crops and underutilized crops are not necessarily the same, although there can be significant overlaps. Such policies provide an opportunity for some underutilized crops to be studied in formal learning institutions. In Peru, for instance, the relevant law (Law N° 24520) imposes an obligation on schools and universities to include in their syllabus, courses that foster and boost the consumption of native foods. It encourages universities to conduct research on the nutritional advantages and potential use of native produce. This regulation has not been developed with regard to implementation and application. Nevertheless, it reveals an early maturity (it was formulated in the 1980s) regarding the relative importance of agrarian biological diversity in Peru.

Some countries have adopted non-formal ways of imparting knowledge to students and the general public alongside the formal system. While the informal system, which includes the use of extra-curricula educational structures, may not specifically include underutilized species as a subject, it nonetheless provides an opportunity for it to be covered. In Zambia, for example, the informal education and public awareness (EPA) activities promoted through the extra-curricular *Chongololo* clubs were for a long time established alongside the Zambia Basic Education Curriculum (ZBEC). The extra-curricula clubs could have been used to teach the subject of underutilized species to both the young and adult population.

Notwithstanding the apparent non-existence of policies that provide for the clear incorporation of underutilized species in school and university curricula in the countries studied, some of the countries are thinking of reform in this area, targeted at the institutional level. In Jordan, for example, the government through the National Environmental Strategy has stressed the need for cooperation and coordination between the Ministry of Environment and the Ministry of Education. This is meant to emphasize flexibility in dealing with environmental education. The strategy also calls for the establishment of an environmental education programme, since the concept of conservation and sustainable use of biodiversity is not very clear for decision-makers or for the public in general (Al-Fayad and Ajlouni 2006). This approach of fostering institutional cooperation between the environmental ministry and the education ministry to develop an environmental education programme that probably includes underutilized species also provides a clear opportunity to demonstrate the value and importance of the subject in education curricula. It also addresses a key factor in policy implementation i.e. institutional collaboration.

Other countries are directing their reforms to the substantive part of their education policies. For the countries that are contemplating a change in policy, this would be a good opportunity to consider the issues relating to underutilized species. It is heartening to note that some of the countries that have already begun their reform are taking these issues into account (either intentionally or unintentionally). In Papua New Guinea, for example, the government's new policy on primary education provides for the integration of relevant practical skills and knowledge of agriculture, basic technology, and commerce, thereby fostering integral human development and the development of practical skills and knowledge important for local community development. The policy emphasizes

the following aspects: (i) principles and techniques of using land to increase the quality and quantity of food production for consumption or sale; (ii) how to prepare nutritious food; (iii) an understanding of the nutritional value of crops and comparison of the benefits of traditional and commercial crops; and (iv) analysis of aspects of a nutritious diet and suggestions as to how and where people might obtain, preserve, process and prepare these foods to meet nutritional requirements. While underutilized species are not specifically mentioned anywhere in the policy, they are relevant and consistent with the policy's objectives and principles, thus making it possible for the topic to be incorporated into the curriculum. The secondary education policy is currently being reformed to give emphasis to agriculture as the mainstay of the country's economy. The syllabus will build on concepts, skills and attitudes developed from the upper primary level. It is also aimed at preparing students who complete their education at this level to be able to lead productive lives in the rural communities from which most of them come. Hence, there is emphasis on understanding the role of local natural resources, which may include underutilized species, in the livelihood strategies of local communities.

Health and nutrition

The nutrition and health sector policies in the countries studied also contain enabling policy statements that provide an opportunity for the greater consumption of underutilized species. While some of these statements do not make a direct link to underutilized species, they do offer a basis from which these species can be better appreciated and consumed. The Health and Nutrition Policy of Nepal (the 10th Five year Plan of Nutrition) for example: (i) emphasizes the production of nutritional food and the right utilization of available food; (ii) aims to improve the quality standards of consumable food in order to prevent adverse effects at the nutritional level and (iii) encourages public awareness through extensive advertising on the importance and availability of nutritious food. The policy potentially allows the nutritious aspects of underutilized foods to be showcased and mainstreamed into the diets of the population. It also provides a basis for food to meet international standards for domestic and export consumption.

