

BACKGROUND TO THE AUTHOR

ANTHONY FITZHERBERT, British, born 1939 UK. Lives in Cumbria, England; MSc degree Reading University. Since 1967 he has worked in countries of the Near East, Central, West and South Asia. His work has been related to the rural sector, including farming and pastoral systems, crop and livestock husbandry, land/natural resource management and rural development.



In Afghanistan, he has been involved in moving agriculture from emergency assistance to early recovery and longer term rural development and production. His working involvement in Afghanistan started in 1987 as the responsible desk officer with FAO based in Rome. In this capacity he visited Afghanistan several times between 1987 and 1988 during the Soviet occupation, on both sides of the lines of conflict. From 1989 to 1995 he managed the FAO's Afghanistan Agricultural Rehabilitation Programme in the field. In 1995 he took up project management work in ex-Soviet Central Asia, being based in Kyrgyzstan until July 2001.

During this time he returned to Afghanistan several times on short assignments for UNODC and the Aga Khan Group, working both in Taliban controlled provinces as well as those controlled by the Northern Alliance. He returned to Afghanistan in early 2002, as a special adviser to FAO. Since then, he has worked as a private consultant and continues to visit Afghanistan regularly on assignments for different agencies, including the UN (FAO & UNEP), INGOs, research bodies (AREU) and donors (EU, DFID etc). This included being attached to the Ministry of Rural Rehabilitation and Development (MRRD) as a special advisor in 2004/2005.

Over the years he has taken a special interest in the traditional farming and pastoral systems practiced in different parts of Afghanistan and their contribution to the resilience of the rural population. He has traveled and worked in almost all parts of Afghanistan, gives regular talks to private and official audiences and has contributed to various papers, studies and reports.



AN INTRODUCTORY GUIDE TO SOURCES OF TRADITIONAL FODDER AND FORAGE AND USAGE

Environmental Resilience
in Pastoral Systems in Afghanistan



Building Environmental Resilience

تقویت تاب آوری محیط زیستی



by Anthony Fitzherbert

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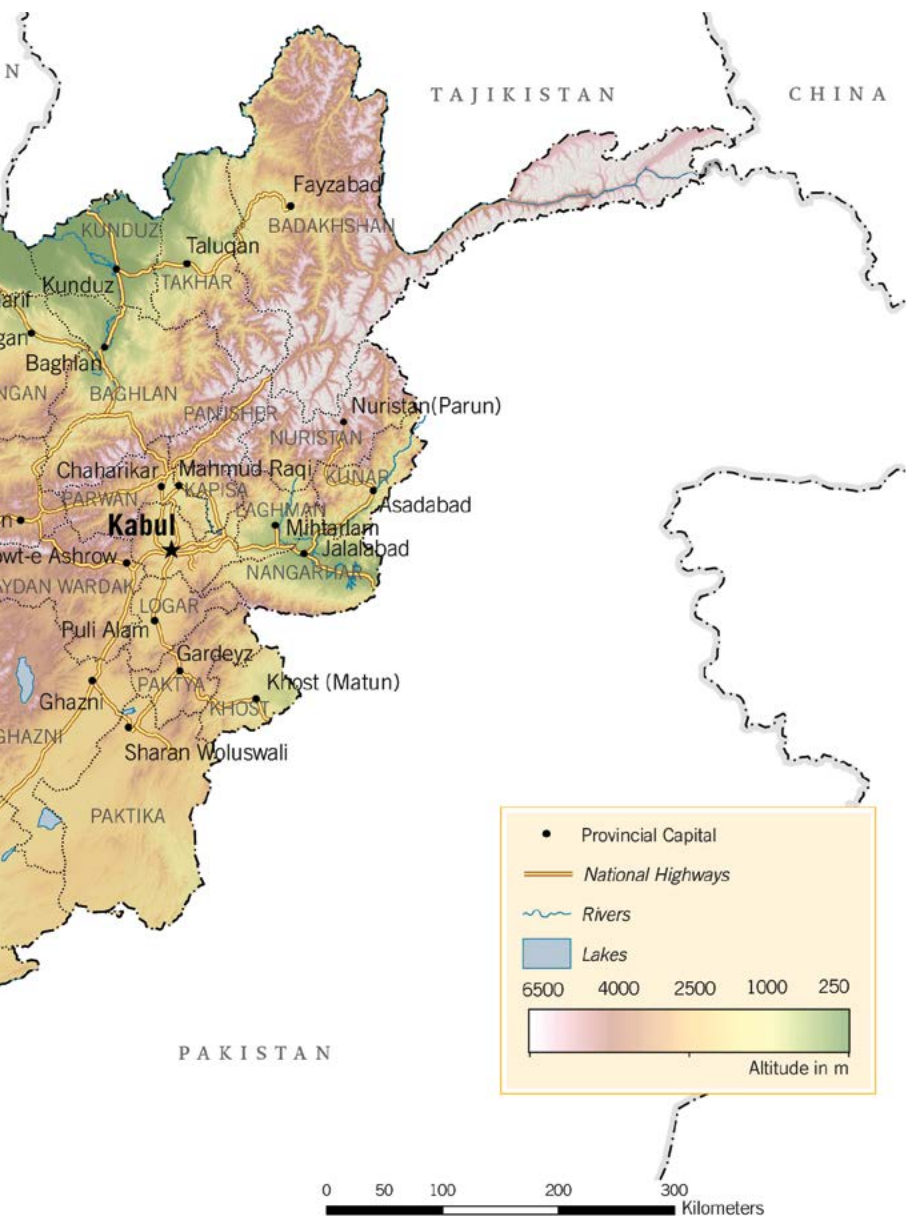


MAP 1

TOPOGRAPHY OF
AFGHANISTAN

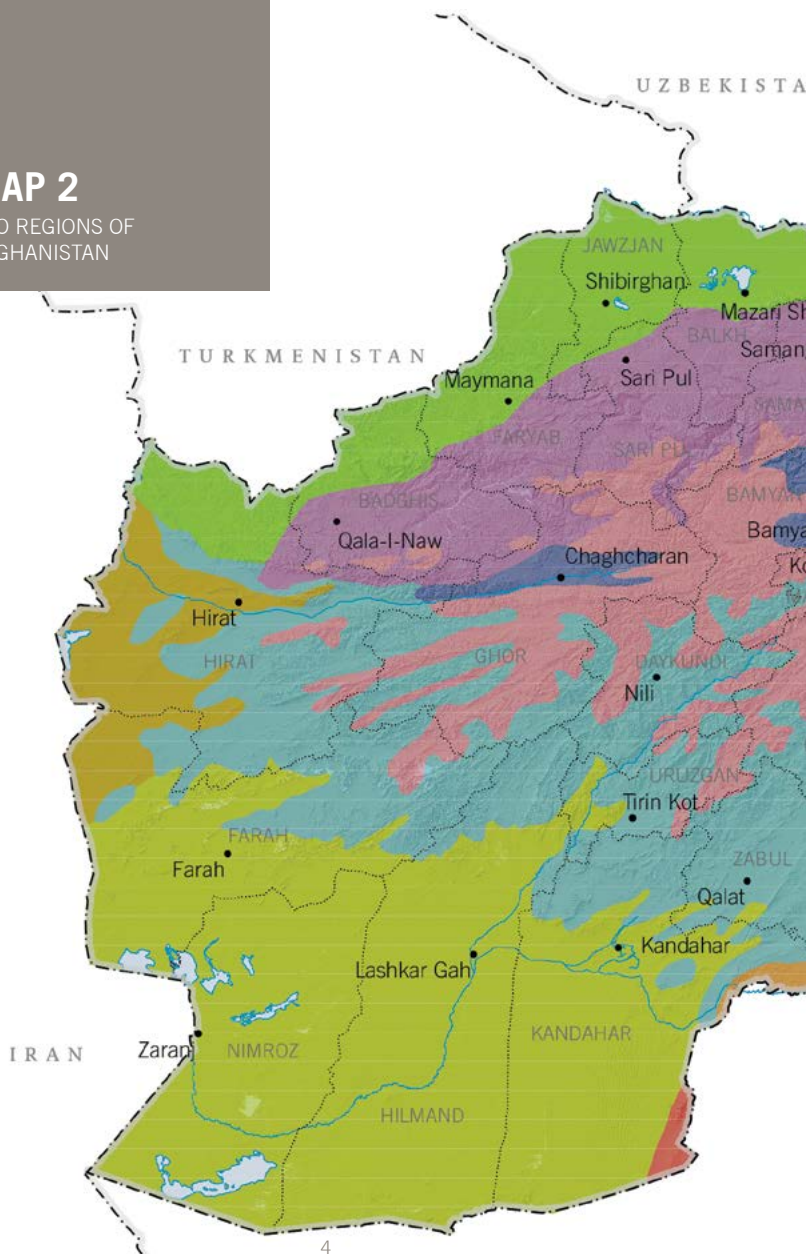
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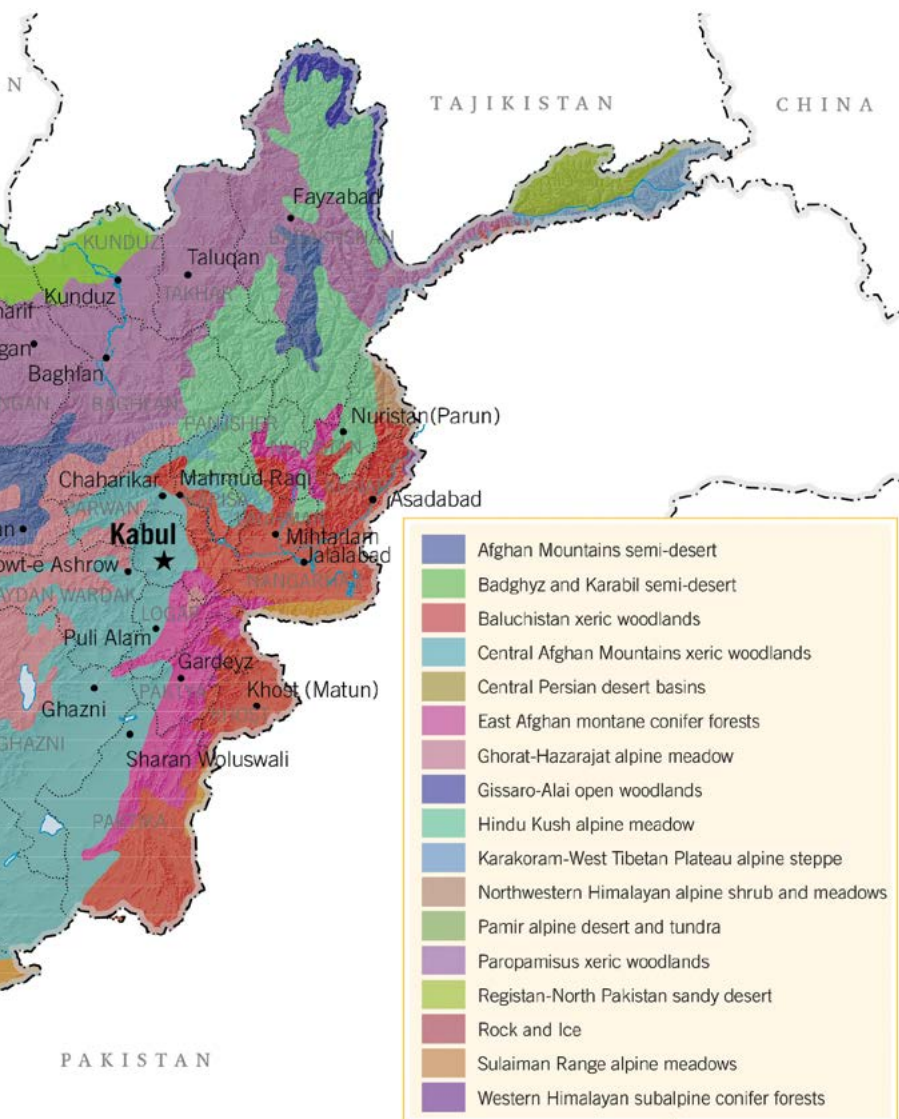




MAP 2

ECO REGIONS OF
AFGHANISTAN





0 50 100 200 300 Kilometers

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ACKNOWLEDGEMENTS

This field guide is the result of many years of field work in different parts of Afghanistan and my long term interest in the traditional farming and pastoral systems that are an integral part of the resilience and coping mechanisms of that country's rural population in adversity.

My first thanks goes to the many Afghans working for different organisations, who have accompanied me and assisted me in the field, and the unfailing patience and hospitality of the villagers, farmers and herdsmen who have entertained me and answered my many questions.

The information included in this field guide was obtained when on field assignment with these organisations of which the following are noted in particular:

The Food and Agriculture Organisation of the United Nations (FAO), for whom I worked for several years in the 1980s and 1990s with regular short assignments in the 2000s. My work with FAO has given me the opportunity to work and visit almost all provinces and districts in rural Afghanistan at one time or another since 1984.

The United Nations Environment Programme in Afghanistan, with whom I have done field work in Bamyan and Badakhshan, including in the Wakhan and Pamir regions. UNEP have bravely taken on the task of publishing this Field Guide as part of their Environmental Resilience knowledge library for whom particular thanks are due to Andrew Scanlon, UNEP's Afghanistan Country Programme Manager.

The United Nations Office of Drug Control office (UNODC) for whom I undertook several assignments in the 1990s in Helmand, Uruzgan, Kandahar, Nangarhar, and Badakhshan.

The Afghanistan Research and Evaluation Unit (AREU), Kabul for whom I carried out several research assignments concerned with traditional livestock husbandry issues between 2004 and 2005, in Ghazni, Herat, Nangarhar, Parwan, Panjshir and Kunduz.

Thanks are also due to the following international agencies and NGOs with whom I have worked or with whom I have lodged as their guest at different times over the past twenty five years, in different parts of Afghanistan:

Aga Khan Development Network (AKDN) in particular the Aga Khan Foundation (AKF) and Aga Khan FOCUS, in Badakhshan, Takhar, Bamyan, Baghlan and Balkh. AKF also helped with initial editorial work on the first drafts of this guide. Particular thanks are also owed to: **Andrew Billingsley, Ghulam Sakhi** and other staff of the **Aga Khan Foundation**, in Bamyan, Takhar and Badakhshan for their support in the final stages of the field research for this work in 2011/2012.

Afghanaid – Badakhshan and Ghor, **Mercy Corps International & M.C. Scotland** – Helmand, Kandahar, Baghlan, Takhar and Kunduz, **Solidarites International** – Bamyan Central, Yakawlang, Sayghan and Kahmard districts in Bamyan, **Central Asia Development Group (CADG)** – Zabol, Kandahar and Helmand, **ACTED** – Faryab, **DACAAR** – Herat, Ghazni and Laghman, **Relief International** – Nangarhar, **International Rescue Committee (IRC)** – Loya Paktia, **MADERA** – Kunar, Nuristan and Wardak, **Concern International** – Logar.

Special thanks to the staff of the **Centre for Middle Eastern Plants (CMEP), Royal Botanic Gardens**, Edinburgh in particular to Dr. Alan Forrest and Dr. Tony Miller for their invaluable botanical, contextual and editorial advice.

To **Mareile Paley** for her invaluable assistance in layout and presentation and to **Jon Coe** for the cover illustration and frontispiece.

FOREWORD

Every year in Afghanistan it has been clear to me and my colleagues in the National Environmental Protection Agency, that not enough knowledge or information in book format exists in a clear and practical manner that handles the important subject of environmental resilience, forage and fodder crops. Knowledge about our native plants is incredibly important and useful as crops and as part of livestock system, for providing ecosystem services and for sustaining life in the harsh and beautiful landscapes that make up the Islamic Republic of Afghanistan.

For all our grasses and clovers, field roots, forage or fodder plants, imparting knowledge about their critical relevance to the environment and development of this country is vital at this critical period in our nation's history.

This book should provide interesting and instructive to field students, extension officers, amateur botanists, community leaders and field project managers everywhere. I take considerable satisfaction in the thought that more and more young Afghan environmentalists are emerging and sharing natural science experience with all our citizens.

Today facts about our wonderful natural heritage are more important than ever, and this series of introductory guides on resilience and environment leads me to confidently look to the future, to more development of science and knowledge on the immense Afghan biodiversity resources, and their protection and understanding.

I would be pleased to hear from all those who read this book, as to how well it meets their views and needs.

Very truly,

A handwritten signature in black ink, reading "Mostapha Zaher". The signature is written in a cursive style. To the right of the main signature, there is a circular stamp containing the name "Mostapha Zaher" and some illegible text below it.

Mostapha Zaher Director-General
Kabul, March 21st 2014

PREFACE

Resilience

re|sili|ence /rɪ'zɪlɪəns/

“The capacity to recover quickly from difficulties; toughness:” Oxford English Dictionary, 2013

ENVIRONMENTAL RESILIENCE IN PASTORAL SYSTEMS:

BACKGROUND TO THE TRADITIONAL
USE OF FORAGE AND FODDER CROPS
AND PLANTS IN AFGHANISTAN

This illustrated Field Guide is intended to introduce field workers and project managers, as well as those generally interested in the rural development of Afghanistan, to the field crops and wild plants on which farming and pastoral families feed their livestock, particularly through the winter. These crops and plants are cultivated, grazed and gathered as part of closely integrated traditional, but adaptive and resilient farming and pastoral systems.

These traditional farming and pastoral systems, developed over many centuries in Afghanistan, have been forged and shaped by the country's harsh physical and climatic environment, as has the character and toughness of the people themselves. These have developed in a diversity of geographical, climatic and ecological conditions created by the mixed geology and topography of Afghanistan. They survive against all odds, subjected to many pressures of climate, geography and remoteness, the effects of increasing population on limited productive land and despite conflict, the lack of an enlightened government as well as the 'need and greed' that leads to the abuse of natural resources and environmental degradation. These systems survive just because they are so well adapted to extreme conditions, but they are threatened.

To these pressures should be added the consequences of misapplied, if well intentioned, international assistance, which has too often encouraged dependency rather than reinforced resilience. In some instances international assistance has actually eroded traditional coping mechanisms and increased vulnerability.

At first glance, to the perception of those coming from more ‘developed’ backgrounds, these traditional systems may appear to be primitive. On closer investigation they are often sophisticated, resilient, well adapted to the local conditions, as well as adaptable and open to adopting appropriate innovations, improvements and opportunities when these are perceived to be advantageous. Although under increasing pressure, these farming and pastoral systems survive and constitute an important part of the coping mechanisms that enable the Afghan rural population and their livestock to survive the challenging conditions in which they live. Too often ignored and even despised as backwards, or outdated, the true worth of these systems needs to be better understood, supported and taken into account in all aspects of rural development and environmental impact assessments in Afghanistan.

