



## Mega-Project 4

# Improvement, Intensification and Diversification of Sustainable Crop and Livestock Production Systems in Dry Areas

### Medicinal and aromatic plants for alternative livelihoods in Afghanistan

At least 65 of the medicinal and aromatic plant species that grow in Afghanistan could be exploited commercially. These species are therefore the focus of three of the 11 projects managed by ICARDA under the Research in Alternative Livelihoods Fund (RALF), which is supported by the UK Department for International Development (DFID). These projects aim to raise incomes and create jobs by helping collectors, farmers, and traders make greater use of the country's plant resources.

#### Sources of natural active ingredients for food, pharmaceuticals, and cosmetics

In 2005, a Novib-Oxfam Netherlands project focused on six medicinal species: liquorice (*Glycyrrhiza glabra*), cumin (*Cuminum cyminum*), Devil's dung or 'hing' (*Ferula asa-foetida*), caraway (*Carum carvi*), wormseed (*Artemisia cina*), and Indian jujube (*Ziziphus jujuba*).

The project is managed by ProFound, the Netherlands, and is being implemented by the Ministry of Agriculture, Animal Husbandry and Food (MAAHF), the Faculty of Pharmacy of the University of Kabul, and the United Nations Development Fund for Women (UNIFEM). Three NGOs are also key implementing partners (Table 1). In the nine provinces covered, the project partners are working with communities, collectors, farmers, and traders to find the best ways to collect, grow, process, and mar-

ket these species. Efforts aim to add value, and include the development of harvest and post-harvest technologies, and work to better understand the plants' properties – by analyzing and identifying bioactive compounds and other



Cumin is not only a medicinal crop, but is also widely used in food preparations.

substances of interest. Researchers are also mapping the distribution of these species, and developing quality standards to ensure that products can be exported. This work is complemented by the project's efforts to build policy and legal frameworks.

#### Growing and marketing saffron

Saffron (*Crocus sativus*) is a high-value crop that is mainly harvested and processed by trained women and girls. These groups benefit from the income-earning opportunities the crop provides,

as around 270 days of labor are needed per hectare. The sustainable production, processing, and marketing of saffron is the aim of another RALF project. Led by the Danish Committee for Aid to Afghan Refugees (DACAAR), the project involves three other partners: Washington State University, MAAHF-Herat, and

Herat University's Faculty of Agriculture.

Since its introduction in 1991, saffron-growing has spread rapidly in Afghanistan – to 21 districts in seven provinces. In Pushtun Zarghun district in Herat province, where DACAAR introduced saffron-growing in 1998, 119 farmers are now involved in saffron production. To help them, the project has established a Saffron Association, which already has 91 members, and a seed bank which is providing saf-

Table 1. Plant species containing valuable natural compounds that are being targeted by the Novib-Oxfam/RALF project in nine provinces of Afghanistan (frequency of occurrence of species: x = low, xx = medium, xxx = high).

Province	Implementing NGO†	Products					
		Artemisia	Caraway	Cumin	Hing	Liquorice	Jujube
Khost	TLO	xx	xx	xx	x	x	
Paktia	TLO	xx	x	x	x		
Badakshan	AKF	xxx	xxx	xx		xx	
Baghlan	AKF	xxx	xx	x	xxx	xxx	
Bamyan	AKF	xxx	x	x	x	x	
Herat	CHA	xxx	xx		xxx	xxx	xx
Ghor	CHA	xxx	xx	x	xxx	xxx	x
Farah	CHA	xxx		x	xx	xxx	
Faryab	CHA	xxx	xx	x	xxx	xxx	xx

†TLO = Tribal Liaison Office; AKF = Aga Khan Foundation; CHA = Coordination of Humanitarian Assistance.

from bulbs (corms).

Around 30 ha of saffron are now being cultivated each year in Herat province. Many farmers want to start growing saffron, which has led to a great demand for corms. Established saffron farmers are earning extra income by harvesting and selling the excess saffron bulbs they produce.

The project is now focusing on improving production and identifying new market opportunities. As quality is the key to obtaining higher prices on international markets, growers and researchers have together worked out ways to meet ISO quality standards governing moisture content, flavor, and color. These include:

- Picking flowers early in the morning, before they wilt.
- Carefully separating stigmas from flowers and styles.
- Careful drying – to ensure that the final product only has a 12% moisture content. Too much moisture causes spoilage and mold, while too little leads to brittleness and loss of weight.
- The use of proper packaging – to maintain moisture levels and attract consumers.



Saffron is a high-value crop mainly harvested and processed by women and girls in Karokh, Herat Province.

Another RALF project, led by Catholic Relief Services, is studying agronomic issues using multi-year on-farm trials in Herat. Results have shown that larger saffron corms produce significantly more flowers and corms, and that saffron grows best when bulbs are planted at a depth of 15-20 cm at a spacing of 15 x 20 cm. In some areas, such as Pashtun Zarghun, it is best to plant saffron in raised beds to ensure good drainage.

The project has also shown growers that regularly digging up and replanting corms reduces the threat posed by pests and diseases. This also ensures that the best new corms are planted at the optimum depth – without regular replanting, bulbs eventually end up close to the surface because the new corms form above the older ones. Replanting also allows producers to gather surplus corms. Good quality ones can then be sold, while poor quality (small)



H.E. Mohammed Sharif (second from left), Deputy Minister of Agriculture, Afghanistan, along with Dr Randhir Singh (fourth from left) of Relief International, and senior scientists from ICARDA Kabul Office, at a farmer's mint field in Jalalabad, Afghanistan.

corms can be used as animal feed.

### Mint cultivation as a viable alternative livelihood

Scientists from ICARDA and Nangarhar University are working in Helmand, Kunduz, and Nangarhar provinces to help farmers produce mint (*Mentha* spp.) commercially on a large scale, as a viable alternative to growing opium poppies. They have already set up research/demonstration plots, trained farmers by organizing field days, and founded mint producers' associations.

Project staff have also helped farmers to set up plastic houses so that they can produce mint using protected-agriculture technology. This means they can sell the crop in winter when prices are very high. The team has also introduced mint growers to the

dry-mint trade, teaching them how to dry, package, and store the mint when prices are very low. This mint can also be sold for a high price in winter.

Four mint-water extraction plants have been imported from Iran and are being installed in the target provinces. The mint producers' associations will use these plants to manufacture mint-water, which they will market as a herbal remedy for common stomach problems. The project is also bringing in improved germplasm and new technologies for extracting mint water and distilling mint oil.

So far, 15 improved varieties have been imported and established in the project's mint-germplasm collection center. Some of the rarer varieties were multiplied using micro-propagation techniques. Nine local mint varieties were also

collected and identified. Researchers studied their oil content and the chemical composition of their oil using high-performance liquid chromatography (HPLC) techniques.

### New links developed

Through the RALF projects' capacity-building activities, links have been built with Afghan universities and MAAHF's provincial research and extension teams. Several medicinal crop experts were also brought together for the Symposium on Medicinal Plants (held at MAAHF-Kabul in November 2005) and a week of activities in Kabul and Herat. The projects have also forged links with the Qarshi Herb Research Centre, Pakistan, and the Forestry and Rangeland Institute and Khorasan Research Centre for Technology Development, Iran.



The sale of bottled mint water, which is used as a remedy for common stomach problems, is rising in Afghanistan.