Other policies in this sector draw interesting links between nutrition and other sectors and development concerns, such as agriculture and poverty and social issues, such as urbanization. The National Nutrition Policy (2006) of Zambia recognizes the fact that food entitlement for most rural households is linked to agriculture. It acknowledges that production of minor staple food crops has been fluctuating at a low level, leading to increased vulnerability to food insecurity, especially among the rural population. As a result, the policy includes measures that address the need to promote increased food diversification, production and consumption, and the utilization of all available food resources for the improvement of the country's nutritional status. Although underutilized species are not specifically mentioned, by providing for increased food diversification for improved nutrition, the policy creates an opportunity for the greater production and consumption of underutilized foods.

The Nutrition Policy of Papua New Guinea makes a link between nutrition, agricultural production systems, poverty, population pressures and urbanization. It recognizes that the problem of nutrition is primarily due to two main factors, namely: (i) malnutrition, as a result of inadequate intakes and imbalances which are the result of poverty, population pressures on food crop production, natural disasters, lack of education and gender disparities; and (ii) poor nutrition, due to income inequalities, urban lifestyle and diet problems. In order to address these issues, the policy aims to: (i) improve access to income and services for nutritionally vulnerable communities; (ii) improve the marketing of locally produced food in major urban centres; (iii) support research and development of inexpensive, high-quality, nutritious foods; and (iv) encourage farming systems approaches that target disadvantaged areas, while addressing problems of low productivity due to pressures on soil fertility and access to land and the need for improved marketing and downstream processing. This integrated approach to nutrition policy provides an opportunity for the greater consumption of underutilized species. While it is not aimed at the greater production of underutilized food alone, it nonetheless provides the policy justification for growing and consuming these crops.

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The thrust of the components of the national health policies that are relevant to underutilized species are linked with the establishment of ayurvedic medical systems (i.e. herbal medicine) in the countries studied. Some underutilized species are important sources of herbal medicine so policies that promote the use of traditional medicine are likely to correspond with an increase in the use of underutilized medicinal species. This is what occurred in Vietnam, where the relevant law (Instruction No. 210/TTg of 2006) on Exploitation and Development of Medicinal Plants and Animals encourages the use of traditional medicine in Vietnam's health-care system. This led to an increase in the demand for medicinal plant species, many of which are underutilized species. According to a report on agricultural and rural transformation produced by the people of Quang Ninh, the use of some underutilized medicinal plants such as anise and cinnamon rose significantly. Similarly, in Nepal, the National Health Policy of Nepal (1991) encourages the development of herbal or traditional health systems. As a result, the use of underutilized species which are the major source of herbal medicines in the country has increased (ABTRACO 2006).

Investment

Public investment policies are generally intended to provide, amongst other things, correctional mechanisms in the market in a situation where market forces fail to create a 'level playing field' for economic actors. If they are properly implemented, they can ensure the viability of small-scale farmers through supporting the development of infrastructure, on the one hand, and efficient production systems, on the other. Public investment has been identified as the major contributor to agricultural growth and rural poverty reduction (S. Fan et al. 2005). The existence of suitable infrastructure and efficient production systems for small-scale farmers can be an opportunity for underutilized species to be promoted and used widely. Peru's public investment policy aims to achieve this. The policy views public investment as a market intervention tool that is supposed to correct the effect of external factors that may lead to incomplete or distorted markets. Such distortion may be the result of trading policies in other countries, market infrastructure or high business costs (Pastor et al. 2006). To achieve the policy objective, the government allocates a significant amount of its national budget to agriculture. For example, 10–15% of the country's total public investment comes from the central treasury. Of the US\$1.2–1.5 billion of overall public investment, 20% goes to the agriculture sector (Pastor et al. 2006). As well as showing the government's commitment to agricultural development, this also indicates the government's national development priority.

At times public investment policies can target a specific function or area in a sector. Under such circumstances the objective will be to address an apparent distortion in that sector. In Vietnam for example, the relevant law (Decision No 17/2006/QD-TTg of 2006) on plant varieties, animal breeds and forest varieties obligates the government to provide capital investment, drawn from national coffers, to institutions that conserve genetic resources to undertake material enhancement activities. As well as indicating the government's priority in national development, this policy also provides an opportunity for underutilized species to be conserved and developed.