This illustrated guide is aimed at introducing teachers, students, field workers and managers to both the cultivated crops and wild fodder and forage plants that contribute to these often complex systems. It is noteworthy that many of the important crops that are an integral part of these systems date back some 10,000 years to the very beginnings of crop husbandry and the domestication of grazing animals during Neolithic times. Their usefulness has stood the test of time as essential components of the traditional local farming/pastoral systems that continue to be practiced to the present day.

The most ancient of cultivated grain crops, wheat and barley (especially wheat), form the basis of all Afghan cropping systems, feeding both the human population and their livestock at all altitudes from 150 to 3,000 metres above sea level (asl). Wheat bread is the staple human food of the country. Everywhere in Afghanistan, wheat straw makes up the bulk of all dry fodder fed to cattle, sheep and goats as well as horses and donkeys during the winter months. In addition, other ancient ‘founder’ crops still play a significant part in Afghan traditional farming/pastoral systems both for feeding the human population as well as their livestock. Significantly these legumes, pulses and oil seed crops are cultivated in rotation with grain crops. Among the most ancient are: green lentil (*Lens culinaris*/Dari: *nask/adas*), field pea (*Pisum sativum*/Dari: *mushung*), chickpea (*Cicer arietinum*/Dari: *nokhod*), bitter vetch (*Vicia ervilia*/Dari: *shokhal*), and flax (*Linum usitatissimum*/Dari: *zargher*). Almost as ancient are broad bean (*Vicia faba*/Dari: *baqla*) and the grass pea (*Lathyrus sativus*/Dari: *kalul* (Central), *patak* (N.East)) and that most important perennial green fodder legume, lucerne/alfalfa (*Medicago sativa*/Dari: *rishqa/serbest* (in Herat), *yonjeh* (in Iran)). Like wheat, lucerne/alfalfa is cultivated at all altitudes in Afghanistan and forms part of most cropping

systems where livestock are raised. Many of the legumes and pulses are particularly well adapted to the higher altitudes.

Lucerne/alfalfa is thought to be the most ancient cultivated fodder crop. The origins of its cultivation date back to before recorded history, probably coinciding with the domestication of sheep, goats, cattle and later horses¹ and their need for quality winter fodder. Also of ancient, but obscure, historical origin is the widely cultivated, and sweet scented annual Persian clover (*Trifolium resupinatum*/Dari: *shaftal*). When green and tender in the spring it may be cooked (like spinach) and is relished in the spring by the rural populations where it is grown.²

All these crops have been cultivated in the Afghan valleys since ancient times, and if not exactly within their centres of origin at least very close to where they were originally cultivated in the near east (the Fertile Crescent and the Anatolian and Iranian plateaux).

Mung bean (*green gram/Vigna radiata*/Dari: *maash*) is widely cultivated as a summer crop where it fills a significant place in irrigated cropping systems up to about 1,800 metres asl. Mung bean usually follows autumn sown wheat as a summer crop in conjunction with maize and rice. Mung is thought to have its origin in Mongolia where its wild progenitor is found and was being cultivated in the Indus valley and other parts of India between 4,000 and 4,500 years ago. It undoubtedly spread from there to what is now Afghanistan at least 2,500 years ago.

Another early addition to these crops was sesame (*Sesamum indicum*/Dari: *konjed*), which was first cultivated about 3,000 years ago in the middle east and western Asia as a valuable oil crop.

From the earliest times the farmers in the valleys of the Hindu Kush have been quick to adopt new crops that have proved to be useful and suit the conditions, needs and markets, and have included them in their cropping systems, without hesitation. Over the centuries this has included equally ancient crops such as

¹ The great war horses of Ferghana in Central Asia (now split between Uzbekistan, Tajikistan and Kyrgyzstan) for which Chinese Emperors sent armies to collect were said to have been fed from the rich crops of lucerne cultivated in the valley.

² In the Panjshir valley, the villagers inhabiting the lower valley where Persian clover is widely cultivated often undersown in the barley crop, are locally known as the *shaftal khor* or clover eaters and those inhabiting the upper (higher altitude) valley as the *baqla khor* or broad (faba) bean eaters.

Asiatic rice (*Oryza sativa*/Dari: *shali*), and mustard (*Brassica spp.*/Dari: *sharsham*), first cultivated in China and India³ in Neolithic times and spread to what is now Afghanistan many centuries ago along the trade routes.

Representing another ancient crop, 'Common' or 'Proso' and 'Foxtail' millets (*Panicum miliaceum* and *Setaria italica*/Dari: *arzan*) are both cultivated in Afghanistan, having found their way to the Hindu Kush valleys in very ancient times from China where millet has a history of cultivation going back to Neolithic times. These types of millet had found their way as far as the Black Sea about 7,000 years ago, so probably reached the Hindu Kush earlier than that. Of less importance as a human food crop than previously, millet is still cultivated as a human food grain in the poorer, remoter parts of Badakhshan and Nuristan. In many lowland locations in eastern and northern Afghanistan and elsewhere, millet is cultivated as a commercial crop for feeding caged song birds, fighting partridges (*Alectoris chukar*/Dari: *kawk/kabk*) and quail (*Coturnix coturnix*/Dari: *bilderchin*). The straw provides fodder for livestock.

Cotton (*Gossypium hirsutum*/Dari: *pakhta/pomba*) which was being cultivated in the Indus valley (Harappa) over 3,000 years ago, may have arrived in what is now Afghanistan with the Arabs in the 7th or 8th century, possibly earlier. Cotton cloth was certainly being produced in the Helmand valley (Bost), Herat and Kabul by the 10th century of the present era. In modern times cotton cultivation was the driving crop for the development of irrigated farming in the lower Kunduz and Helmand valleys in the late 19th and 20th centuries.

Even the opium poppy (*Papaver somniferum*/Dari: *koknar/taryoq/apin*), itself a very ancient cultivated crop dating back over 4,000 years in the eastern Mediterranean basin⁴, has been cultivated in the Hindu Kush valleys for at least 2,500 years. Legend relates that it was introduced by Alexander the Great's Greek soldiers. More probably it had already traveled east down the trade routes during the time of the Achaemenid Persian Empire (550-330 BCE), which effectively connected central Asia with the eastern Mediterranean. Its attraction was both medicinal and mystical. In addition, the seed and quality of the oil produced

³ Both lay claims, with possibly the China having the best claim to have been the first place that rice was cultivated, also in Neolithic times.

⁴ Wild poppy seed capsules have been found in caves dating from Neolithic times, and in Minoan Crete (3,500 to 4,000 years ago), there was even a female deity of the opium poppy.

from the seed is highly regarded and is not narcotic; the dried stalks are a useful fuel for bread ovens in locations where suitable fuel is in short supply. Poppy is itself a useful short season crop that fits well into small farmer multicropping systems and rotations. Although, of minor significance for feeding livestock in comparison to its (illegal) value as a narcotic crop, opium poppy does provide some seasonal green forage from weeding and thinning and where the seed is pressed for cooking oil, as in Badakhshan, it also produces high quality animal feed.

With the European discovery and colonization of the Americas in the 15th and 16th centuries, new crops started to find their way into what is now Afghanistan along the trade routes from India to the south and from the west via the Mediterranean through the Ottoman and Persian Empires to the lands ruled by the Mughals and the Central Asian Khanates. Maize (*Zea mays*/Dari: *jowari*) has long been established as an important human subsistence crop as well as providing fodder for livestock in much of irrigated Afghanistan up to about 1,800 metres asl in all areas where a summer crop is possible.

It is probable that short duration (early maturing) 'flint' type maize found its way eastwards from Europe within a short time of it reaching the Mediterranean. By the mid 18th century, it is likely to have already been well established as part of the farming systems in the Hindu Kush valleys. Early maturing 'flint' maize of distinct early maturing (80/85 days) local ecotypes could still be found in the more isolated valleys in the Paktia mountains and elsewhere in the early 1990s. Since then cross pollination with 'improved' varieties introduced under various aid/development programmes has brought about changes in characteristic in most locations. 'Dent' type maize found its way to Afghanistan in more recent times, possibly via British India and later from international sources (FAO/CYMMIT etc) as part of development programmes.⁵

In the same way, in the course of time, other New World crops such as tobacco, sunflower, squash and the Phasaeolus bean (Dari: *lubia*) of several types, found

⁵ Correspondence with Dr John Stevens PhD, previously a maize breeder with the CIMMYT programme in Pakistan and later part of the FAO Afghan team between 1988 and 1993. Undoubtedly maize was also brought to India by Portuguese traders and Jesuit missionaries as early as the 16th century. However, there is now strong evidence that maize of various types had already found its way to parts of Africa and Asia (India and China) prior to Columbus's 'discovery' of the New World and European settlement (ref M.D.W. Jeffreys et al), which raises the interesting question of pre-Columbian contact between the Old and the New Worlds.

their way into the cropping systems of Afghanistan, some of those valued for feeding both humans and livestock are featured here.

Other crops of New World origin such as the potato, the tomato, the aubergine, all are now well established in Afghan cropping systems and diet, as well as the peanut (*Arachis hypogaea*/Dari: *mumpali/badam-e zamini*). These crops have entered the Afghan cropping system and diet either by way of India and Persia (Iran) or more recently as part of international development programmes.

Some reference is made to very recent crop introductions that have a potential for feeding livestock. These new introductions are meeting with more or less popular acceptance depending on how well they fit into and enhance local needs, farming systems and markets. Among these are berseem clover (*Trifolium alexandrinum*), fodder oats (*Avena sativa*/Dari: *yulaf*) and sorghum (*Sorghum bicolor*/Dari: *bajera*).

Among oil seed crops, safflower⁶ (*Carthamus tinctorius*), a crop cultivated in India for many centuries, appears to have been largely unknown to Afghan farmers until very recently. Safflower is increasingly being cultivated, mainly in northern Afghanistan.

Both oil seed rape/canola (*Brassica napus*) and soya bean (*Glycine max*) have been quite aggressively introduced in recent years under some development programmes. Although reasonable yields have been obtained, there remain unresolved issues of marketing and the absence of an industrial base to guarantee the purchase and processing of the crop. To date there has been little general popular acceptance of these crops, unless heavily subsidized by foreign donors.

Most of the crops mentioned above are valuable sources of livestock fodder either as the primary purpose of their cultivation as a fodder crop such as lucerne/alfalfa, clover, vetch or grass pea, or as a by-product of a grain, pulse or oil seed crop in the form of straw, stover or oil-seed cake (Dari: *konjola*). Even dried potato haulms (in Bamyan) and the fallen leaves from the orchards and vineyards are gathered for feeding livestock in the autumn and winter months.⁷

⁶ 'Unknown' to the extent that many Afghan farmers in the early 2000s ignorant of the crop have been 'palmed off' by crooked seed salesmen with over priced safflower seed sold to them as 'saffron' seed and persuaded they would make their fortunes! (Observed by the author).

To these cultivated crops are added a wide variety of wild or feral plant species which are gathered from the fields, wastelands and mountainsides as fodder or forage for livestock. This gathering has been carried out for centuries, usually in an entirely sustainable fashion. This is in contrast to the gathering of woody perennials for fuel (such as *Artemisia spp.* and *Ephedra spp.*) which are usually and destructively up-rooted. Weeds are everywhere gathered from the growing crops and usually fed as green forage.

Some of the wild species gathered for fodder are surprising in so far as they are very spiny (e.g. *Cousinia spp.*), or unpalatable, even poisonous whilst green and sappy, although entirely acceptable as winter fodder when dry. These include the widely used Afghan Hogweed (*Heracleum afghanicum*/Dari: *baldarghan*, *baldargho*), and a whole variety of species including *Ferula*, *Prangos*, *Centaurea*, *Rheum*, *Astragalus*, and *Winklera spp.* to mention a few. Some of these species still require correct classification⁸. A selection of these wild plants used for fodder are presented in this introductory guide.

For those who have been associated with the lives of rural Afghans over many years, the resilience of the rural population – their ability to survive and recover from repeated disasters both natural and those induced by human folly – remains a matter of constant admiration and wonder. Whilst not wishing to underestimate the gravity of the socio/economic problems faced by many rural families, as recorded in many studies, the ability of Afghan rural society not only to recover from repeated shocks but to innovate and adapt is astonishing. As remarked by a number of experienced observers, and taking account of everything that has happened over the past thirty years and more, it is remarkable that the situation is not a great deal worse than it is.⁹

⁷ Afghanistan boasts ca.1200 plant species that are 'endemic' to the country (i.e. found no where else, reference Checklist of the Vascular Plants of Afghanistan: Breckle, Hedge, Rafiqpoor (2013)., The Hindu Kush and adjoining ranges being particularly rich in endemic species, many undoubtedly still waiting to be identified.

⁸ Some may even be endemic to the country. In which case the link between plant species, conservation, sustainable use and fodder crops/livelihoods is very relevant.

⁹ Pain A et al. 2007. *Reconstructing Agriculture in Afghanistan*. FAO and Practical Action, Rugby

PREFACE

Too often aid and development assistance has been based on recipes imported from elsewhere or on models which suit the donors' perceptions rather than the real needs of the situation. Too often 'indigenous' systems are perceived by donors and the international development fraternity to be faulty by definition: irrelevant at best, harmful at worst and not worthy of closer study. In the past too little heed has been taken of the 'resilience' of local coping mechanisms or the importance of understanding how they work or in what ways they might be strengthened and reinforced in the interests of sustainability and the avoidance of dependency.

In the mainly subsistence character of the Afghan rural economy, farming and pastoral systems are closely integrated and the relationship between the two is naturally symbiotic. Where resources are limited nothing can afford to be wasted.

For clarity of presentation this introductory field guide is set out in six sections, each dealing with a different category of crop or plant as for instance: 'grain crops'; 'legumes and pulses'; 'oil seed crops' and so on. It should not be forgotten that the crops and plants so divided into different categories in fact occur as part of closely integrated farming pastoral systems which vary according to location. Some such as wheat and lucerne form components of almost all farming systems at all altitudes. Others are more specific to particular systems, as for instance those found in the highland, sub-alpine valleys. Some are even more location specific. This is noted in the description of each crop and plant. Through encouraging a better understanding of these sources of fodder and forage, and the resilience of the systems of which they are part, it is hoped that appropriate programmes can be developed to strengthen and improve them.

Emphasis is placed in this Field Guide on the significance of the traditional/resilient systems into which these crops and plants fit so well, and the importance of conserving the ancient Neolithic founder crops that are such an important part of them. The conservation of both wild and endemic plant species cannot be separated from the pastoral and livelihood systems of which they are an integral part. The need for more understanding of these systems and how they might be encouraged, restored and built upon to increase productivity, sustainability and the quality of rural livelihoods cannot be overstated. These founder crops, whether originating in the Old World (both west and east) or in the Americas, are the basis of much of agriculture world wide. Their loss along with the systems in which they have developed would be a tragedy. This is particularly true in

a commercial agricultural world that increasingly and dangerously places emphasis on mono-cropping certain commercial crops at the expense and virtual exclusion of traditional mixed cropping.

It is worth referring to the relevant targets of Global Strategy for Plant Conservation (GSPC, summarized below).

Global Strategy for Plant Conservation (GSPC) Summary of Relevant Targets

Target 9:	70 percent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous local knowledge.
Target 12:	All wild harvested plant-based products sourced sustainably.
Target 13:	The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.
Target 15:	The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy.

HOW TO READ THIS GUIDE

The Introductory Field Guide is divided into six sections by subject.

1 Section One deals with the by-products (straw and stover¹⁰) derived from the main grain crops: wheat, barley, maize, rice and millet.

This section includes all the main grain crops cultivated for human consumption and also some for feeding livestock. The straw and stover of these crops, in particular wheat, comprise the main source of dry fodder for livestock.

3 Section Three deals with oil seed crops.

In addition to producing useful vegetable oil for human consumption, the residues and by-products, such as oil-seed cake (*Dari konjola*) as well as the stover, are highly valued as livestock feed. They also form an important component of small farmer cropping systems.

2 Section Two deals with cultivated legumes and pulses.

This section includes both crops primarily cultivated to feed livestock and those cultivated primarily for/or with the dual purpose of providing human and animal food but which provide useful by-products in the form of straw/stover.

4 Section Four deals with the more opportunistic by-products of the cropping systems, such as weeds and grasses.

These are commonly gathered from the growing grain and other crops and provide a useful supplement for feeding domestic livestock with green forage during the spring and summer months.

¹⁰ Stover – the coarse dried stalks and leaves of crops such as maize after harvesting the grain

5 Section Five deals with sources of wild (natural) forage, fodder/hay meadows, seasonal pastures, field boundaries and gardens.

6 Section Six deals with the wide (sometimes surprising) variety of wild plants in the late summer and autumn, from the fallow and waste land, mountain slopes and plains that surround the rural villages.

In many situations these plants comprise a vital addition to fodder produced from cropping systems. Without these additional natural sources of fodder, it would be difficult if not impossible for many mountain communities to sustain their livestock through the long months of winter. While woody species such as *Artemisia spp.* and *Ephedra spp.* are uprooted in an unsustainable fashion for fuel, these perennial plants collected for winter fodder are gathered when mature and almost dry. They are cut above the surface of the ground leaving the root systems intact, to grow again the following season.



INTRODUCTION

TO FODDER AND FORAGE DISTRIBUTION IN FARMING SYSTEMS IN AFGHANISTAN

Wheat (and barley) straw comprise the main source of winter fodder for livestock throughout the whole of Afghanistan wherever there is both irrigated and rain-fed cultivation. Perennial lucerne/alfalfa¹¹ (*Medicago sativa*) and annual Persian clover (*Trifolium resupinatum*) are also grown throughout the country at almost all altitudes, wherever there is at least a minimum of irrigation water. These two fodder crops are common to almost all farming systems in which livestock are a feature. They are the most significant cultivated fodder/forage legumes cultivated in the country. Rain-fed/dryland lucerne cultivated without irrigation is also an important feature of many highland locations.

The location of other crops which contribute as sources of livestock feed and forage are dictated by such factors as altitude and the availability of irrigation water. For instance, maize, rice, cotton, and mung beans are all irrigated crops which are not cultivated much above 1,800 metres asl.