Public investment policy opportunities in Vietnam also take the form of government subsidies. These have successfully enabled the conservation and increased production of certain crops, some of which are underutilized. The relevant law (Decision No. 257/QD-UBND of Son La province) provides for the development of agricultural commodity production through subsidized prices for seeds (including main crops and some underutilized species). The government subsidy usually takes the form of supporting food processing operations and providing investment credit. A related law on government subsidy (Decision No. 1190/QD-UBND and Decision No. 257/QD-UBND of Ha Nam and Son La provinces respectively) provides for the expanded production of minor crops such as kohlrabi, shallot, garlic, melon, luffah, water spinach, French beans, and pawpaw. The government subsidy or support provided by this policy takes the form of financial and capital investment in field-leveilling work, irrigation systems and post-harvest and food processing, as well as the provision of preferential interest loans to scale-up production, assisting in the development of underutilized crop species.

Private investment policies also play a crucial role in the development of agriculture. In some of the countries studied, they provide an alternative source of investment where public or government investment is not forthcoming. In Papua New Guinea, for instance, the relevant investment law established a statutory body called the Investment Promotion Authority (IPA), which regulates foreign investment and monitors the impact of investments and the activities of enterprises in the country. If properly informed, the IPA is capable of providing marketing information for potential investors to invest in activities involving the conservation and commercialization of underutilized species. The law also established another statutory body called the Small Business Development Corporation (SBDC), whose aim is to promote small and medium enterprises as a way of enabling citizens to be self-reliant and contribute to national development. The types of activities encouraged by the corporation include honey production, soap manufacturing, and the processing and marketing of some underutilized crops such as spices like turmeric, cardamom, ginger, lemon grass and chili. The SBDC could potentially support activities relating to the production, manufacturing, processing and marketing of other underutilized species found in the country.

In Uzbekistan, the use of private investment for agricultural development is even more pronounced. The government, through the operation of several statutory regulations, encourages the use of private financial capital, such as micro-credit schemes, to enhance farming operations. For instance, one regulation: *'Implementation of the Micro-crediting Program with Assistance from the European Bank of Reconstruction and Development'* promotes the financing and development of small manufacturers for processing local raw material and agricultural production. While the regulation does not specifically tie the provision of finance to underutilized species, it does provide a clear opportunity for local resources such as underutilized species to be produced and processed using this facility.

Marketing and export

Although the marketing policies in the countries studied tend to be weak (as highlighted in the section on 'Gaps in sector policies'), some of them do contain constructive elements. The regulation on the 'Establishment and Development of a System for the Wholesale Markets on Purchase and Sale of Agricultural Products' of Uzbekistan is one such policy. This regulation provides for: (i) the creation of conditions for the establishment of a modern market system of wholesale purchase and sale of agricultural products; (ii) the wholesale purchase of agricultural products from agricultural enterprises, small households (dehkans) and farms; (iii) the provision of services to sellers and consumers with regard to organization of trade in agricultural and food products, their sanitary and veterinary testing, certification, transportation, cargo handling works, storage, packing and labelling; (iv) the provision of information on market conditions for supply and demand in wholesale markets and (v) the sorting and primary processing of agricultural products to meet international standards, as well as the creation of favourable conditions for delivery to local dehqan (agriculture) markets and for export. Some of the policy statements, such as those encouraging the sourcing of agricultural products from small-scale farmers (who are usually the producers of underutilized crops), and the provision of services relating to sanitary testing, certification and transportation etc. to sellers and consumers, are crucial for the marketing of underutilized species. Therefore, while this policy may not directly encourage the marketing of underutilized crops, it nonetheless provides a platform, or starting point, for their successful marketing.

The marketing and export policies of some of the countries studied reveal that effort is being made to include 'non-traditional' crops in export crop lists. In Ghana, for example, policies have intensified to diversify the country's agricultural export base and this has led to a focus on other non-traditional export crops such as pineapple, banana, and spices (pepper, ginger, black and pepper). This policy has the potential to include underutilized plant (crop and tree) species. Most of the crops produced in Ghana are for domestic consumption, however, strong attempts are being made to export some of these under the 'non-traditional exports' category. There are also efforts to process them into industrial raw materials—for example, industrial starch from cassava, or into finished

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products such as orange and pineapple juice, tomato paste and other vegetable and fruit juices. These initiatives present an opportunity for underutilized species to be marketed domestically and internationally as both raw produce and processed foods.