Other annual legumes and pulses, more characteristic of the high mountain valleys above 2,000 metres, are valuable sources of winter fodder as well as contributing to small farmer food security and essential crop rotation. These include beans (of different species): vetches (*Vicia spp.*), grass pea (*Lathyrus sativus*), field pea (*Pisum sativum*), and lentils (*Lens culinaris*). These crops occur as part of traditional and often sophisticated subsistence cropping systems that balance the requirements of both human and animal nutrition with the fertility of the soil. Too often overlooked and undervalued, these grain, pulse and legume systems also include more recently introduced crops such as potatoes and onions. They are still commonly found in the highland sub-alpine valleys of the Hazarajat, Ghor, Baghlan, Panjshir, Takhar and Badakhshan.

¹¹ The British/European term of *lucerne* rather than the North American *alfalfa* is used in this field guide for this most important of fodder plants – *Medicago sativa* – whose centre of origin lies between eastern Turkey, Iran and Central Asia. This is from personal habit and preference. North American readers of this guide will please forgive me.

Other crops contributing to both human and livestock feed are more confined to the lower and medium elevation rain-fed plains and foot-hills, mainly in the north, and north east. These include dryland crops such as flax (linseed), sesame and chickpea.

The field guide includes weeds gathered from the growing crops, straw, crop residues and the by-products of cultivation, as well as wild forbs and grasses gathered from the margins of the cultivated land, fallow land, gardens, meadows and the plains (Dari: *dasht*) and mountains surrounding the villages. Even the dried haulms from the potato crop are carefully gathered and stored as winter fodder. The fallen autumn leaves from orchards and vineyards are fed to livestock.

An interesting selection of wild plants are gathered for winter fodder. Some account is given in this field guide of a sample of the more significant of these. Although incomplete, this is intended as an introductory guide. Unfortunately it has not been possible to obtain an analysis of feed values.

The field guide provides descriptions of location, usage and the type of cropping system in which each plant is found. Where positive botanical identification of a species is in doubt, the *Genus* is given with the designation of sp. (species name not known). Local names are given with the understanding that these vary both in form and pronunciation from one region to another, from location to location even from valley to valley as well as from one linguistic group to another. The names given here are mainly in one or other of the regional Persian dialects.

Cultivated grain, pulse and oil seed crops – general comment

Grain (barley and maize) and pulses are fed to both sedentary as well as transhumant/migratory livestock. Milk cows, working oxen, baggage animals, as well as pregnant and milking ewes and animals in poor condition or being fattened may be fed grain, pulses or oil seed cake (Dari: *konjola*), if available and affordable. Grain or pulses may be grown 'on farm', purchased or exchanged with neighbours for other agricultural produce, for instance wheat grain. When fed to cattle, barley and pulses are fed as meal, usually mixed with chopped and dampened wheat straw. Sheep, donkeys and horses are fed whole grain. Barley is held in the highest esteem for feeding all stock.

Certain pulses, particularly field pea, are preferred for working oxen, except during hot weather. Barley can be expensive. Maize or pulses may be cheaper.

INTRODUCTION

In poor communities barley and maize grain are also consumed by the human population.

Whilst maize grain is commonly consumed by the human population, it may be cultivated as a commercial grain crop. This is often sold to the nomadic pastoralists (Dari: *maldar/kuchi*) who winter on the plains. Maize is most commonly fed to livestock in the form of green forage or as stover (the dried stalks and leaves) which must be chopped. Maize stover is also used as fuel. In some locations, such as the Paktia valleys, a later sown crop of maize (known as *garma*) may be cultivated purely as a green forage crop. However, in the case of early sowings of maize (known as *sarda*), the seed rate is usually rather generous. The crop is regularly thinned throughout the growing season for green forage, the final stand being allowed to mature as a grain crop.

Oil seed residue of all kinds is held in high regard, but is expensive, in limited supply and fed sparingly. Baggage animals such as camels and donkeys are fed grain only when working and only in the cool weather.

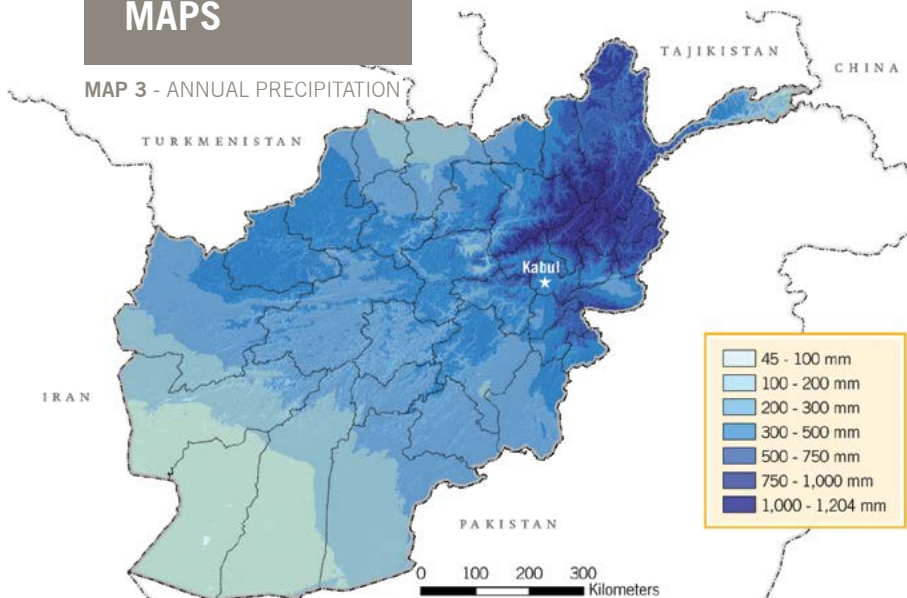
Whilst wheat straw is the most widely fed dry fodder, it is usually supplemented with 'cut and carried' green forage or dry hay. Hay is made from legume crops such as lucerne/alfalfa, clover or natural grasses (Dari: *alaf-e khodra*) cut from water meadows (Dari: *tala*), field boundaries, banks and orchards. Residues such as the straw from pulse crops and even the dry haulm from the potato crop and the pressings from vegetable oil production are all used. Nothing is wasted including the weeds gathered from the growing crops and the fallow land. In many mountainous areas, winter fodder is supplemented by the collection of various wild grasses and plants gathered from the surrounding mountains and hay cut from natural meadows (Dari: *chaman*).



Stall fed stock // Zala Qala, Khwaja Umari, Ghazni, in November

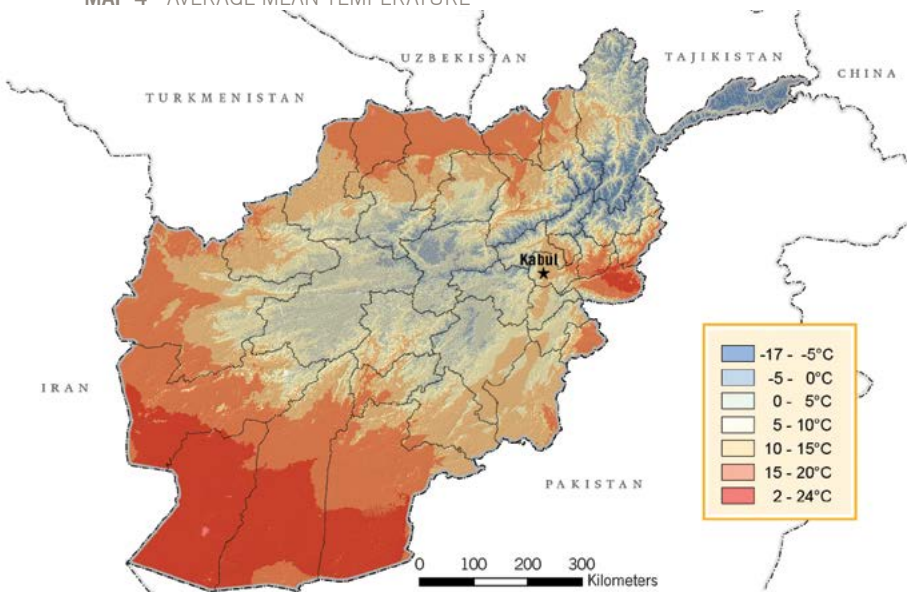
MAPS

MAP 3 - ANNUAL PRECIPITATION



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MAP 4 - AVERAGE MEAN TEMPERATURE



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1

GRAIN CROPS

Latin:

Triticum aestivum L.

Wheat ~

Dari: *gandom*

Pashto: *ghanum*

Wheat straw ~

Dari: *kah* or *kah-e gandom*

WHEAT

(GRAIN AND STRAW)

Wheat is the most widely grown crop in Afghanistan ranging from the lowest altitudes to about 3,000 metres asl, cultivated both as an irrigated and as a rain-fed crop. Wheat grain is generally not fed to livestock although small and broken grain is fed to poultry. The bulk of dry fodder fed to cattle and small stock is in the form of chopped wheat straw. After the wheat is harvested the stubble provides a major contribution to grazing in the late summer and autumn. It is no exaggeration to say

that the sedentary livestock economy is largely dependent on wheat production. Even the transhumant and nomadic flocks benefit from seasonal stubble grazing in the late summer and autumn and straw purchased from the settled population in the winter. The straw of local landraces of wheat (known as *kah-e-safid*, i. e. white straw) from rain-fed/dryland (Dari: *lalmi/dayma*) wheat is considered to be superior from a fodder point of view to that of the higher yielding improved varieties of irrigated wheat, which is coarser. This has to be balanced against the need for high grain yields, greater resistance to diseases such as rust and smut and to lodging to which the older types of wheat are prone. Nonetheless, whilst high grain yields, household food security and bread making quality are important factors considered by a farmer when deciding what type or variety of wheat to grow, straw quality as fodder is also extremely important and cannot be ignored.

¹² It should also be noted that wheat straw has a high value as an essential component of traditional mud building (*kahgel*).

¹³ 'Rogued' in this context means the process of collecting the weeds and also off types by hand from the growing wheat crop.

The market value of straw can sometimes match that of grain¹² and some local tolerance of weeds in a wheat crop has to be understood in the context of the fodder value it may add to the straw. These grasses and other weeds are often rogued¹³ out of the wheat crop anyway before harvest and fed to the household stock. In some locations these weeds have a value that makes them worth harvesting separately. (See Page 81. wild white cumin)



Two *lalmi* rain-fed local land-race-wheat // Badakhshan, September (left), Pushtun Zarghun, Herat, in June (right)



A very good crop of *lalmi* rain-fed wheat
(local name *hazar-danna*) //
Dasht-e Kandari, Aliabad, Kunduz, in May 2003

GRAIN CROPS

WHEAT (GRAIN AND STRAW)



Irrigated wheat
(variety *Rowshan*)
// Khanabad,
Kunduz, in May



Improved irrigated 'winter' hardy wheat
(variety *Pamir 95*) // Panjab, Bamyan, in Sept.



Reaping // Badakhshan, Warduj, in July



Stacking // Herat, Pushtun Zarghun, in June



Threshing old style and new style (Batala thresher from Pakistan) // Bamyan, Kahmard, in July



Collecting wheat straw // Pushtun Zarghun, Herat, in August



Storing wheat straw
// Herat, Pushtun
Zarghun, in August

GRAIN CROPS

WHEAT (GRAIN AND STRAW)



Traditional straw stack // Waras, Bamyan



Fodder store: lucerne hay (on top) & wheat straw (below) // Khwaja Umari, Ghazni



Village sheep grazing wheat stubbles // Pushtun Zarghun, Hari Rud valley, in July
Note: stubbles are customarily open for grazing the village livestock after harvest.

Latin:*Hordeum vulgare L.***Dari:***jaw, kah-e jaw*
(barley straw)**Pashto:***wurbasha***BARLEY**

(GRAIN, STRAW AND GREEN CROP)

Like wheat, barley is cultivated at all elevations and found, to some extent, in all cropping systems. It is considered to be the superior grain for feeding livestock, and barley straw is considered better than wheat straw as fodder. As barley grain is usually in comparatively short supply, it is expensive and fed sparingly to working oxen, milking cows and breeding sheep

in poor condition or those being fattened for sale or slaughter. In many high elevation settlements in the central and eastern highlands (Ghor, the Hazarajat, Baghlan, Takhar, Badakhshan) where food is scarce, barley grain is also cultivated for human consumption and cannot be spared for animals.



An exceptionally good crop of rain-fed *lalmi* barley // Ganj, Rustaq, Takhar, in June 2012



Reaping barley // Ghor, September



Winnowing barley // Sarhad, Wakhan, October

Note on barley as green forage *jawtarosh*:

In many parts of Afghanistan barley is cultivated specifically for green forage (Dari: *jawtarosh*) rather than for grain, for feeding milking cows and also small stock. Green barley may be grazed, but is more usually 'cut and carried'. In Nangarhar, Kunar, Laghman and other locations, barley is commonly sown mixed with clover seed. After the barley is harvested the clover crop comes away as a green forage or hay crop. In lower elevations barley may be sown in the autumn for cutting green in the early spring. In higher elevations, such as in Ghazni and Wardak for instance and also in Herat, barley is commonly sown in the summer for cutting or grazing as a green crop in the autumn (Dari: *tir-e mah*) when no other green forage is available.



Terraces of green barley (*jawtarosh*) for autumn forage
// upper Khwaja Umari valley, Ghazni



Green barley for fodder // Pushtun Zarghun district, Herat



Green barley (*jawtarosh*) being cut for forage // Khwajar Umari valley, Ghazni

Note on 'Fodder' oats (*Avena sativa* L., Dari: *yulaf*)

In recent years a number of programmes (FAO and others) have introduced fodder oats as a green 'cut and carry' forage crop. In the case of FAO this has been associated with the Dairy Cooperative projects being supported in Kabul, Balkh, Kunduz, Herat and Nangarhar. The practice has still to be generally adopted by the wider farming population. Although fodder oats are proving popular in the locations where they have been introduced, the seed is not yet generally available and is mainly being marketed through the dairy cooperatives. More extension work is needed. There are positive examples from the region. For instance, fodder oats have been successfully adopted by small farmers in the Pakistan highlands, particularly in Pakistani Kashmir. Fodder oats have the potential to fit into the niche traditionally filled by the cultivation of green barley with the potential to produce a considerably higher yield of green forage.

**Fodder oat seed
for sale by the
FAO supported
Nangarhar Dairy
Cooperative Feed
Mill // Hadda,
Jalalabad, Sept.
2013**



Note: Wild oats (*Avena fatua*) and wild rye (*Elymus* spp.) are commonly rogued out of a wheat crop and fed green to livestock. These weeds are often deliberately left with the wheat to enhance the feed value of the straw. This is a tradeoff between the need for grain, and the need for fodder. (see Chapter Five.)

GRAIN CROPS

Latin:

Zea mays L.

Dari/Pashto:

jawari, kah-e jawari

MAIZE

(GRAIN AND STRAW/STOVER)

Maize is cultivated from 150 metres asl to about 1,800 metres asl +/- depending on location, wherever there is sufficient irrigation water to cultivate as a summer crop. In much of Afghanistan, maize is cultivated as a grain crop for human consumption, milled and eaten as a form of corn bread. Maize is generally cultivated as a summer crop after wheat, and in conjunction with

other summer crops such as, mung beans, rice (if water is sufficient), cotton, and summer vegetables such as okra. In some locations a crop of climbing beans may be intercropped with the maize.

Maize has been long established in the cropping systems of Afghanistan having found its way east down the trade routes from the Mediterranean some time after being brought there from the Americas in the 16th century. White grain maize is preferred in some locations (valleys) and yellow grain maize in others. Traditionally these have been flint type maize with small cobs of varying colours, from purple, through yellow to white. The strong colour/taste preferences by the people inhabiting different valley systems is an indication of long local establishment.

In the medium elevation highlands (for instance in Paktia), short maturity (80/85 days) maize is preferred when being cultivated as a grain crop. Since the 1990s there has been much cross pollination with 'improved' varieties introduced as part of various development programmes. Although higher yielding with larger cobs, these improved lines have tended to be longer maturing and better suited to the lower elevations than to the shorter season of the higher valleys. The emphasis has been on introducing open pollinated synthetics as there has been no readily available local source of affordable hybrid seed. Subsistence farmers generally plant their own farm saved seed and cannot afford to buy replacement seed every year.

A generous seed rate is customarily planted. The maize crops are assiduously thinned throughout the growing period and the green crop fed to cattle. Heavy

seeding rates are also an insurance against cut worm, which can be a problem¹⁴. After thinning the remaining plants left to mature as a grain crop are spaced at about the correct plant density.

In some places maize may also be cultivated specifically to be cut as a green forage crop. For instance in the Paktia, Logar, Wardak valleys up to about 1,800 m asl the early sown maize crop, known locally as *sarda*, i.e. sown in the cool weather, is the one from which a grain crop is taken. A later *garma* or warm weather crop of maize is planted only for green forage.

After the grain harvest, the dry stover may be chopped and fed as a coarse winter fodder for cattle or used as fuel for bread ovens (Dari: *tandor*). This pattern is followed throughout many of the traditional maize growing areas of Afghanistan including Parwan, lower Panjshir, Kunar, Laghman, Nangarhar, Paktia, Paktika and Khost. In some provinces such as Helmand, Kandahar, Kunduz, lower Takhar, Nangarhar and Laghman, some farmers cultivate maize as a commercial grain crop for sale to cattle owners as well as to the *kuchi* nomads and transhumance pastoralists who winter in these areas. Maize grain in such locations may be cheaper than barley.



Maize // lower Panjshir valley



Maize crop // Helmand, Nahr-e Saraj, August

¹⁴ As a protection against cutworm it is customary to boil the gum extracted from the *Asafoetida* plant, (*Ferula asafoetida*) known locally as *hing* and feed the resulting infusion into the water irrigating the maize.

GRAIN CROPS

MAIZE

(GRAIN AND STRAW/STOVER)



Maize stover for fodder // Baticot, Nangarhar, in November



Local 'ecotype' short maturing 'flint' maize cobs being hulled // The stover will be stored and later chopped for fodder as well as fuel. Sayed Karam, Paktia, in October

Latin:

Oryza sativa L.

Rice - the crop ~

Dari: *shaali*

Rice straw ~

Dari: *kah-e shaali*

Pashto: *shawla*

RICE

(STRAW)

Although rice straw is rated lower in feed value than wheat or barley, it is used as fodder as well as for bedding wherever the crop is cultivated. For instance, the *kuchi* who spend the winter in Laghman¹⁵ feed their stock (sheep, goats, cattle and camels) on rice straw procured from local farmers as well as on wheat and pulse straw. Rice straw is more acceptable to cattle and

camels than to sheep. It is chopped and often mixed with wheat, pulse straw or lucerne hay. Rice straw is also used for fuel and for building (mixed with mud for sun-dried bricks (Dari: *khesht*) and mud/straw mortar (Dari: *kargel*). Rice stubble is also grazed by both village livestock and rented to transhumance pastoralists and *kuchi* herdsmen prior to being cultivated for the next crop.

¹⁵ The Khomarikhel-Ahmadzai *kuchi*



**Rice stubbles
being grazed //
Harirud Valley,
Pushtun Zarghun**



Rice straw stacks // Laghman



***Kuchi* camel collecting rice straw //
Laghman, in December**

GRAIN CROPS

Common (or Proso) millet/Foxtail millet

Latin:

Panicum miliaceum L./
Setaria italica L. P. Beauv.

Dari/Pashto:

arzan

MILLET

Two types of millet are cultivated – Common (Proso) millet and Foxtail millet. As with other grain crops the straw (*kah-arzan*) is fed to livestock. Millet was previously more widely cultivated in Afghanistan than at present. In many remote highland locations where millet was once the dominant food grain, it has been replaced in recent years by new varieties of wheat and barley. Millet is still cultivated

as a human food in the remoter mountain valleys in Nuristan and Badakhshan. It is also cultivated as a cash crop in Nangarhar, Laghman, Kunduz, Takhar and elsewhere specifically for the cage-bird market (song birds, partridges and quail).



Foxtail millet (for bird fanciers) //
Sorkhrud-Nangarhar, Panjshir valley



Common millet

Note on Sorghum (Latin: *Sorghum biclor*, Dari: *bajera*) In Afghanistan sorghum is cultivated to a very limited extent, mainly in the northern provinces and mainly by peri-urban dairy farmers being supported by different agencies, including FAO, for cut-and-carry green forage. Sorghum is a comparatively recent introduction to Afghanistan under FAO and other programmes. The limited availability of seed is a problem and because the seed has generally been from hybrid lines it has not been replicable by the farmers themselves. As yet there is no local source of hybrid seed apart from the agencies themselves and from Pakistan.

2

CULTIVATED LEGUMES & PULSES

As described in the preface, the traditional farming/pastoral systems in Afghanistan include a rich variety of legumes and pulses, many of them dating back to the very earliest development of settled farming before recorded history. They are of enormous importance as primary sources of feeding both the human population and their domestic livestock. They also fit well into traditional small farmer cropping systems and crop rotations enriching the soil as well as providing a wonderful source of honey for bee keepers. These are cropping systems that are wonderfully adapted to the difficult environmental situations in which they have developed and form an integral part of the coping mechanisms of a rural population living in harsh conditions. They need to be understood and where possible strengthened. Their loss and the crops that go with them would be a tragedy.

Latin:

Medicago sativa L.

Dari/Pashto:

rishqa

Herat: *serbest***Iran:** *yonjeh***LUCERNE**

(ALFALFA)

Lucerne/Alfalfa, is the most widely cultivated and highly regarded green fodder crop in Afghanistan, that has been cultivated in this part of the world since ancient times, predating recorded history¹⁶. It is used for feeding both cattle and small stock as well as horses and donkeys to which it is fed either green or as hay. Lucerne is cultivated from the lowest to highest altitudes

as a perennial irrigated crop and is part of a variety of farming/cropping systems wherever there are livestock to be fed. In some highland locations lucerne is

¹⁶ Ref. World Crop Series-Alalfa Botany Cultivation and Utilization J.L.Bolton B.S.A., M.Sc. and others. Many species of wild *Medicago* occur in the mountains of Central Asia and one theory suggests that Lucerne may have been seriously developed as a cultivated crop in the Ferghana valley (presently divided between Uzbekistan, Tajikistan and Kyrgyzstan) to raise the great war horses for which various Chinese Emperors sent armies to obtain.

grown as a rainfed/dryland crop without or with only minimal irrigation apart from snow melt.

The crop may be cultivated within walled enclosures close to or within family compounds or in open fields depending on the circumstances and location and is often intercropped between the rows of young fruit trees. Lucerne may be sown in the early spring or late autumn, depending on location and altitude. As a perennial crop it is usually grown on land not required for annual crops. 'Farm saved seed'¹⁷ is mainly used, but seed is also available in most rural bazaars.

Almost all available seed is of very local provenance. This has considerable relevance particularly where certain characteristics such as drought and cold tolerance and longevity and resilience under grazing pressure are required.

Some aid/development programmes, particularly those associated with dairy co-operatives, have introduced high yielding varieties of lucerne from Australia, New Zealand and the USA. Good results are reported particularly from lower elevations in Balkh, Kunduz, Herat and Nangarhar.

At lower altitudes between 150 to 1,500 metres asl, lucerne is usually cropped for between 4 to 6 seasons with from 4 to 8 cuts¹⁸ being taken in a season depending on altitude, soil quality and available irrigation water¹⁹.

At higher altitudes between 2000 to over 3,000 metres asl it is possible to find stands of lucerne that have been both cut and grazed continuously for between 10 and 20 (or more) seasons²⁰. In these high altitudes, only two or three cuts in

¹⁷ i.e. seed saved by the farmers themselves from their own crops.

¹⁸ For instance the well irrigated parts of Nangarhar near to Jalalabad, such as lower Surkhrud, and Behsud.

¹⁹ Some farmers in the well irrigated districts close to Jalalabad (Nangarhar) specialize in cultivating lucerne for sale to peri-urban dairy farmers or to the owners of cab-horses and transport donkeys. These farmers may exceptionally obtain up to 10 cuts of well irrigated lucerne. Some highland villages situated on the 'drove' roads along which sheep and goats are traditionally driven by itinerant stock traders or *choli* en-route to urban markets such as Kabul also specialize in cultivating lucerne for sale to these stockmen.

²⁰ On a mission to Waras in Bamyán (June 2012) the author was told of a stand of rain-fed lucerne that had been cropped continuously for 40 years!

a season may be taken from well irrigated lucerne, plus some early spring and autumn grazing.

In the highlands some local types of cold and drought tolerant lucerne are cultivated with little or no irrigation apart from snow-melt and rain. Known locally as *rishqa-e kohi*, i.e. mountain lucerne, these are in fact eco-types²¹ of the same species, i.e. *Medicago sativa*. As such they are a valuable source of seed for reclaiming worn-out destroyed range land or abandoned rain-fed cultivation.

Lucerne seed can be purchased in most rural bazaars, but is commonly collected by the farmers themselves from their own crop or obtained from neighbours. Development agencies when procuring lucerne seed for their projects would be well advised to procure seed directly from known sources and farmers from matching environments to where the seed is intended to be sown. Preferably these should be as close to the reclamation sites as possible. Seed sold on the open market, where its provenance cannot be verified, should be avoided. Great care should be taken not to collect or procure seed from stands of lucerne that are infested with dodder (*Cuscuta spp.*), which is a plague in some locations.

When made into hay for the winter, lucerne is usually tied in small bundles to prevent unnecessary leaf loss. The hay is stored in a number of different ways; in covered barns, in stacks in the open, and sometimes in open clamps capped with mud and straw. The hay is usually chopped and mixed with chopped wheat or pulse straw before being fed to livestock. The proportion of straw to hay varies, but is usually about 80% straw to 20% or less lucerne or clover hay depending on availability and the type of stock being fed.

²¹ A plant population of a particular species that is specifically adapted to a particular set of environmental conditions, and which therefore exhibits behavioural, structural, or physiological differences from other members of the same species. For instance in the case of the 'mountain lucerne' described above which is botanically still *Medicago sativa*, particular characteristics of cold and drought tolerance and/or tolerance to grazing pressure.

CULTIVATED LEGUMES & PULSES

LUCERNE (ALFALFA)



Lucerne hay (top) & straw (bottom) // Khwaja Umari, Ghazni



Lucerne hay clamp // upper Harirud, Ghor



Lucerne for green fodder // 4th cut Herat (left), 1st cut for hay, Panjab, Bامyاب, in June (right)



Goats grazing lucerne // Herat, Pushtun Zarghun, in May



Cutting lucerne hay // Ghor, in August



Mixed wheat and fodder (lucerne & clover) // upper Harirud valley, Ghor (left), Baharak plain, central Badakhshan (right)

In certain situations as in the well irrigated districts surrounding Jalalabad, lucerne is often cultivated as a cash crop to feed peri-urban dairy cattle, donkeys or cab horses.

Some mountain villages situated along the highland ‘drove’ roads and migration routes specialize in cultivating lucerne to sell to traveling livestock traders (Dari: *jalab*), drovers (Dari: *choli*) when they stop for the night at one or other of the simple hostelries or *saray*. These *saray* are located at approximately one day’s driving distance apart. Good examples of this can still be seen in Behsud and Panjab districts in Bamyan. As the condition of rural roads in the Hazarajat improves, this is changing as more livestock are transported by lorry.



The traditional way and the new way // on the old ‘drove’ road from the southern Hazarajat to Maidan Wardak, Saray e Zard Sang, Panjab district, Bamyan (left), Kabul via Behsud and the Jalrez valley, in June 2012 (right)

CULTIVATED LEGUMES & PULSES

LUCERNE (ALFALFA)



Rain-fed 'mountain' Lucerne (*rishqa-e kohi*)
// A 20+ year old stand, Khoshkak valley,
Bamyan. Note the spacing between plants
allowing for extensive root development and
drought resistance.



20 year old rainfed lucerne // Kotal-e Sad
Barg, Yakawlang, Bamyan



'Mountain' lucerne (without irrigation) // Zar Sang, Panjab, Bamyan, in June 2012



Dryland 'mountain' lucerne sown on 'protected' site, without irrigation // Bagh-e Hisar, Rustaq, Takhar, Aga Khan Foundation Programme, in June 2012

Latin:

Trifolium resupinatum

Dari:

shaftal

Pashto:

showdar

PERSIAN CLOVER

Persian clover (Dari: *shaftal*) has been cultivated since ancient times from Anatolia to Central Asia, including Afghanistan. It ranks second only to lucerne as the most highly regarded and widespread traditional fodder legume. As an annual crop, *shaftal* fits well into small farmer crop rotations and as a legume helps to fix nitrogen. Persian clover is fed to cattle and sheep and is cut both for green forage and

dried as hay, when it is tied into small bundles to prevent leaf loss.

In many places, fresh young clover is also cooked and eaten by villagers as a vegetable dish known as *saag*, served like spinach (Dari: *polak*)²³. Persian clover is an annual with a very sweet scented pink flower. It is also an excellent honey plant where bee keeping is practiced. Depending on location, altitude and water availability *shaftal* may be cut between two and four times in a season. More often no more than two or three fodder cuts are taken with the final cut kept for seed.

Persian clover may be cultivated in enclosures close to family compounds or in open fields, but always as part of a crop rotation. It may be cultivated as a full season crop or (in more intensive cropping systems) as a 'catch' crop for a green forage cut in the autumn. It fits well into a number of different cropping systems in widely differing situations from the high valleys of the Hazarajat, Ghor and Badakhshan to Parwan and the lower Panjshir valley and the lower altitude valleys of Nangarhar and Kunar. Several different ecotypes are found.

Depending on location, *shaftal* may be sown in the autumn or in the spring and in some situations is under-sown with a grain or pulse crop. Clover seed is sometimes sown together with barley or mung bean. After these crops have been harvested the clover is irrigated and grows on. Sometimes the seed is broadcast directly into wheat or rice stubbles as in the Kahmard valley in Bamyan.

²³ For instance in the Panjshir valley the villagers inhabiting the lower valley are known locally as *shaftal-khor* (clover eaters) as opposed to those in the upper valley who are known as *baquli-khor* or broad-bean eaters.

CULTIVATED LEGUMES & PULSES

PERSIAN CLOVER



Persian clover (*shafal*) // Bamyan, Yakawlang at almost 3,000 metres asl in the Sad Barg valley)



Persian clover, under-sown with barley // lower Panjshir, in September



Clover hay bundle // Pushtun Zargun, Herat

Clover hay store // Pushtun Zargun, Herat

Latin:

Trifolium alexandrinum L.

Dari:

shaftal-e misri

BERSEEM

(EGYPTIAN CLOVER)

A high yielding annual clover, originating in Egypt, berseem has been introduced to Afghanistan from Pakistan. Not being as cold tolerant as Persian clover, berseem is mainly found in warmer lower altitude locations such as in eastern and southern Afghanistan. Various agencies have been encouraging the cultivation of berseem in recent years and it has been successfully

introduced to the dairy co-operatives in Balkh, Kunduz, Herat and Nangarhar.



Berseem (*Trifolium alexandrinum*)



Berseem and fodder oat seed for sale by the Nangarhar Dairy Cooperative // Hadda, Jalalabad, in September 2013

Other cultivated legumes and pulses

In addition to lucerne and clover, a number of other legumes and pulses are widely cultivated in Afghanistan, particularly in the highland regions over 2,000 metres asl. Some of these fulfill the dual purpose of producing a pulse for human food, with the straw used as fodder for livestock. Some species are primarily cultivated to feed stock, both as a pulse and for the straw. Some of these fodder pulses, such as grass pea and vetches are also eaten by the very poor in situations of acute food insecurity (such as the Wakhan), but at considerable risk to health. The straw of most species of pulse/legume are considered superior to wheat straw, but not as good as clover or lucerne hay. All these crops are annuals and fit well into small subsistence farmer crop rotations and being nitrogen fixing they enhance the fertility of the soil.

CULTIVATED LEGUMES & PULSES

Latin:

Vigna radiata (L.)
R.Wilczek (previously
Phaseolus aureus)

Dari: *maash*

Pashto: *maiee*

MUNG BEAN

Green gram/Mung bean (*Vigna radiata*) has been cultivated in Afghanistan for many centuries and is widely grown as an irrigated summer crop at elevations up to about 1,800 metres asl, usually following a wheat crop and in conjunction with maize, rice and other summer crops as appropriate to the location. In some provinces such as Kunduz, parts of Takhar, Helmand, Kandahar, Nangarhar, Kunar and Laghman

mung bean is cultivated primarily as a cash crop for both the Afghan urban market and export to Pakistan and even India. Some Black gram (*Vigna mungo*/ Dari: *maash-e siah*) is also cultivated mainly for export to Pakistan, but is less significant. Mung bean is also cultivated as part of the local subsistence food economy. The straw of both pulses is valued as fodder for cattle and small stock, although ranking below lucerne and clover hay. In some locations, as in the Helmand valley, Persian clover (Dari: *shaftal*) is sometimes under-sown in the mung bean crop to grow on after the mung has been harvested.



Mung bean (*maash*) // Pushtun Zarghun,
Herat, in July



Mung bean and maize // Helmand, Nahr-e
Saraj, in July

Latin:

Phaseolus spp.

Dari/Pashto:

lubia

PHASEOLUS BEANS

Several species of *Phaseolus* beans are cultivated in Afghanistan, *P. vulgaris* being the most common. *Phaseolus* beans originate in the Americas. It is not certain when they were first introduced to Afghanistan, but they are now well established in many locations. Several different types are cultivated and fit well into small farmer systems. Beans are often cultivated between rows of fruit trees as in the

Wardak, Ghazni and Parwan valleys, or in open fields (as in lower Nangarhar). Climbing beans are often intercropped with maize up which the plants climb. They have been more recently introduced to the central Hazarajat by various aid and development projects.

In the Harirud valley, in Pushtun Zarghun district (Marabad/Buriahbaf villages), a yellow flowered white bean is popular. *Phaseolus* beans are usually stored as a dry pulse, but are increasingly being cultivated for sale as green beans when there is easy access to an urban market. In the districts close to Jalalabad (Behsud, Kama, Khiwa and Lower Surkrud) spring green beans are increasingly being grown for both the Jalalabad and the Kabul markets. Bean straw is valued as fodder for livestock.



Green beans for Kabul market // Kama, Nangarhar, in April



Beans for winter pulse // (Farmer field trial - FAO programme), Panjab, Bamyan, in July

PHASEOLUS BEANS



Two types of bean in the Hari-rud valley // *Phaeolus spp.*, Herat, Pushtun Zargun, in July

Latin:

Pisum sativum

Dari: *mushung*

Pashto: *mishing*

FIELD AND COW PEAS

Field peas of various types are widely cultivated throughout highland Afghanistan, for instance in Ghor, Hazarajat, Baghlan, Takhar, Badakhshan and upper Panjshir. *Pisum sativum* is one of the Neolithic 'founder' crops dating back to the earliest cultivation of plants that occurred about 10,000 years ago in west Asia and the fertile crescent. Two types of pea are traditionally cultivated. One is primarily for human food (*mushung-e-gerdi* - 'round pea') and the other primarily for feeding livestock, particularly cattle, milking cows and working oxen (*mushung-e-gawi* - 'cow pea'). Both are types of *P. sativum*. When fed to cattle the pulse is milled and fed as meal which is mixed with chopped and dampened wheat or barley straw. Pea straw is rated equal if not better than barley straw and is considered high quality winter fodder for both cattle and small stock.



Field pea (*mushung*) // Panjab, Bamyān



Field pea // Tag-o Bargh, Panjab, Bamyán



Wheat undersown with peas // Bamyán, Panjab, in June



Two types of field pea // on left for humans, on right for cattle

CULTIVATED LEGUMES & PULSES

Latin:

Lens culinaris medik

Dari: *nask*

Pashto:

adas (= the Arabic term)



Native lentil, *Lens culinaris*

// Yakawlang, Bamyan

LENTILS

A small, green, native lentil is widely cultivated in Afghanistan, especially in the highlands of Ghor, the Hazarajat, Takhar and Badakhshan. This is another of the Neolithic 'founder' crops originating in west Asia and the Fertile Crescent. Grown primarily as a subsistence crop for household consumption, it fulfills a very useful role in the grain/legume rotation. Lentil straw is used as winter fodder for cattle and small stock.

It is not uncommon to come across highland farmers in poor provinces such as Ghor, who have received WFP 'food aid' who have attempted to cultivate the larger yellow or red lentils originating from 'food aid' packages. Success in growing these 'food aid' lentils is somewhat mixed as germination is uncertain.

Latin:*Cicer arietinum L.***Dari/Pashto:***nakhud***CHICKPEA**

Chickpea, another Neolithic 'founder' crop originating in west Asia, is commonly cultivated as a rain-fed crop at lower and medium altitudes up to about 2,000 m. asl, mainly in northern and, and north eastern Afghanistan. It is normally cultivated as a rain-fed/dryland crop on the *lalmi/dayma* land. Whilst chickpea may be cultivated as a subsistence crop, it is also commonly cultivated as a cash crop rather

than just for household consumption. For farmers in northern Afghanistan dependant on rain-fed cropping with little else to sell from their land (apart from dry-land melons), chickpea can provide a much needed source of income. The straw is fed to livestock. The native chickpea is comparatively small and dark in colour, resembling the Desi type and possibly closer to the originally cultivated chickpea. In recent years some 'improved' varieties of chickpea have been introduced by FAO (and others) originating from ICARDA, ICRISAT. The native variety is still the most widely cultivated.