The same policy thrust exists in Peru. The relevant policy (Strategy on Foreign Trade) acknowledges the fact that traditional exports account for 70% of the country's exports and makes a deliberate statement to encourage and expand the export of non-traditional products. While the policy does not specifically encourage the export of underutilized species and their products, it nevertheless creates an opportunity for them to be marketed and exported as non-traditional products. In Uzbekistan, the relevant policy on export (Regulation on 'Preparation of the State Program on the Development of Export Potential') provides for State support for exporters, including exporters of non-traditional exports. It also provides for increased import-replacing production of certain crops and products again, with State support.



Policy failure

“ The failure of a policy to achieve its goals is often an important reason for the decision to replace it. Failure alone, however, is rarely a sufficient explanation of the timing and direction of policy change. Change follows failure when alternative policies exist that are politically viable—that is, able to garner support from powerful actors—and that can explain past failure persuasively, and offer new policy prescriptions. ”

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The policy failure

The notion of 'policy failure' attracts different definitions. The Global Biodiversity Assessment (2002) defines policy failure (from an economic policy angle) as a situation where government policies fail to correct market failures. Another school of thought defines it as: 'The situation when a policy or policies are inconsistent and militate against the success of other policies (e.g., subsidies on agricultural fertilizers and environmental protection policies)' (GESAMP 2001). These two definitions are not necessarily contradictory. They can be viewed as complementary, with differences being those of emphasis rather than substantive inconsistency. One definition emphasizes failure from a 'policy utilitarian perspective' while the other emphasizes failure from a 'policy framework coherence perspective'. Policy failure can occur if a policy that was designed to achieve a certain objective does not meet that objective i.e. 'policy utilitarian perspective'. It can also occur in a situation where, regardless of whether or not a policy achieves its objectives, it causes unintended negative effects on other policies, i.e. 'policy framework coherence perspective'. It is not always possible to define 'policy failure' in a single caption. It can mean different things to different people, depending on the nature of the policy failure. However for purposes of getting a more incisive understanding of the topic, it is probably imperative that both formulations be considered together as components of the same subject.

The causes of policy failure are diverse and can be found in all stages of what Bridgman and Davis (2004) describe as the 'policy cycle'. A policy cycle, according to Bridgman and Davis, begins with policy-makers identifying an issue for attention, subjecting it to analysis, identifying appropriate instruments, consulting with those affected, coordinating the activities of different agencies involved and presenting the issue to cabinet for decision, which is followed by implementation and evaluation. The cycle can be further synthesized into three basic stages, namely (i) policy formulation (involves the identification of issue or problem, analysis of the problem to establish justification for intervention, development of appropriate instruments to achieve the set objectives, consulting with stakeholders and coordinating with relevant government institutions); (ii) policy implementation (involves the application of the policy in practice to achieve the policy goals) and (iii) evaluation (involves the assessment of the policy and the evaluation of its impact on the target). The existence of any form of 'weakness' in any of the components in the 'policy cycle' may result in the intended objective not being realized or the manifestation of unintended adverse effects.

The present study reveals some 'weaknesses' in the policy formulation and, to some extent, implementation stages of most of the policies examined. An analysis of the policies disclosed that specific mention of underutilized species is not included in the text of the policies. Some of the policies do not acknowledge the special nature of underutilized species and also do not make specific provision for their conservation and extended use. This shows that the issues associated with underutilized species were not identified as a problem that required policy intervention during the policy formulation stage. Consequently, there was no analysis or consultation that would result in the incorporation of underutilized species in the policies. This 'weakness' probably explains the existence of policy gaps that appear in the form of policy statements which have the potential to run counter to the idea of conservation and extended use of underutilized species. It is highly probable that the policy-makers did not have the incorporation of underutilized species on their minds at the time of formulation and it is almost certain that they did not intend such non-incorporation to have negative effects on the conservation and use of underutilized species. The unintended negative effect that is contributed by these policies is a sign of policy failure.

An analysis of the policies and how they are being translated into action reveals a gap in the implementation of the policies. Some of the policies studied have clear objectives (that may or may not have an impact on underutilized species) and clear statements that guide action towards the realization of the objectives. However, some of these statements are not being converted to action. Without undertaking field surveys or administering questionnaires to identify causes, the study identified several possible causes for non-implementation based on past empirical studies on the subject. The lack of effective implementation was identified as a weakness in the implementation stage of the policies. The fact that the intended objectives of the policies were not realized in some cases is another sign of policy failure.