Note: Interestingly, the popular chickpea cultivated in India and Pakistan, which is larger and paler, is popularly known in the sub-continent as the *kabuli*. It is thought to have originated in Afghanistan.



Rain-fed chickpea // Dahaneh Ghorī, Baghlan, in May



Rain-fed chickpea // Rustaq plateau, Takhar, in June

CULTIVATED LEGUMES & PULSES

Latin:

Vicia faba L.

Dari: *baquli*

Pashto: *baquli*

BROAD (FABA) BEAN

Broad (Faba) bean is an important subsistence human food crop, also of ancient origin. The crop is commonly cultivated throughout much of highland Afghanistan, including parts of the Hazarajat, upper Panjshir, Baghlan, Takhar and Badakhshan²⁴. The bean straw provides low quality bulk fodder for livestock and may also be used as fuel for household bread ovens (*tandor*). The pulse is usually used

for human food although it may on occasions be fed to livestock.



Broad (Faba) beans // upper Panjshir, in August

²⁴ In the Panjshir valley there is a division between the inhabitants of the lower valley (up to about 2,000 metres asl+) who cultivate wheat and clover followed by a second summer crop of maize and the upper valley villagers where only one crop is possible - either wheat, barley, broad beans or field peas. The lower Panjshir people are known locally as *shaftal khor* i.e. 'clover eaters' and the upper valley people as *baquli khor* i.e. 'broad bean eaters'.

VETCHES

Latin:

Vicia spp.
mainly Bitter Vetch: *Vicia ervilia* R. Willd.

Dari:

shokhal also *ghamoo*

Pashto:

talkhak; *mort* (depending on locality)

At least two species of annual fodder vetch are cultivated in different parts of Afghanistan. The most widely cultivated is the white flowered, so called 'Bitter vetch' *Vicia ervilia* known as *shokhal* in central Afghanistan, *ghamoo* in the north east and *talkhak* (i.e. 'bitter') in the Harirud valley, which reflects its name in English²⁵. This is another of the Neolithic 'founder' crops dating back 10,000 years to the dawn of farming in west Asia and the Fertile

Crescent. The author has also observed a cultivated variety of mauve flowered Common vetch *Vicia sativa* being grown in highland Ghazni and Wardak in the summer²⁶.

Bitter vetch is an important small farmer crop throughout highland Afghanistan over 2,000 metres asl, for instance in the Hazarajat, highland Baghlan and Takhar, upper Panjshir and Badakhshan. *Shokhal* is mainly sown in the spring as a summer pulse or hay crop. It may also be sown in the summer for an autumn green forage crop. Although ranked lower in feed value to field pea, *shokhal* has the advantage of being comparatively drought tolerant and although requiring some irrigation can be successfully cultivated on poor marginal land. In years of good precipitation in the North East, it may be cultivated as a rain-fed/dryland crop without irrigation. In Nangarhar, Shinwar, a vetch known locally as *mort* is cultivated for fodder. This may be another species.

Vetches make a valuable contribution to feeding livestock in poor mountain/highland environments. The crop fits in well into traditional small farmer systems grown in rotation with wheat, barley, other legumes/pulses and potatoes. As a legume helps to put nitrogen back into the soil. The dried pulse is

²⁵ NB this should not be confused with a *Centaurea sp.* also used for fodder (see 'Wild Plants') also known as *talkhak*

²⁶ Several species of high-yielding vetch are successfully cultivated on the Anatolian Plateau, Turkey, which might be well suited to Afghan conditions.

ground and fed to cattle as well as the straw. *Shokhal* may be cut as a hay crop or as green forage. Vetch pulse is sometimes eaten by the human population in poor mountain communities in the Hazarajat, Ghor and Badakhshan when there is little else to eat. In this case, it must be soaked in water for one or two days to remove the toxins, usually in a cloth bag and the water changed several times.



Bitter Vetch // Yakawlang, Bamyan (irrigated), in June



Bitter Vetch // Rustaq, Takhar (rain-fed-*Ialmi*), in June



Bitter vetch



Bitter vetch // seed pod



Bitter Vetch // seed (left)

Fenugreek (*shamlit*) // seed (right)

CULTIVATED LEGUMES & PULSES

Latin:

Lathyrus sativus L.

Dari: *kalul* (Ghor & Hazarajat); *patak* (Panjshir, Takhar, Badakhshan)

Pashto:

kalul

GRASS PEA

Grass pea is another ancient crop originating in west Asia widely cultivated as an annual legume crop throughout highland Afghanistan. In Ghor, the Hazarajat, highland Baghlan, Takhar and upper Panjshir it is cultivated as a fodder crop and for the pulse. Although primarily cultivated for feeding livestock (mainly small stock), in Badakhshan, in the poorer parts of Wakhan, the pulse is also consumed as

a human food with bad results. In north eastern Afghanistan it is known as *patak* and in central Afghanistan and the Hazarajat as *kalul*. Grass pea is usually harvested when mature for the pulse and the straw, both of which are fed to livestock, mainly sheep and goats. The crop may also be cut green as a forage crop or for hay. The pulse, which is high in protein, is fed to small stock without milling.

As an annual legume *patak/kalul* fits well into the crop rotations of small subsistence highland farmers and helps to fix nitrogen. It is considered an 'insurance' crop as it provides reliable yields when other crops fail. In chronically food insecure locations, for example the Wakhan, there has been a long tradition of poor families eating *patak* in the winter when there has been a shortage of wheat, barley or other food. Unfortunately the *patak* seed contains a neurotoxic amino acid, which if regularly eaten by humans can cause paralysis of the lower limbs, known as Lathyrism (or Neurolathyrism). The paralysis is said to effect men more than women. There is a particular danger of Lathyrism where the population is already suffering from chronic malnutrition as has been the historical situation in the Wakhan. When, as has been common in the Wakhan, this is combined with chronic addiction to opium, the rural population has been even more vulnerable. The visual effects of Lathyrism are similar to polio and the paralysis is irremediable. In recent years, various rural development and aid programmes have done much to improve the nutrition situation in eastern Badakhshan.



Grass pea, *patak* (blue flower) with field pea, *mushung* (pink flower) // Badakhshan, in June



Grass pea, *kalul* being cut as green forage // Tagab Bagh, Panjab, Bamyan, in July

CULTIVATED LEGUMES & PULSES

Latin:

*Trigonella foenum-
graecum L.*

Dari/Pashto:

shamlit

FENUGREEK

Fenugreek has been cultivated in Afghanistan as a comparatively drought resistant legume fodder crop, since ancient times. The seed is used in cooking certain dishes, both in Iran and Afghanistan, and is a particularly popular spice throughout the Indian subcontinent. Now cultivated world wide as a semi-arid crop, fenugreek was first cultivated in western Asia and charred seeds have been found in Iraqi sites

from over 6,000 years ago. Cato the elder (Rome-234 to 149 BCE) lists fenugreek, clover and vetch, as important crops grown by Roman farmers to feed cattle. In Afghanistan and parts of Iran it is known as *shamlit* (also in Iran as *shanbalieh*). Fenugreek is grown up the Harirud valley together with *talkhak* (bitter vetch) in the more drought prone villages along the foothill spring-line north of the river and its flood plain. In these villages it is cultivated as an exchange crop, the main demand coming from cattle owners in the better watered villages lying along the Harirud. *Shamlit* seed, which has a high oil content and a distinctive smell, is exchanged for wheat grain. It is also cultivated as green forage and if for seed the straw is fed to cattle.



Fenugreek // Hari-rud valley



Seed of various legume crop from the Hari-rud valley // left to right: Bitter Vetch (*Vicia ervilia*), Fenugreek (*Trigonella foenum-graecum*), Two types of field pea (*Pisum sativum*): *mushing-e gerdi* for human consumption and *mushing-e gawi* for cattle

3

OIL SEED CROPS & RESIDUES

NOTE ON OIL-SEED RESIDUE: Oil seed ‘cake’ (*kunjawra* or *konjara*) of different origins is highly regarded as cattle-feed in particular and is available in many local bazaars. Cotton seed cake is the most readily available, but also linseed, sesame, peanut, mustard/rape seed and sunflower seed pressings are available where these crops are cultivated. Not all farmers can afford to buy oilseed cake unless they are cultivating the crop themselves and are able to obtain the residue relatively inexpensively (or even free) from the owners of local oil presses. These local oil pressed are termed variously – *kaross* in the NE Afg; *ginee* in the Hazarajat; and *jawoz* elsewhere. A number of pilot projects sponsored by international donors have experimented with various commercial oil seed crops-notably rapeseed (canola), peanuts and soya. As things are at present (2014), Afghanistan finds it difficult to compete with the comparatively cheap vegetable oil imported from elsewhere in the world where production and processing are already well developed and economies of scale exist. Nonetheless oilseed crops of various kinds are an important part of the local subsistence rural economy and the residue from the pressings makes a useful contribution to feeding household livestock such as milking cows.

Latin:

Brassica arvensis L., *B. rapa* L., *B. napus* L. and other *Brassica* spp.

Dari/Pashto:

sharsham

MUSTARD AND RAPE SEED

(CANOLA) ETC

In many poor areas in highland Afghanistan such as Badakhshan, mustard (*B. arvensis*; *B. nigra* etc) is cultivated as an oil seed crop or grows as a useful ‘weed’ in the wheat crop, harvested as an oil seed crop before the wheat. The seed is locally pressed in village mills for oil and the ‘straw’ and residue fed to livestock. In eastern Badakhshan wild mustard growing

as a weed in the wheat is commonly gathered before the wheat/barley harvest, the seed threshed out and pressed for oil. In the Hazarajat on the other hand wild mustard (*charlock*) growing as a weed in the irrigated crops is not generally used for extracting oil, but is collected as green forage for stock. When fresh and tender, wild mustard leaves are cooked and eaten like spinach or as fresh salad (see also Section 4: 'By-products of the Cropping Systems')

Farm field trials with oil-seed rape/canola (*B. nap*) carried out in Helmand and Kandahar between 2002 and 2005 produced very promising results. However lack of local processing facilities and the difficulty of achieving economies of scale have made it difficult to secure either a local or an export market for unprocessed rape seed. This is still an issue in 2014. If these difficulties can be overcome, rape-seed, which is seasonally coincidental with opium poppy, might prove to be a possible alternative crop, provided the farm gate price is competitive. The oil seed cake would also provide useful livestock feed and a possible subsidiary source of income for the farmers who grow the crop.



Oil seed rape (canola) Helmand (trials) // *Brassica rapa*, 2004/2005 (ref CADG) (note the opium poppy as a line of pink in the distant background)

Latin:

Raphanus sp.

Dari:

sharsham-e-benafshi

RADISH

In Badakhshan, this member of *Raphanus sp.* is cultivated as an oil seed crop like mustard and flax. The seed is pressed locally for oil and the straw fed to livestock. See below:



Sharsham-e-benafshi // Baharak, Badakhshan, in June

Latin:

Arachis hypogaea L.

Dari:

mummpali/badam-e zamini

PEANUTS

Peanuts are mainly cultivated in Southern Afghanistan and to some extent elsewhere such as Herat. Both the straw and the oil-seed cake are fed to livestock. A pilot project that ran between 2003 and 2005, based in Kandahar (Zhareh district)²⁷, produced peanut oil from crops grown in Kandahar and Helmand on a trial basis. This trial was able to demonstrate that

²⁷ Managed by the Central Asia Development Group

PEANUTS

good yields of peanuts and high quality oil can be produced in Afghanistan. The relatively high cost of production, market competition from cheaper good quality oil and increasing insecurity brought the project to an end. The potential is there.



Peanut *mumpali/badam-e zamini* // Arghandab, Kandahar (CADG project)



Peanut oil processing pilot project // Kandahar, Zhareh, 2004 (CADG project)

Latin:

Elianthus annuus L.

Dari/Pashto:

gul-e aftar parast

SUNFLOWER

In Afghanistan sunflower is widely cultivated, often as a subsidiary crop along field boundaries, mainly to produce seed for 'snacks' and to some extent for vegetable oil. In recent years, there have been farmer field trials in southern Afghanistan, (possibly elsewhere), to cultivate sunflower, (both 'snack' varieties and for oil extraction) under programmes managed by different agencies. Farmer

field trials carried out in Helmand, Kandahar and Zabol provinces between 2003 and 2005 produced very promising yields. Processing and marketing still have to be properly developed (2014). Chopped sunflower heads and stalks after seed extraction may be fed to livestock or may be burned in bread ovens.



Sunflower farmer field trials // Helmand, Nahr-i Saraj, August 2005 (CADG project)

OIL SEED CROPS & RESIDUES

Latin:

Gossypium hirsutum L.

Dari:

pakhtha, punba

Pashto:

malooch

COTTON

Cotton in Afghanistan is mainly cultivated as a commercial crop in the lower Helmand valley and in the lower elevation irrigated districts of Baghlan, Kunduz and Takhar. Cotton is grown to some extent in the lower Hari-rud valley as well as in eastern Afghanistan in Nangarhar and Laghman primarily for domestic purposes to stuff mattresses etc. The industrial base for commercial cotton production

in Afghanistan, (including the manufacture of cloth) was well developed in the 1960s and 70s²⁸ was shattered by the years of conflict in the 1980s and 90s. It has not yet recovered. Although something remains of the industrial and processing base in Kunduz and Helmand (Lashkargah), many processing plants were looted and destroyed. The old parastatal agency “Spinzar” ceased to function. Little has happened since 2002 to effectively restore the Afghan cotton industry to the position it held in the national economy before 1978 despite the efforts of a number of international agencies. The conditions for cotton’s processing and marketing in Afghanistan remains very weak (2014).

Nonetheless cotton seed cake is still being produced, albeit in limited quantity as a by-product of what remains of the cotton industry in Helmand and Kunduz. Cotton seed is still the main source of oil seed cake for livestock feed available in Afghanistan.

²⁸ With the parastatal Spinzar corporation in the north and the Bost corporation in Lashkargah in Helmand



Cotton (Farm field variety trial) // Helmand, Nad-e Ali

Latin:

Linum usitatissimum L.

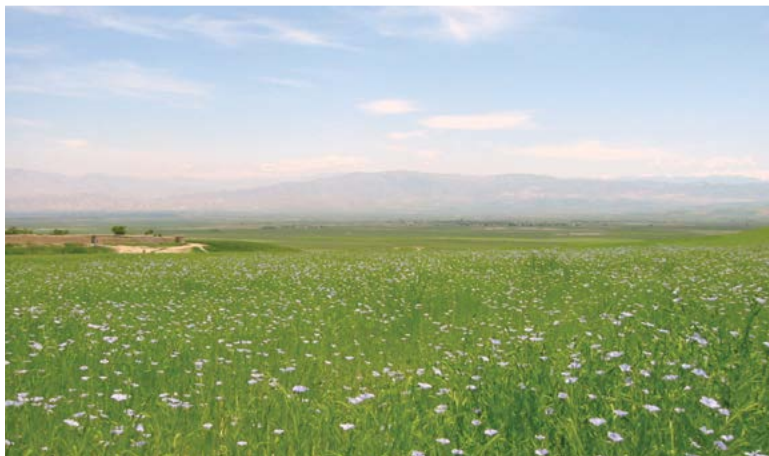
Dari/Pashto:

zargher

FLAX/LINSEED

Flax, another Neolithic 'founder' crop originating in western Asia, has undoubtedly been cultivated in Afghanistan since ancient times. It is still widely cultivated as a rain-fed oil-seed crop in northern and north-eastern Afghanistan. The seed is processed for oil in numerous small private extraction mills. The *konjara* is fed to livestock.

Whilst the manufacture of linen in Egypt and Mesopotamia goes back to ancient times, in Afghanistan and Central Asia the cultivation of flax appears to have remained quite primitive, (at least until recent times). There does not appear to be a history of linen manufacture and linseed is primarily cultivated as a rain-fed oil seed crop. The straw, although rather coarse, is fed to the village livestock after seed extraction.



Rain-fed Flax (Linseed) cultivated on the *Ialimi* land // Dahaneh Ghor, Baghlan, in May

OIL SEED CROPS & RESIDUES

Latin:

Sesamum indicum L.

Dari/Pashto:

konjed

SESAME

Sesame is widely cultivated in northern and north eastern Afghanistan in particular as an oil-seed crop processed in small local mills. The 'cake' is valued as cattle feed. Sesame is cultivated both as an irrigated as well as a rain-fed crop.



Field of Sesame // Dasht-e Qala, Takhar

Latin:

Carthamus tinctorius L.

Dari/Pashto:

zafaran-e kha'eni

SAFFLOWER

Safflower, a comparatively recent introduction to Afghanistan, now being increasingly cultivated as an oil-seed crop, especially in the north and the east. Known as *zafaran-e kha'eni* ie 'false saffron' it should not be confused with true 'saffron' (*Crocus sativus*/Dari: *zafaran*), which is an entirely different plant. Safflower is part of the thistle family (see reference to right),

whilst true saffron is a *Crocus* in the family *Iridaceae*²⁸. Safflower is NOT a spice,

although the seed is a source of good quality vegetable oil and the flowers are sometimes used to colour rice.

Nonetheless, dried safflower flowers (petals and stigmas), which are used for colouring, and being of a similar colour to saffron are often used 'in the trade' to deliberately 'bulk out' consignments of saffron as a commercial fraud. True saffron which is derived from the stigmas and styles of the saffron crocus, is an extremely expensive spice and the trade is full of 'tricks' to catch the unwary. This fraud is not difficult to detect, but nonetheless continues to successfully fool the ignorant customer.

In addition to vegetable oil, safflower can also be used for forage and even silage as it is in the countries of former Soviet Central Asia²⁹. Its potential for this purpose is not yet understood in Afghanistan.



Safflower // Behsud, Nangarhar, in April

²⁸ Saffron *Crocus sativus* a classic member of the Crocus family *Iridaceae*; the spice saffron being the dried red/orange stigmas and styles removed from the deep purple coloured flower.

²⁹ G. Gintzberger et al "Rangelands of the arid and semi-arid zones in Uzbekistan", CIRAD-ICARDA, 2004

OIL SEED CROPS & RESIDUES

Latin:

Glycine max (L.) Merr.

Dari:

soya

SOYA BEAN

Soya is a new crop in Afghanistan. The plant originates in east Asia but is now internationally widely cultivated as an industrial oil and food/feed crop. Soya is classified by FAO as an oil seed crop. Since 2002 various USAID funded projects have been vigorously promoting soya in different locations of Afghanistan. Without the industrial and processing infrastructure and agro/industrial market it has not yet been

very widely adopted by Afghan farmers without donor support. As a result of internationally aided projects some soya bean meal is now being procured by the FAO (and other supported dairy union projects). Soya bean still has to find a popular place in customary diet and cropping systems.



Maize undersown with soya and soya-demonstration farmers // Behsud, Jalalabad, in Sept. 2013

Latin:

Papaver somniferum L.

Dari/Pashto:

plant: *koknar/apin*

opium resin: *taryoq*

poppy seed: *khash khash*

OPIUM POPPY³⁰

The commercial, if illegal, cultivation of opium poppy for the production of opium and its derivatives such as heroin is to be seriously discouraged. The Afghan opium crop currently supplies more than 80% of the international trade in heroin. The crop is included here as it does play an important part in small farmer cropping and coping systems in certain parts in Afghanistan. In addition to opium resin, a number

of other by-products of opium poppy cultivation have more benign uses.

Opium poppy is another very ancient cultivated crop probably originating the eastern Mediterranean basin and the Fertile Crescent. Opium poppy is recorded from Mesopotamia and Crete some 4,000 years ago³¹. Opium poppy may even have been first cultivated in Neolithic times, primarily as a magical and medicinal plant. Legend has it that the opium poppy was brought to Afghanistan by Alexander the Great's soldiers, but had probably arrived earlier possibly during the Archaemaenid Persian Empire or even earlier. Poppy has possibly been cultivated in Afghanistan for at least 2,500 years.

In addition to the production of narcotic opium resin (Dari: *taryoq*), the opium poppy has a number of other uses. The crop must be assiduously thinned and weeded, which cleans the land for the subsequent crop. The weeds and green poppy thinnings are fed to the family livestock. After the extraction of the opium resin, the stalks and dry seed capsules are a very useful source of fuel for village bread ovens in areas where fuel is scarce. The poppy seed extracted from the dried capsules, known locally as *khash khash*³² is not narcotic and there is a considerable demand for poppy seed in international confectionary trade. In addition to this, in parts of rural Afghanistan, particularly in Badakhshan, poppy

³⁰ Opium poppy, (Dari: *koknar, apin* - the plant, *taryoq* - the product Opium, *khash khash* - the seed)

³¹ The opium poppy was the symbol for a female deity in Minoan Crete

³² Not to be confused with hashish (in Dari/Pashto *charis/bhang*) produced from the hemp plant *Cannabis sativus*

OIL SEED CROPS & RESIDUES

OPIUM POPPY

seed is used to produce a high quality vegetable oil for household consumption. The residue of this extraction is fed to livestock. The burned stalks and empty dry seed capsules are also used in the local manufacture of soap (in Badakhshan) and when boiled are used as a mild sedative and pain killer.



**Opium poppies
in flower** // Jurm,
Badakhshan, June

**Weeding/ thinning
opium poppy**
// Koghiani,
Nangarhar, in
March



**Weighing poppy seed for sale to the
international confectionary market as well
as local oil extraction** // Helmand, Sangin
bazaar, in June



**Opium poppy stalks and seed capsules
drying before seed extraction** // The seed
is processed for vegetable oil-residue fed to
stock, the dry stalks burned in bread ovens-
tandor. The ash mixed with the oil is made into
local soap.

Latin:

Olea europaea L.

Dari/Pashto:

zeytun

OLIVE OIL

Commercial olive production in Afghanistan is confined to the old state farms in Nangarhar. Several hundreds of hectares of olive plantation established under a USSR programme in the 1960s & 70s still survive. Although presently not very productive these were planted under Soviet direction for both oil production and pickling. Some processing capacity remains. The plant is Italian and was refurbished in

2002/2003. Samples of good quality oil were being produced. Although some large plantations of olives still survive under State management they are not very productive.



Olive trees planted in the Bolan Agricultural Research Station, Lashkargah, Helmand // dating from the USA project (1950s-1970s) and bearing a lot of fruit in 2004.

4

OTHER BY-PRODUCTS OF THE CROPPING SYSTEM

CROP WEEDS

WEEDS OF THE WHEAT FIELDS: GRASSES AND FORBS

Throughout Afghanistan extensive use is made of weeds 'rogued' from the growing crops as green forage for household livestock. Much of this work is done by women and children. Nothing is wasted. The type of weed varies with location, but includes many grasses such as darnel (*Lolium temulentum*), wild oats (*Avena fatua*) and wild rye (*Elymus spp.*), and invasive perennials such as camel thorn (*Alhagi spp*) and liquorice (*Glycyrrhiza glabra*) (see 6. Wild Plants).



Weeding wheat fields for green forage in spring // Nangarhar, Behsud, in March



Kunari cows, fed green 'weeds' 'rogued' from the wheat crop // Baticot, Nangarhar, in March



Wheat infested with wild rye // Panjab, Bamyan



Wheat infested with wild oats // Aybak, Samangan

Wheat straw when mixed with grassy weeds such as wild oats and wild rye is considered to be more palatable for stock. Although heavy weed infestation reduces grain yield and lowers the quality of the flour, some contamination is often tolerated by subsistence farmers. It is, however, unacceptable for farmers who aspire to growing a seed crop.

OTHER BY-PRODUCTS OF THE CROPPING SYSTEM

Latin:

Brassica spp.

Dari:

zireh safid (from the wheat crop)

CROP WEEDS

WILD BRASSICAS

(WILD MUSTARD/CHARLOCK)

Wild Brassica of several species and no doubt hybrids (Dari: *sharsham-e sahray*) growing as weeds in the wheat and other crops are commonly gathered as green forage for feeding stock. In Eastern Badakhshan and Wakhan wild mustard is commonly harvested as an oil seed as well as for forage. In the Hazarajat wild mustard is usually only gathered for green forage. The young tender leaves may also be gathered and cooked as a vegetable.



Gathering mustard as green forage



As a weed in wheat // Panjab, Bamyan

Latin:

Cuminum cyminum

Dari:

zireh safid (from the wheat crop)

WHITE CUMIN

In parts of Samangan, round Aybak white cumin (Dari: *Cuminum cyminum/zireh-ye safid*) commonly occurs as a weed in the wheat crop. It is harvested separately before the grain harvest as its aromatic seed is sold as a spice. After the seed is threshed, the straw of white cumin although rather coarse is also fed to livestock.



Harvesting white cumin growing in the wheat crop // near Aybak, Samangan, in May

POTATO HAULM (*BARG-E KACHALU*) AND WASTE VEGETABLES

In highland provinces such as Bamyan, Wardak and Ghazni potatoes are a significant cash as well as a subsistence crop. The dried leaves (haulm) collected shortly before lifting the potato crop in the late summer/autumn make a significant contribution to the supply of winter fodder for livestock in these provinces. Unpalatable and even poisonous when green, dried potato leaf appears to be acceptable as fodder and even commands a price in the local bazaars in Bamyan centre and Yakawlang. In addition to the dried potato leaf, small and undersized tubers not eaten by the human population, are fed to their livestock in the winter.



Potato haulm for winter fodder // Yakawlang, Bamyan, in October

NOTE ON WASTE VEGETABLES AND MELONS AND BEET: Around Jalalabad (Nangarhar) surplus or unsold vegetables such as cauliflower and root vegetables are fed to livestock. In the north, surplus or low quality melons may also be used in this way. In the north, in Baghlan, sugar beet cultivation was encouraged for the local sugar factory. Some farmers are still growing beet but mainly for feeding to their livestock.

5

MEADOWS, HAYFIELDS & GARDENS

MEADOWS AND GARDENS

Throughout Afghanistan the rural populations make extensive use of the wild grasses and herbs cut from the borders of the irrigated land and from between fruit trees in the orchards. In many highland valleys, natural meadows of different types, *tala* and *chaman*, may be deliberately or naturally flooded in the spring encouraging the growth of wild grasses and forbs. This may be cut for green forage or as a hay crop and grazed.

TALA AND CHAMAN

There are two types of meadow in the Afghan highlands: *tala* and *chaman*:

Tala

Tala are part of the 'close by' irrigated village farming system. These are small perennial meadows managed by individual households as part of their private land-holding. *Tala* are managed as 'water meadows' that are deliberately flooded in certain seasons to produce a crop of hay and some grazing. They are often composed of a rich sward of mixed grasses and forbs including wild legumes – *Trifolium spp.*, *Medicago spp.*, *Lotus spp.* and others including a mixture of meadow flowers and orchids. The hay made from both *tala* and the boundary banks (Dari: *bund*) surrounding irrigated fields is known as *alaf-e lab-e ja* and makes an essential contribution to both winter fodder and green cut forage as well as providing grazing for household stock.

MEADOWS, HAYFIELDS & GARDENS

MEADOWS AND GARDENS

TALA



Sward with orchids and wild cumin // Panjab, Bamyán, June



Sward with *Trifolium repens* and *T. pratense* // Rustaq, Takhar, June



Birdsfoot trefoil (*Lotus corniculatus*) and Red Clover (*Trifolium pratense*) // Shashpol, Bamyán



Tala spring flooded hay meadows of mixed grass and forbs // Panjab, Bamyán, in July

Chaman – areas of natural grassy sward–meadow land

Chaman are areas of natural grassland and grassy sward that are usually part of a rural community or transhumant pastoralist traditional seasonal common grazing. *Chaman* are generally more extensive than *tala*. They may be located in highland basins, or river flood plains that are subject to seasonal snow cover or inundation, or areas of high water table and basins subject to periodic flooding, forming a turfy sward overlaying peat moss. These are usually areas unsuitable for cultivation where conditions favour the natural growth of grasses and forbs. *Chaman* may provide both a summer hay crop as well as seasonal grazing and are usually managed as a community resource.



***Chaman* provides grazing as well as hay for local transhumant pastoralists**

// Bamyān, Shahto-highlands, Panjab, Yakawlang



***Chaman* in the Ghor highlands in October**

// Re-growth after the hay crop left for autumn grazing. The common property of local settled communities practicing transhumance system of livestock husbandry.

MEADOWS, HAYFIELDS & GARDENS

MEADOWS AND GARDENS

CHAMAN



Chaman in Darreh Iraq valley, Shibar, Bamyan, periodically flooded // Grazed in early spring then left to grow a summer hay crop and grazed in the autumn.



Hari-rud flood plain, Pushtun Zarghun, Herat

// Provides spring grazing for both sedentary and nomadic sheep and round the year pasturage for village cattle.



Amu Darya flood plain, Dasht-e Qala

// provides winter/spring grazing for both sedentary (transhumant) and nomadic flocks.

Example of a *chaman* under threat:



The 'great meadow' (*chaman-e kalan*) threatened with drainage to cultivate potatoes
// Yakawlang, late autumn

The great *Chaman* of Yakawlang, Bamyan traditionally provides the village communities surrounding it with both spring/summer grazing for their livestock and a hay crop³².

³² Note: the Yakawlang *Chaman* is presently threatened by cultivation to grow potatoes encouraged by the Kabul market and improved road access. This may be ultimately futile due to the high water table and salinity. Although this development may temporarily benefit some individuals, it may also be at the expense of those who traditionally use the *Chaman* as a community resource supporting livestock.

Alpine, spring-line 'peat moss' 'turf' *chaman* used for hay and summer grazing:



Spring line 'peat moss' 'turf' *chaman*
// Shah-Foladi, Bamyan



***Chaman* threatened by uncontrolled turf cutting** // for the 'new town' development in Bamyan, in June 2009

MARGINS OF THE IRRIGATED LAND, PATHS, STREAM BANKS AND GARDENS:

Throughout Afghanistan, all available sources of forage and fodder are made use of to maintain livestock through the long winters. Nothing is wasted, however apparently insignificant. This includes the margins of fields, irrigation and drainage ditches, paths, bunds and banks wherever there is irrigation water. Gardens of fruit trees are often rich in valuable grazing and forage plants. These include many wild grasses (*Agropyron*, *Hordeum*, *Alopercurus*, *Festuca*, *Lolium* /Dari: *alaf-e khodro*) and other species as well as perennial and annual legumes and forbs. The latter include white and red clover (*Trifolium repens* and *T. pretense*/Dari: *seh bargeh*), various medics both wild and feral (*Medicago spp.* / Dari: *rishqa-e-sahrai*) vetches *shaftal-e sahrāi*, *Astragalus spp.*, and *Onobrychis spp.* as well as forbs such as *Centaurea spp.*, *Mentha spp.*, *Psoralea spp.*, liquorice (*Glycyrrhiza glabra*/Dari: *shirin boya*) and camel thorn (*Alhagi sp.*/Dari: *kar shotur*). The last two also occur as invasive plants in marginal cultivated land. All these are cut for green forage or dried as hay for the winter. The aftermath of a hay cut is also grazed.



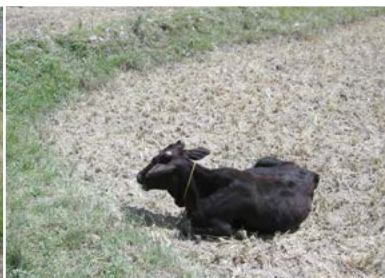
A typical enclosed garden combining orchard and hay meadow // (*Setaria viridis*; *Medicago sp. rishqa sahrāi*; *Trifolium repens seh bargeh*, etc.) Panjshir valley, in August



Rich garden swards of *Medicago sp.* and *Trifolium spp.* // Panjshir valley, in August



Garden-hay *Festuca sp.* // Panjshir valley



Cow tethered to graze bank // Pushtun
Zargun, Harirud valley



Hay from field bunds and edges of irrigation channels (*lab-e ja*) // Panjab, Bamyan, in July

AUTUMN LEAVES

Fallen autumn leaves from willows (*Salix spp.*), fruit trees and vines provide some bulk feeding towards the end of the year and should not be overlooked. Fallen leaves from apple, plum, apricot and mulberries feed small stock in the autumn. Leaves from poplars and chinar (*Platanus orientalis*) are not so palatable, but may be gathered as fuel for bread ovens (*tandor*). Grazing fallen leaves is generally confined to household livestock, but there are cases where leaves are sold to passing nomads (*kuchi*). In the Shomali plain (Parwan) *kuchi* herders returning from their summer pastures (Dari: *aylaq*) in the Panjshir and the Hazarajat rent orchards and vineyards from settled villagers to graze the herbage and the fallen autumn leaves. This fills a seasonal 'gap' on their way to winter quarters in Laghman and Nangarhar.



Leaves from apple trees being collected for fodder // Khwaja Umari, Ghazni, in November

6

WILD PLANTS OF THE MOUNTAINS & PLAINS (USED FOR FODDER)

Throughout Afghanistan, huge efforts are made to collect wild plants of many kinds from the plains and mountainsides for winter fodder, often at some distance from the settlements. Individual households in a community often have the right to gather wild plants from specific parts of the mountains where the community as a whole has its traditional grazing rights. Families who do not possess arable land or have grazing rights may have to pay for such a privilege. In some places the right to graze as well as to gather wild plants for fodder is dependant on being the owner of irrigated agricultural land.

In highland villages in the late summer/autumn much effort is spent collecting these plants and preparing for winter. The many species of wild plants gathered for winter fodder are cut and carried when mature and already quite dry, in the late summer/autumn. These 'fodder' plants, which are mainly deep rooted perennials, are cut above the surface of the ground with the root systems left undisturbed. Thus regeneration in the next year is unaffected and the process is sustainable. If necessary, the plants are further dried and stacked beside or on the roofs of houses, and stored in barns. Different species are stored separately as being more suitable for different classes of animal – cattle, sheep/goats, horses/donkeys. Some of the plants, especially certain *Ferula* spp. are poisonous for equines even when dried, whilst being harmless for cattle and small stock. Many of these plants are unpalatable and even poisonous to all livestock when green and sappy, but are acceptable and considered nutritious when dry. Insufficient attention has been paid to the importance of this source of winter fodder and the species utilized or the different categories of stock. Without this additional source of winter fodder, mountain communities throughout Afghanistan would find it almost impossible to keep livestock through the winter. Most of these plants are found growing on the intermediary slopes above the villages. The early ephemeral grasses and forbs may be grazed lightly in the spring as the stock move up through this zone to their summer aylaq at a higher altitude. The later maturing deep rooted perennials, collected later in the late summer/autumn for winter fodder, are thus left to grow on undisturbed through the summer.

The collection of woody shrubs such as *Artemisa* and *Ephedra spp.* as well as some spiny 'pincushion' forms of *Astragalus*, *Caryophyllaceae* (*Acanthophyllum*), and *Plumbaginaceae* (*Acantholimon*) gathered for fuel is generally much more destructive than cutting for fodder, as these plants are up-rooted and the whole plant destroyed in the process (see reference to *Artemisia*). Some of the wild fodder plants, such *Ferula spp.* also provide a dual purpose, with the dried leaves and softer parts of the plant providing fodder and the more woody stems used as fuel for bread ovens³³.

Among the important wild forbs gathered for winter fodder are several species of the families and genera: *Apiaceae* (previously *Umbelliferae*) including *Ferula*, *Prangos*; *Asteraceae* including *Cousinia*, *Cirsium*, *Centaurea*, *Karelinia*, *Matricaria*, *Microcephala*, *Senecio*, *Hertia*; *Fabaceae* (legumes, previously *Leguminosae*) including *Trifolium*, *Medicago*, *Astragalus*, *Alhagi*, *Melilotus*. Other genera in the families *Chenopodiaceae*, *Polygonaceae* (*Rheum*), *Caryophyllaceae* (*Acanthophyllum*), and *Plumbaginaceae* (*Acantholimon*) are also gathered. This list is not complete and there are others. Some of the *Ferula spp.* in particular are said to be poisonous for horses and donkeys. Before being fed to the animals, all these plants are chopped and usually fed as a mixture with chopped straw and/or lucerne/clover hay.

³³ Significant work has been carried out in the USSR, in the Central Asian Republics, Pakistan and Iran. A useful recent reference book that also covers some, but not all, the range species grazed or gathered for fodder in Afghanistan is 'Rangeland of the arid and semi-arid zones in Uzbekistan' G.Ginzburger et al - CIRAD-ICARDA 2003. Interesting observations were also made by a number of 19th century explorer adventurers such as William Moorcroft (1767-1825) (Moorcroft and Trebeck: 'Travels') who combined human and veterinary medical skills with extremely observant exploration in Afghanistan and Central Asia, Sir Alexander Burnes (1805-1841) (Cabool and Journey to Bokhara) who combined political exploration with acute observation of the human and natural world; Mounstuart Elphinstone (1779-1859) (Account of the Kingdom of Caubul) as well as individuals who like William Griffith (1810-1845) combined a career as an imperial doctor in India with 'Great Game' exploration and botany.