Recommendations

When policy failure is detected, the next step is to assess how the policies can be changed to address the identified gaps. Walsh (2006), however, cautions that change should only be pursued if there are alternative policies that are politically viable. Some of the things to consider in this context are: (i) the availability of policy options or alternatives; (ii) justification: why and how the policy alternatives/justification will address the identified policy gaps and (iii) political commitment for the suggested policy options/alternatives. The national policy reports on which this study is based developed sets of recommendations for policy change in their respective countries. This section will attempt to synthesise these policy recommendations, while at the same time placing them in the appropriate framework for general national policy change. The recommendations are directed towards policy-makers as well as research and advocacy groups, with the aim of presenting political strategic options for policy reform.

The role of policy

in the conservation and extended use
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Agriculture

Recommendations for policy-makers

- Agricultural research institutes should be able to gain access to and use underutilized plant species germplasm for the purpose of breeding and multiplication
- The importance of underutilized plant species as valuable and rare genetic resources needs to be emphasized, as well as their value in sustainable agricultural development and in the local economy
- The concept of conservation of underutilized species should be incorporated in policies so as to encourage people in remote areas to conserve the underutilized plant species, popularize traditional knowledge and improve people's knowledge of the value (medicinal, cosmetic, nutritional, cultural) of such species and their cultivation techniques
- Local underutilized plant species should be collected, identified and inventoried, thereby creating a listing of these species
- Concerns over conservation of plant genetic resources for food and agriculture should be mainstreamed into land-use policies.

Education

Recommendations for policy-makers

- Develop policies in both public and private research institutes that will facilitate research on local underutilized plant species with farmer participation.

Recommendations for research and advocacy groups

- Draw up an informative and educational programme about the actual and potential value of underutilized species that endeavours to create greater value and improve public perception of these crops
- Develop and incorporate curricula on underutilized species in national training programmes
- Encourage the sharing of knowledge and information on underutilized species by promoting empirical research
- Document existing knowledge for use in schools and carry out further research to expand on it.

Health and nutrition

Recommendations for policy-makers

- Identify specific crops/species that have the potential nutrients required in food diets in national nutrition and public health policies, this will allow nutritious food produced from underutilized species to be included
- Strengthen the link that exists in most national nutrition and public health policies, between agricultural biodiversity, food and nutrition.

Recommendations for research and advocacy groups

- Increase public awareness of the importance of underutilized species for nutrition, with emphasis on the low cost and easy availability of nutrient-rich but underexploited crops
- Promote the use of local foods in government institutions such as schools

- Identify and document the medicinal properties of underutilized plant species through research and use of indigenous knowledge. The use of medicinal plants is associated with mystics and incantation. This calls for intense public education to demystify information on medicinal plants.

Investment

Recommendations for policy-makers

- Reform of tax systems based on impact studies on tax levied on agricultural production especially for regions where people live mainly by production of underutilized crops
- Government subsidy reform, especially considering the removal of subsidies that promote one component of the agricultural sector at the expense of another as these usually have negative impacts on the wider use of underutilized species
- Develop micro-credit and micro-finance systems that suit the circumstances of local farmers
- Develop policies that encourage the involvement of the private sector, especially the use of private-sector investment in small-scale agriculture.

Recommendations for research and advocacy groups

- Sensitize national governments in their budgetary allocation of State funds, about the opportunities inherent in agriculture, especially small-scale agriculture, for food security, nutrition and livelihood enhancement.

Marketing and export

Recommendations for policy-makers

- Mainstream underutilized species in agricultural marketing policies
- Promote the inclusion of underutilized species and their products on export commodity lists after determining their demand in export markets
- Improve infrastructure, including communication in remote areas
- Address market imperfections such as market organization and access to micro-credits.

Recommendations for research and advocacy groups

- Develop entrepreneurial training programmes for producers of underutilized species and organizations of buyers and distributors, on the potential economic significance of underutilized species. Such training programmes will be in the context of a national agricultural marketing strategy.
- Investigate ways of promoting the use and consumption of underutilized crops in niche markets including the use of geographical indicators and other quality certification schemes.



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