WILD PLANTS

NOTE ON LOCAL NAMES: The mountain peoples of Afghanistan have a rich and precise nomenclature for all useful plants whether used for fodder and forage, fuel, food or medicinal purposes, as well as for plants that are best avoided. Names tend to be very local sometimes changing between sets of adjoining valleys. Confusingly, some names are used interchangeably for different plants in different localities. Those provided below are some of the names commonly met with, but the list is not complete. The pronunciation of names also varies with locality and even between neighbouring valleys. Those provided here are renderings of those provided to the author and checked with Afghan friends and colleagues. The list does not claim to be definitive and is open to future modification.

APIACEAE (FORMERLY UMBELLIFERAE)

Latin:

Heracleum afghanicum
Kitam

Dari:

baldarghan (North East)
baldargho (Hazarajat)

AFGHAN HOGWEED

Afghan hogweed is found throughout most of highland Afghanistan. The plant is generally known as *baldarghan* with local variations such as *baldargho* in the Hazarajat with other variations elsewhere. The plant is highly valued all through the Afghan highlands as cattle fodder and is said to be particularly suitable for milking cows. The young basal stems when green and fresh are also peeled and eaten as a

fresh vegetable. The dried seeds are also boiled in tea as a beverage. *Baldarghan* is often deliberately planted along the lines of irrigation bunds, terrace banks, surrounding irrigated and along mountain streams in the Hazarajat, Ghor, Baghlan, Takhar and Badakhshan.

This plant is closely related to other species such as the Giant hogweed (*H. mantegazzianum*), an unpleasant plant causing serious irritation to the human skin on contact. Giant hogweed is considered to be an invasive pest in Europe and North America where it has spread widely from its original home in the Caucasus. It is therefore curious that the Afghan hogweed (*Heracleum afghanicum*), which is visually very similar should be considered as such a valued fodder plant in highland Afghanistan. It may also be noted that the common

European hogweed (*H. sphondylium*) was at one time fed to pigs in western Europe, hence its English name.

In Afghanistan, *Baldarghan* is both cut and carried green or cut and dried when more mature and dried for winter fodder.



Afghan hogweed *baldargho* // Panjab & Shibar, Bamyan



Afghan hogweed *baldargho* // Panjab & Shibar, Bamyan

WILD PLANTS

APIACEAE

FENNEL SPECIES USED FOR WINTER FODDER

Latin:

Ferula spp.

Dari/Pashto:

Local villagers and herdsmen have quite precise names for different species, although these change with locality. Some of these shown here are: *khola, ushai, ashai, badian, badran, ghaigho, ghaigun* and others

Several species of fennel (*Ferula spp.*) occur in Afghanistan in different locations and at different altitudes. These include the evil smelling and aptly named Asafoetida (*Ferula assa-foetida*/Dari: *hing*) which grows at between 400 to 1,300 metres asl mainly (but not exclusively) in the north. It should be noted that *hing* is not used for fodder. This plant is greatly valued for the dried resin extracted from the roots of the mature plant, which has many uses

including, medicinal, food preservation, as an insecticide and (paradoxically) in the perfume industry.

A number of other species, mainly those growing at altitudes between 1,500 to 3,000+ metres asl, although generally unpalatable and even poisonous to livestock when green and sappy, are valued as winter fodder when mature and dry. The seeds of some species are boiled as a health beverage. When dry and chopped many of these *Ferula spp.* are fed to cattle and small stock in the winter. Some, such as *kamai* are reputed to be toxic for equines, causing blindness. The dry stalks of the more woody species are also valued as fuel for bread ovens³⁴. Local names vary confusingly from one location to another and the same (or similar) names are not infrequently attached to different species in different localities. However, local livestock owners and pastoralists, throughout highland Afghanistan generally have a highly developed nomenclature for the plants growing on their surrounding mountains, particularly for those that are useful for one purpose or another or which are best avoided. Examples of some of these are illustrated below.

³⁴ According to the Greek myth, Prometheus stole the fire of the Gods from Zeus (on Mount Olympus) by hiding a burning coal in a hollow stick of fennel for which he was condemned to be chained to a rock on Mount Caucasus, his liver forever eaten by an eagle during the day only to grow again during the night.



Ferula sp.
// Ishkamish,
Baghlan, in June



Ferula sp. (gaighun/arghun) at 3000+ metres asl // Ishkamish, Baghlan, in June



Ferula sp. (badran) // Shah Foladi, in June



Ferula sp. // Badakhshan, Kishim-Tagab
valley, in June

WILD PLANTS

APIACEAE

FENNEL SPECIES USED FOR WINTER FODDER



***Khola* with tussock grass (*Koeleria cristatum*, *kharkoda*)** // Shahto Pass, Bamyān, in June



Same without other ground cover // valued for both fodder and fuel



***Ferula hindukushensis* (*ushai/ashai*) for fuel and fodder** // Shahto Pass, Bamyān, in June



***Ferula sp.* (*jeras*) for fuel and fodder** // Bamyān-Chijin Waras, Bamyān, in June



***Ferula sp.* (*ghaigho*)** // Shahto Pass, Bamyān, Yakawlang, Panjab, in June



Latin:

Prangos sp.

Dari:

kamai

PRANGOS

Prangos are another plant of the high mountains, which are unpalatable to livestock when green and sappy (and unpleasant to the human touch), but nonetheless provide very valuable winter fodder for both cattle and sheep when mature and dried.



Prangos sp. (kamai) // Bamyán-Foladi and Shahto Pass, Panjab, in May and June

WILD PLANTS

APIACEAE
PRANGOS



Bringing in the *kamai* for fodder // Warsaj, Takhar



Stack of dry
Prangos sp.
(*kamai*) stacked
for winter fodder
// Warsaj, Takhar

POLYGONACEAE (RHUBARB FAMILY)

Latin:

Rheum spp.

Dari:

chukri

Pashto:

rawash

RHUBARBS

Several species of wild rhubarb are found in the mountains of Afghanistan, Iran and Central Asia. In the spring, fresh young stalks are collected to be cooked and eaten. Stalks of fresh wild rhubarb are sold in the local bazaars and on road sides as a delicacy. As with cultivated rhubarb, the leaves are poisonous when green and fresh. Once mature and dry wild rhubarb is valued as winter fodder for livestock, particularly

cattle, but also sheep and goats. Much trouble is taken by mountain villagers to collect the dried leaves and stalks which are stacked beside the houses or on the roofs as winter fodder. Wild rhubarb is often found growing on the driest gravelly slopes where there is little other vegetation.



Wild rhubarb (*Rheum sp./chukhri*)// Bamyan, Safid Gaw, Waras, in June



Wild rhubarb (*chukri*)// Khushkak Valley, Shah Foladi, Bamyan, in May



WILD PLANTS

POLYGONACEAE (RHUBARB FAMILY) RHUBARBS



Rhum sp. (chukri) collected and stacked for winter fodder // Bamyán, Yakawlang, in October

Latin:

Rumex spp.

Dari:

qaf

DOCKS

Usually growing on the edges of fields and on abandoned crop land. Dock is usually cut green but may be dried for winter fodder.



Dock // Waras, Bamyán, in June

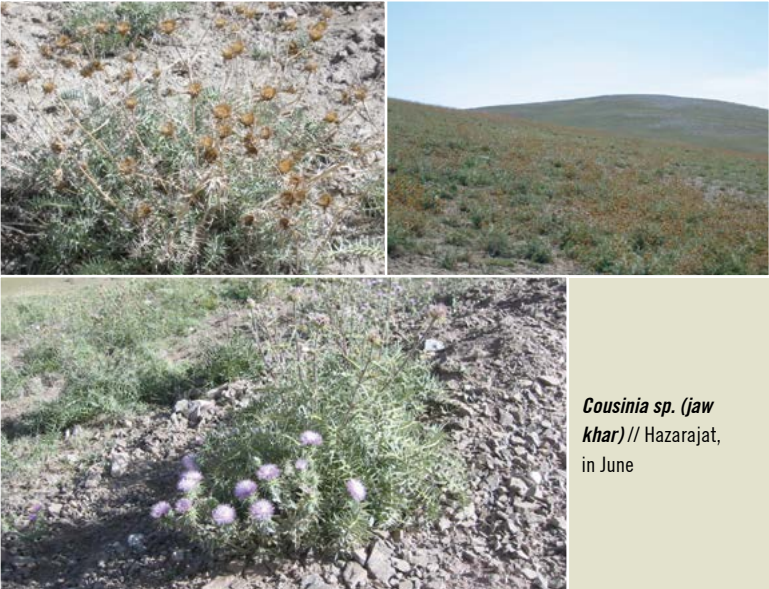
ASTERACEAE (PREVIOUSLY COMPOSITAE) THISTLE FAMILY

The Persian term *khar* is used generically for most of the thistle family and also for other thorny plants. In Herat the term *kangar* is also used.

There are many local names for different thistles particularly for the useful species e.g. *safid khar*, *surkh khar*, *jaw khar*, *shireh khar* and many others. Some have a dual purpose as fodder and fuel.

COUSINIA AND CIRCIUM SPP

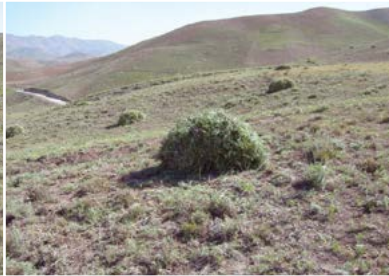
Despite appearances, many species of thistle, (*Cousinia* and *Circium* spp. in particular), and related plants such as knapweed (*Centaurea* spp.), are collected from mountain-sides and wasteland by highland Afghans, dried, stored and fed to livestock in the winter. They are considered nutritious particularly if seed heads are still intact. These plants are generally fed after being chopped and mixed with chopped wheat straw, lucerne hay etc. They may also be used to heat bread ovens.



Cousinia sp. (*jaw khar*) // Hazarajat, in June

WILD PLANTS

ASTERACEAE THISTLE FAMILY *COUSINIA*



Cutting *Cousinia* sp. (*jaw khar*) for winter fodder // Shahto Pass, Yakawlang, in July



***Cousinia* sp. (*jaw khar*) for winter fodder // Robat-i-Sangi-Khalifa Rahmat, Herat, in November**



***Cousinia* sp. (*jaw khar*) for fodder and fuel // Robat-i-Sangi-Khalifa Rahmat, Herat, in November**

Latin:

Centaurea spp.

Dari/Pashto:

Talkhak

KNAPWEED

Although unpalatable to livestock when green, being very bitter, hence the local name *talkhak* (referring to the bitter taste), various species of knapweed and related plants are cut and dried for winter fodder. Some species occur as invasive weeds on old cultivation and fallow land, others occur on the uncultivated mountain sides. It is a genus with many species, sub-species and hybrids, with flowers varying

from white, mauve, pink, red to yellow.



Mauve knapweed (*Centaurea sp./talkhak*) being prepared and chopped for winter fodder

// Sar-e Shibar, Bamyan, in late July



Mauve knapweed (*talkhak*) on fallow land and being cut for winter fodder

// Jerayeel, Rustaq, Takhar, in June

WILD PLANTS

ASTERACEAE THISTLE FAMILY KNAPWEED



Yellow knapweed (*Centaurea sp.*) on old cultivation // Bamyán, in June



Bringing in *talkhak* and *shireh khar* off the *lalmi fallow* // Rustaq, Takhar, in June

Latin:

Anthemis spp.

Dari:

dombeh goosaleh
(calf's tail)

CHAMOMILE

Several species of *Anthemis* are found in Afghanistan. Various species are found throughout the Hindu Kush, usually associated with old cultivation as shown here and is often cut and dried for winter fodder. There is some tradition (as in the West) for making an infusion of the flower heads to drink. The photograph on the right also shows a species of *Euphorbia*, which is characteristic of old cultivation,

growing along side chamomile. *Euphorbia* species are known generically in Dari as *shiraq* because of their milky sap. Being unpalatable to livestock this genus is also characteristic of heavily grazed rangeland.



Chamomile growing on old rain-fed cultivation



***Euphorbia sp.* and chamomile // growing on old rain-fed cultivation, Zard Sang Valley, Panjab, Bamyán, in June**

Latin:

Artemisia spp.

Dari:

Poosh / Bhutaae

WORMWOOD

Wormwood (*Artemisia spp.*) is one of the most characteristic perennial deep rooted woody plants of the desert, dry steppe (*dasht*) and mountain rangeland of Afghanistan, Central Asia, Iran and Turkey. No fewer than fifteen, and possibly more, species occur in Afghanistan and its neighbouring countries. *Artemisia spp.* can be found growing from the lowest to the highest altitudes. Characteristically this



***Artemisia* bushes**

genus is long lived, deep rooted and drought resistant and is one of the most valuable plants for soil stabilization and grazing. Although generally unpalatable to livestock in the early summer because of its highly pungent, aromatic and volatile oils, it is a valuable source of winter grazing for small stock, during the 'hungry gap'. Unfortunately, *Artemisia* bushes are also much valued as a source of fuel, especially for heating bread ovens (*tandor*). For this reason the plants are extensively up-rooted and gathered in increasingly destructive quantities to satisfy not only the fuel needs of the rural population, but also the rising demands of the rapidly increasing urban population. Recent improvements in rural roads and transportation into the more the remote mountain regions is exacerbating the problem. This is leading to the commercial exploitation of this important groundcover carried out in an unsustainable fashion and is causing

WILD PLANTS

ASTERACEAE THISTLE FAMILY WORMWOOD

widespread exposure of mountain slopes to erosion. Other deeply rooted woody perennial plants characteristic of the dry steppe and mountains which are also exploited for fuel include *Ephedra*, *Astragalus* spp. and others.



Artemisia ground cover still in comparatively good condition



Artemisia having been heavily grazed and collected for fuel still capable of regeneration if given protection // Hazarajat, in June



Ground cover destroyed by excessive fuel collection (foreground) and cultivation (by tractor) for rain-fed wheat // View from the road, within the Band-i Amir National Park, Yakawlang, Bamyan (officially protected area) approximately 2,700 metres asl, in June



A mixed blessing – Improved rural roads // *Artemisia* for fuel is still being transported by donkey, but soon by lorry. Bamyán, Kahmard and Sayghan valleys



The present trend – commercial extraction of *Artemisia* and other woody ground cover to meet the urban demand for fuel

WILD PLANTS

ASTERACEAE THISTLE FAMILY

SOME OTHER *COMPOSITAE ASTERACEAE SPP.*

A number of different species of *Senecio* occur in Afghanistan. They are not palatable when green, but when dried as hay, usually mixed with other species, may be fed to livestock.



Gawchaq (Senecio sp.)



Aster Sp.

BRASSICA FAMILY – *BRASSICACEAE*

Latin:

Winklera silaifolia

Dari:

Pali

WINKLERA SPP.

A common flowering perennial throughout the Hazarajat and elsewhere through the Hindu Kush Mountains 2,000 to 3,000+ m. asl. Highly valued as a fodder plant, it is very oily when green and fresh. When fed to milking animals it is said to give high butterfat. The milk is highly flavoured and used for making *roghan-e zard/maska* (yellow ghee and butter).



Winklera (pali) and mountain lucerne (*rish-qa-e kahi*) // Chijin Waras, Bamyan



Winklera near the Kotal-e Takht Pass // Chijin Waras, Bamyan, 3000 m asl, in June

WILD PLANTS

FABACEAE (LEGUMINOSAE) LEGUME FAMILY

CAMEL THORN

Latin:

Alhagi maurum Medik.
(formerly *A. camelorum*)

Dari:

khar-e shotur

Pashto:

shotur-khar

Camel thorn (*khar-e shotur*) is a spiny leguminous, deep rooted perennial which grows freely as an invasive weed in old cultivated fallow land and periodically cropped wheat fields. The plant is mainly found in the lower/medium elevation plains and foot-hills from about 500 m to 1,800 m asl. Despite its spiny character camel thorn is considered to be a valuable fodder plant, much loved by camels as its

name denotes. It is also grazed by sheep and goats and is often cut for winter fodder and fuel. In former Soviet Central Asia (e.g. Uzbekistan) it was made into silage³⁵. When fed dry to livestock it must be finely chopped, and is usually mixed with chopped wheat straw and lucerne hay. As a deep rooted legume the plant fixes nitrogen and thus improves soil fertility. It can also be a useful plant for soil stabilization against wind erosion. It is, however, a very invasive weed, particularly on periodically cultivated crop land.



Wheat stubble and camel thorn (*Alhagi sp.*; *khar-e shotur*) being grazed // Hari-rud Valley

³⁵G.Gintzberger et al

Latin:

Glycyrrhiza glabra L.

Dari/Pashto:

shirin boya

LIQUORICE

A deep rooted rhizomatous perennial, often found as an invasive plant on old cultivated land, mainly in central, northern and north eastern Afghanistan. In some places liquorice is harvested for its roots, which are exported from Afghanistan through Pakistan bound for countries such as India where it is processed as a confection. It is also used in the tobacco industry and Afghan liquorice root is even exported

via Karachi to the USA for this purpose³⁶. The plant is to some extent grazed by sheep, goats and camels and is also collected and dried for winter fodder. In the former Soviet Central Asian Republics it was sometimes ensiled³⁷.



Liquorice (*shirin boya*)// Bamyán, Panjab, in June

³⁶ According to a study carried out by High Value Horticulture (UK) in 1989/90 on Afghan trade in high value spices and other exotic products- about 30,000 tonne of dried liquorice root from northern Afghanistan was at that time reported as being exported annually from the port of Karachi. Much of it destined for Philip Morris Inc. in the USA.

³⁷ G.Gintzberger et al

WILD PLANTS

FABACEAE (LEGUMINOSAE) LEGUME FAMILY

Latin:

Onobrychis spp./*Onobrychis pulchella* Schrenk

Dari:

Qazr-e Baran

WILD SANFOIN

A number of species of wild *Onobrychis* are found throughout Afghanistan and Central Asia.

Curiously, the valuable cultivated fodder plant *Onobrychis viciifolia* (sanfoin), which is widely cultivated throughout the Central Asian Republics (particularly in Kyrgyzstan and Tajikistan) as well as central and eastern Turkey, has not yet been successfully introduced to Afghanistan. There is

certainly a place for it as it is a valuable cultivated perennial fodder legume suitable for the highlands and is comparatively drought resistant.

The wild *Onobrychis* illustrated here, occurs in N.E. Afghanistan (Takhar and Badakhshan), as well as in Tajikistan. It is characteristic of old cultivated rain-fed land (*lalmi*) and occurs as a weed in rain-fed grain crops. It is known in N.E. Afghanistan as *qazr-e baran* (literally 'rain-drops') because of its hanging seed pods (see image below right). It is often gathered for fodder.



Onobrychis sp. (*qazr-e baran*) // growing as a 'weed' on fallow *lalmi* land before being cut for fodder



Onobrychis sp. showing its characteristic 'rain-drop' seed pods // Rustaq, Takhar, in June

ASTRAGALUS SPP.

More than 300 species of *Astragalus* are found throughout Afghanistan at all altitudes. Some are valuable grazing and fodder plants, others spiny and unpalatable.

The particular species illustrated below – known locally as *zardgul* – is a common mountain perennial that grows in profusion in certain locations between 2,000 and 3,000 metres asl. It is common in Panjab and Waras districts of Bamyan and elsewhere, where it is highly valued as a forage/fodder plant. Its local name derives from its yellow flower.

Not all *Astragalus spp.* are palatable to livestock and some form dense spiny pin-cushion type clumps which are often dug up by the roots as fuel.



Zardgul
(Astragalus
species) // Waras,
Bamyan, in July

WILD PLANTS

SOME OTHER WILD FODDER PLANTS

BORAGINACEAE – BORAGE FAMILY



There are many species of Borage and *Echium* (examples above), which can be used as fodder when dried as part of a 'wild' hay crop, usually in a mixture of species. The flowers of some species are dried and infused like tea.



Selection of mountain plants collected and dried for winter fodder // Ghor, in August



A load of wild hay going back to the village // Darreh Ajar, Kahmard Valley, Bamyan, in July

An example of good community based protection and management of natural resources: The Tagab-e Kishim Valley, Badakhshan



In the Tagab-e Kishim valleys
// Badakhshan, in June 2009



Ligularia sp // to be cut and dried as winter fodder.

Note the rich mixed vegetation and ground collection. When mature, the herbage is cut and dried for winter fodder by the local villagers. For a number of years, under strong local leadership no cutting of trees, up-rooting of woody plants for fuel or hunting had been permitted. Grazing has been strictly controlled and managed.

INDEX OF PLANT NAMES

(BY CHAPTER)

SCIENTIFIC CLASSIFICATION	ENGLISH	DARI	COMMENT
GRAIN CROPS			
<i>Triticum aestivum</i>	Wheat	<i>Gandum</i>	ancient land races still present mainly on rain-fed land + many new varieties
<i>Hordeum vulgare</i>	Barley	<i>Jaw</i>	v. ancient founder crop
<i>Avena sativa</i>	Oats	<i>Yulaf</i>	fodder oats new introduction
<i>Zea mays</i>	Maize	<i>Jawari</i>	introduced but may have reached Afghanistan some centuries ago
<i>Oryza sativa</i>	Rice (Asiatic)	<i>Shaali</i> <i>Bereng</i>	- the crop - the grain
<i>Panicum miliaceum</i>	Common Millet	<i>Arzan</i>	v. ancient
<i>Setaria italica</i>	Foxtail Millet		
LEGUMES & PULSES			
<i>Medicago sativa</i>	Lucerne / Alfalfa	<i>Rishqa</i> <i>Serbest Yonja</i>	v. ancient - common name - in Herat - in Iran
<i>Trifolium resupinatum</i>	Persian Clover	<i>Shaftal</i>	v. ancient
<i>Trifolium alexandrinum</i>	Berseem Egyptian Clover	<i>Shaftal Misri</i>	introduced
<i>Vigna radiata</i>	Mung Bean Green Gram	<i>Maash</i>	v. ancient

SCIENTIFIC CLASSIFICATION	ENGLISH	DARI	COMMENT
LEGUMES & PULSES			
<i>Phaseolus spp</i> mainly <i>P. vulgaris</i>	Phaseolus Beans Green Beans	<i>Lubia</i>	several types introduced
<i>Pisum sativum</i>	Field & Cow Peas	<i>Mushung / Mishing</i> <i>M-gerdi & M. gowi</i>	v. ancient founder crop
<i>Lens culinaris medic</i>	Green Lentil	<i>Nask Adas</i>	v. ancient founder crop
<i>Cicer arietinum</i>	ChickPea	<i>Nakhud</i>	v. ancient founder crop
<i>Vicia faba</i>	Broad (Faba) Bean	<i>Baquli</i>	v. ancient
<i>Vicia spp</i> mainly <i>Vicia ervilia</i>	Vetches mainly Bitter Vetch	<i>Shokhal</i> <i>Gahmoo</i> <i>Talkhak</i>	v. ancient founder crop - general - in north east - in Herat
<i>Lathyrus sativus</i>	Grass Pea	<i>Patak</i> <i>Kalul</i>	- in north east - in centre & n.west
<i>Trigonella foenum-graecum</i>	Fenugreek	<i>Shamlit</i>	v. ancient
OILSEED CROPS			
<i>Brassica spp</i> <i>B. arvensis</i> , <i>B. rapa</i> , <i>B. napus</i> etc	Mustard / Charlock / Oilseed Rape + hybrids	<i>Sharsham</i>	- generic name v. ancient - oilseed rape (canola) - recent introduction
<i>Raphanus spp</i>	Raddish family	<i>Sharsham-e benafshi</i>	mauve 'sharsham' - north east
<i>Arachis hypogaea</i>	Peanut / Ground-nut	<i>Mumpali</i> <i>Badam-e zamini</i>	introduced
<i>Helianthus annuus</i>	Sunflower	<i>Gul-e aftab</i> <i>parast</i>	introduced
<i>Gossypium hirsutum</i>	Cotton	<i>Pakhta / Punba</i> <i>Malooch</i>	v. ancient

INDEX OF PLANT NAMES

SCIENTIFIC CLASSIFICATION	ENGLISH	DARI	COMMENT
OILSEED CROPS			
<i>Linum usitatissimum</i>	Flax / Linseed	<i>Zargher</i>	founder crop
<i>Sesamum indicum</i>	Sesame	<i>Konjed</i>	v. ancient
<i>Carthamus tinctorius</i>	Safflower	<i>Zaferan-e kha'eni</i>	v. ancient in India new in Afghanistan
<i>Glycine max (L) Merr</i>	Soya Bean	<i>Soya</i>	very recent introduction
<i>Papaver somniferum L.</i>	Opium Poppy	<i>Koknar / Apin / Taryoq / Khash khash</i>	v. ancient - the plant -narcotic resin -seed
<i>Olea europaea</i>	Mediterranean Olive	<i>Zeytun</i>	recent introduction mainly to Nangarhar
SOME CROP WEEDS			
<i>Lolium temulentum etc.</i>	many grasses	<i>Alaf</i>	generic
<i>Avena fatua</i>	Wild Oats	<i>Yulaf e sahra</i>	
<i>Elymus spp</i>	Wild Rye	<i>Chavdar-e sahra</i>	
<i>Brassica spp</i>	Charlock / Wild Mustard	<i>Sarsham-e safid</i>	
<i>Rumex spp</i>	Dock	<i>Qaf</i>	
<i>Alhagi spp</i>	Camel Thorn	<i>Khar-e shotur</i>	
<i>Chenopodium spp</i>	Fat Hen etc	<i>Shorak</i>	
<i>Cuminum cyminum</i>	White Cumin	<i>Zireh safid</i>	may be cultivated
<i>Glycyrrhiza glabra</i>	Liquorice	<i>Shirin boya</i>	

SCIENTIFIC CLASSIFICATION	ENGLISH	DARI	COMMENT
MEADOWS AND GARDENS			
<i>Agropyron spp</i>	many grasses	<i>Alaf / Alaf-e sahrari / Alaf-e khodro</i>	
<i>Hordeum spp</i>			
<i>Alopercurus spp</i>			
<i>Aegilops spp</i>			
<i>Festuca spp</i>			
<i>Lolium spp</i>			
<i>Setaria spp</i>			
<i>Poa spp</i>			
<i>and others</i>			
Fabaceae (Leguminosae)			
<i>Trifolium spp</i> (<i>T. repens, T. pretense</i>)	various Clover, Lucerne / Medic, Trefoils, Sweet Clover, Vetches, Milk Vetch, Sainfoin & Pitch Trefoil		
<i>Medicago spp</i>			
<i>Lotus spp</i> (<i>Lotus corniculatus</i>)			
<i>Melilotus spp</i>			
<i>Vicia spp</i>			
<i>Astragalus spp</i>			
<i>Onobrychis spp</i>			
<i>Psoralea spp</i>			
<i>and others</i>			
<i>Mentha spp</i>			Mint
WILD PLANTS OF THE MOUNTAINS & PLAINS			
Apiaceae (Umbellifera)			
<i>Heracleum afghanicum</i>	Afghan Hogweed	<i>Baldaraghan / Baldargho</i>	fed green and dry
<i>Ferula spp</i>	Fennel Species	<i>Khola, Ushai, Ashai, Badian, Badran, Ghaigho, Ghaighun etc</i>	fed dry
<i>Prangos spp</i>	Prangos	<i>Kamai</i>	fed dry
<i>Asafoetida</i>		<i>Hing</i>	

INDEX OF PLANT NAMES

SCIENTIFIC CLASSIFICATION	ENGLISH	DARI	COMMENT
WILD PLANTS OF THE MOUNTAINS & PLAINS			
Polygonaceae (Rhubard)			
<i>Rumex spp</i>	Rhubarb family	<i>Chukri</i>	fed dry, also fuel
Compositae (Asteraceae)			
<i>Cousinia spp</i> <i>Circium spp</i>	Thistle family	<i>Safid khar, Surkh khar, Jaw khar, Shireh khar etc</i>	fed dry, also fuel
<i>Centaurea spp</i>	Knapweed / Cornflower family	<i>Talkhak</i>	fed dry
<i>Anthemis spp</i>	Camomile	<i>Dombeh goo-saleh</i>	fed dry, also medicinal
<i>Artemisia spp</i>	Wormwood	<i>Poosh / Bhutae</i>	grazed in late summer / winter, widely used as fuel
<i>Senecio spp</i>	Cineria	<i>Gawchaq</i>	fed dry
<i>Aster spp</i>	Aster family		
<i>Brassica spp</i>	Mustard family	<i>Sharsham</i>	
<i>Winkleria silaifolia</i>		<i>Pali</i>	fed green and dry
<i>Borago spp</i>	Borage family		fed dry
<i>Echium spp</i>	Bugloss family		fed dry
Fabaceae (Leguminosae) refer to weeds & meadows above			

GLOSSARY OF TERMS

DARI / PASHTO	ENGLISH	COMMENT
Alaf	grass / herbage	generic name
Alafcha	grazing land, pasture	generic name
Alaf-e khodra	wild hay	from gardens, meadows, hill-sides and field boundaries
Aydaq / Yailaq	summer grazing / summer quarters	
Barg	leaf	e.g. seh bageh = clover (i.e. three leaves)
Bagh	garden / orchard	
Baqla-khor	term used for the inhabitants of the upper Panjshir valley	literally- someone who eats broad beans
Bildirchin	Eurasian Quail	Coturnix coturnix
Chaman	natural meadow	usually grazed or mowed for hay as a community resource
Dasht	steppe, open plains, desert	a term with a broad meaning
Chinar	oriental plain tree	Platanus orientalis
Choli	drover / travelling livestock trader	a term used in the Hazarajat (see jalab)
Dayma	rain-fed / dryland cultivation	a term used in north west Afghanistan & Iran (see lalmi)
Dodder (English)	The parasitic weed – <i>Cuscuta spp</i>	a problem in lucerne / alfalfa crops
Garma	late planted crop, usually referring to maize	sown in the late spring i.e in the warm weather (see sarda)

GLOSSARY OF TERMS

DARI / PASHTO	ENGLISH	COMMENT
Gheshlaq also Kishlaq	winter camp / winter quarters / winter village	relating to nomads and trans-humance herders. In Central Asia also a term used for a 'village' (see <i>aylaq</i>)
Hazar dana	a type of rainfed / dry-land wheat popular in north east Afghanistan	literally 'a thousand grains'
Jawraz	traditional oil seed press	also karos & ginee
Jalab	a livestock trader (usually someone who buys livestock to feed up before selling)	See also <i>choli</i>
Jawtarash / Jawtarosh	barley sown for cutting as a green forage crop rather than for grain	
Jawaz (also Kaross & Ginee)	oil-seed press	other regional terms ref. pg 67
Kabuli (Nakhod-e kabuli)	a term used for a type of white chickpea	a term commonly used in India and Pakistan
Kah	straw	<i>kah-ye gandom</i> : wheat straw <i>kah-ye jaw</i> : barley straw <i>kah-ye jawari</i> : maize stover <i>kah-ye shaali</i> : rice straw <i>kah-ye safid</i> : rainfed wheat straw (lit. white straw)
Kawk	Chukor / Chakar Partridge	<i>Alectoris chukar</i> (in Iran <i>kabk</i>)
Kahgel	wet mud mixed with chopped straw	for making plaster (and adobe bricks) <i>khesht</i> for building
Khash khash	Opium Poppy seed	not narcotic. Widely used in confectionary trade and for vegetable oil in Badakhshan
Khesht	mud and straw plaster	
Koh / Kohistan	mountain / highlands	also a region of mountainous country north of Kabul

DARI / PASHTO	ENGLISH	COMMENT
Kol khosheh	a type of very drought resistant rainfed / dryland wheat popular in south west Afghanistan (Kandahar etc)	literally 'bald headed' i.e. the spike is without awns
Konjola / Kunjawra	oil seed 'cake' (residue) fed to cattle	generic
Kuchi	a term used for 'nomads' mainly those belonging to Pashto speaking clans	from the verb root <i>kuch</i> , literally to wander about. See also <i>maldar</i>
Lalmi	rainfed / dryland cultivation	the term widely used in Afghanistan (see <i>dayma</i>)
Maldar	pastoralist / herdsman	literally the owner of livestock <i>mal</i> . The term used generically for both nomads and transhumance herders. See also <i>kuchi</i>
Maska	butter	
Mushung-e gerdi	small grained field pea preferred to human consumption	literally 'round' pea.
Mushung-e gawi	larger grained field pea preferred for feeding cattle	literally 'cow pea'
Rishqa-e kofi	a local type of lucerne/ alfalfa suitable for rainfed / dryland conditions in the high elevations	literally 'mountain' lucerne
Roghan-e zard	ghee - traditional butter	literally yellow fat
Saag	a vegetable dish made from spinach (palak) or Persian clover (shaftal)	

GLOSSARY OF TERMS

DARI / PASHTO	ENGLISH	COMMENT
<i>Saray</i>	traditional name for a wayside inn	as in caravan saray traditional place where travellers and 'drovers' can stay the night with their animals (usually one day's march apart)
<i>Shaftal khor</i>	term used for the inhabitants of the lower Panjshir valley	literally 'clover eaters', see also <i>baqla khor</i>
Stover (English)	the straw of coarse grains like maize	
<i>Talkhaq</i>	term used for several different plants and pulses with a bitter taste	used for 'bitter vetch' (<i>vicia ervil-ia</i>) as well as for various species of <i>Centaurea spp</i> gathered and dried for winter fodder.
<i>Tandor</i>	traditional bread oven	
<i>Taryoq</i>	opium resin	the narcotic resin extracted from the seed capsules of the opium poppy after the petals have fallen.
<i>Tir-e mah</i>	the late autumn	literally the 'passing month' the end of the season before the winter

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complete). Includes more than ten thousand species of flowering plant, gymnosperms, and ferns. Significantly for this field guide the Flora includes: -53 species of *Ferula* within Apiaceae, 353 species of *Cousinia* within the Asteraceae; 126 genera within the Brassicaceae, more than 1000 species of *Astragalus* & *Astracantha* within the Fabaceae etc. Vienna, Austria.

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NOTES

CUSTOMARY UNITS OF MEASUREMENT IN AFGHANISTAN

AFGHAN MEASUREMENT	METRIC SYSTEM
Distance and Length	
<i>manzil</i>	A stage in a traveler's journey or the notional distance that might be travelled in one day. Also a stage in the spiritual journey of a Sufi.
<i>kuruh</i>	1.5-1.7 miles / 2.4 to 2.74 kms (in reality a variable time / distance travelled with baggage animals)
<i>farsakh or farsang</i>	Derived from the Ancient Greek <i>parasang</i> (ref. Xenophon's - Anabasis. Approximately 10 stades) Traditionally a variable measure of time / distance that may be covered with loaded baggage animals in an hour. In rural Afghanistan and 19th century Iran approximately 6.25 km. In modern Iran now officially established as a metric unit of 10 kms.
<i>bidist, wajab</i>	Handspan from little finger tip to thumb (about 9 inches or 23 cms)
Mass / Weight	
<i>Many of the following measures although not official are still commonly used by the local rural populations</i>	
1 ser of Kabul <i>(sometimes referred to as maund or mond, e.g. in Jalalabad)</i>	7.066 kg/15.8 lb (The official measure of Afghanistan usually equated as 7 kgs)
<i>Note: However, different weights and measures are still customarily used in different parts of Afghanistan by the rural population. Thus:</i>	
1 man of Kandahar	3 kg (used in S.West Afghanistan)
1 man of Herat / Khorasan	3.5 kg (used in N.West Afghanistan & N.East Iran)
1 man of Peshawar (used in Jalalabad)	5 kg
1 man of Balkh (used in Mazar & the North)	14 kg

AFGHAN MEASUREMENT	METRIC SYSTEM
Mass / Weight	
1 kharwar of Kandahar (used in the S. West)	450 kg / 1000 lbs
1 kharwar of Herat / Khorasan (used in N. West Afghanistan and N. East Iran)	400 kg
<i>Note: kharwar is derived from 'donkey load' or khar bar</i>	
1 pao or pau 1 chahrak	¼ of a seer
1 chakha (for weighing small seed)	1.4 kg
1 mescal (for weighing very small objects)	approximately 4.5 gram
Area	
1 jerib	2000 m² / 0.2 hectare / 0.4942 acre (usually equated at 3 <i>jerib</i> = 1 acre or 5 <i>jerib</i> = 1 hectare)
1 tanab	Same as <i>jerib</i> , in northern Afghanistan (Turkestan)
1 juft-e gaw (juft)	A unit of irrigated land used mainly in Herat and N.West Afghanistan and N.E. Iran derived from what a yoke (pair) of oxen (<i>gaw/gaw</i>) can plough in one day. Varies with the type of land. (between 3 and 5 jerib)
1 biswa	100 m² (commonly used in the case of small farmers growing high value crops such as opium)
1 qulbah	40 <i>jerib</i> , or 20 acres
1 gulbah / gulbeh bast	120 jerib unit of rain-fed <i>dayima</i> land in N. West Afghanistan