Research and Public Consultation Document

(Draft) 2004

Afghanistan in the 21st Century: sowing the seeds of sustainable development.

An economic and environmental alternative to narcotic cultivation and the depletion of forest resources in Afghanistan.

Author: Marc Robert Deeley B.A hons, M.Env.S
Research and Project Development
Spirit Aid Ltd (UK)

Abstract:

The aim of this work is threefold. Firstly, reducing or eliminating opium production in Afghanistan will reduce the availability of heroin to Scotland's 56,000 registered users, it will also prevent communities being flooded with cheap drugs – thus preventing people beginning a heroin habit - and will greatly assist tackle the increasingly serious problem of opium and heroin addiction in Afghanistan, especially in Kabul City. Afghanistan currently supplies 75% of global opium production (UNDCP). The impact of opiate addition is negative in the extreme for individuals and communities, regardless of location. Secondly, the people of Afghanistan require a means of sustainable income now and in future. This has to be achieved in a context of limited resources i.e. availability of arable land and the gradual return of some 4 million displaced individuals (refugees). In a country where 80% of the population derive a living from the land, the focus for this project is on the introduction of high value annual crops (specifically hemp) to replace opium while *also* addressing the most serious environmental challenges faced by Afghanistan in the 21st Century – that forms the third aspect of this work. Tackling local environmental problems such as deforestation, soil erosion, desertification and the pollution of ground water will increase the ability of Afghans to meet the economic needs of their families and communities in future. This work aims to be a long term approach to these problems but with short term and immediate benefits. Food security and the nutritional quality of that food is also a central issue of this work. Following on the recommendations of the Intergovernmental Panel on Climate Change (IPCC), these local problems are addressed within the wider context of global climate change. This proposal will make an empirically based case for the integration of industrial hemp (Cannabis *Sativa L.*) into sustainable systems of rotation agriculture, including the introduction of *ruderallis* (wild) varieties into areas of marginal economic significance for the remediation of environmental problems and to provide an immediate income and/or use value for geographically isolated communities. Maintaining a genetically diverse and well planned land management strategy will enable the production of industrial hemp to be used as a building material/composite, textile, fuel and food product – thus providing several practical incentives to replace the opium poppy crops set to occupy more than 80,000 hectares of arable farmland in 2004 (United Nations, 2001, 2002, 2003), producing >4000 metric tons of opium: 75% of which is destined for the European Union as heroin.

This project is intended to be replicable in so far as the principles used could potentially benefit our brothers and sisters around the world who continue to be plagued by armed conflict, drug cultivation, poverty and environmental destruction, often in combination.

For more information or to arrange a meeting to discuss the contents of this document please send an email with the subject heading "Afghanistan" to marc@spiritaid.org.uk

Contents:

Section 1:

Executive Summary

"In the middle of difficulty lies opportunity". Albert Einstein.

Einstein was correct in so far as there is no shortage of opportunity in the 21st Century, especially in Afghanistan. Decades of conflict have held back development in this country to an incredible degree. We cannot underestimate the low baseline from which Afghanistan must develop in the 21st Century. Depletion of forests is one of the most serious concerns. The increasing demand for wood used in heating and cooking applications, combined with illegal logging and conflict has reduced the amount of forest by as much as 70-80 percent in some areas (UNEP, 2003). If the current situation is allowed to continue it is estimated that there will be almost no forest left by 2009, posing a grave threat to soil quality, food security, biodiversity and the survival of millions of Afghan people.

This proposal identifies and offers solutions to these complex and inter-related issues using an approach that integrates environmental, social and economic dimensions to produce a relatively simple answer based on scientific and social understanding. The primary objective is to ensure future prosperity by creating an immediate income where it is needed most using environmentally beneficial (or sustainable) methodology.

In section two of this proposal we discuss the socio-environmental problems faced by Afghanistan and set up the context for the introduction of a sustainable land management strategy that will help ensure long-term food security, adding value to local industry (specifically agriculture) and providing a renewable resource base to ensure short and long term economic benefits. The soil is our greatest resource.

Section three looks specifically at industrial hemp in Afghanistan and how our proposal will help address several key social and environmental challenges.

Section four examines the technological developments that Afghanistan could look forward to in the near future by beginning a land management strategy aimed at securing an industrial resource base for sustainable, cellulose-based (biomass) energy production. We summarise some of the key technologies necessary to free Afghanistan from dependence on non-renewable resources.

Section five explains how these agricultural, environmental and economic components are linked to assist the overall objective of climate change mitigation. Of course this is a global problem, but taking action as an individual country will set a striking example of how wealth generating domestic industry can form the basis for a sustainable climate change mitigation strategy that addresses immediate social and environmental concerns.

Section six outlines some of the available funding resources additional to the aid promised by the individual members of the international community (UN).

Section seven outlines our plans for a UK based project beginning with a feasibility study to create a replicable farm-scale project aimed at supporting the proposal in Afghanistan via capacity building, training and technology transfer.

Section eight describes the international legal framework that permits industrial hemp cultivation and cannabis cultivation in general for both industrial and medical purposes.

Section nine concludes the document.

Section ten consists of our reference material.

1.0 Introduction

Afghanistan has experienced over two decades of armed conflict which has had a severely negative impact on both people and environment. As many as 2 million Afghanis have died as a result of conflict, while the environment has also been devastated. In 2003, the United Nations Environment Programme (UNEP) pointed out that there is a "close link between humanitarian and environmental needs". It is the intention of this proposal to go further than this. It is not so much that there is a close link between humanitarian and environmental needs: there is no visible or practical separation whatsoever, especially in Afghanistan.

80% of Afghans depend on the land for their economic needs, and indeed their survival. It is a harsh reality alien to most people in the West, although global problems, such as climate change, are affecting us *all* now, whether in terms of the cost of fuel, insurance against flooding or in the creation of environmental refugees. In short, we do not live separately from our environment: we are an intrinsic *part* of it. We have the ability *and* choice to live in harmony with it, allowing future generations the same luxury and economic opportunities. We even have the ability to enhance these depending on the choices and opportunities we *create.*

Afghanistan presents us with a unique opportunity to affect positive change in the 21st Century, not least because the problems Afghanistan faces will affect us all to some extent. According to the United States Agency for International Development (USAID) 6 million Afghans depend on food aid. But at the same time the population has been minus around 4 million people due to conflict and the socio-environmental conditions affecting agriculture and therefore food security.

Over the next decade there will be added pressures on the Afghan natural resource base to provide food and shelter for a returning and therefore rapidly expanding population. Moreover, the complex of issues facing this country requires a strategic and long term approach that will *positively* encourage self sufficiency and industrial capacity building. Afghanistan's agricultural base and resources will be fundamental in achieving these objectives but it is also the case that the agricultural sector is limited by many inter-related and overtly environmental problems that require urgent attention.

The problems facing Afghanistan necessitate careful consideration with regard to the possible 'solutions'. For example, the United States Agency for International Development (USAID) has strongly encouraged cultivation of high value crops in a programme area covering 18,000 farmers in Helmand Province, the idea being to "diversify crops" and "replace opium" - a three fold increase in cotton (*Gossypium L.*) production in the region has been heralded as a successful outcome by USAID.

From either a social or environmental perspective this is completely misguided. Increasing cotton production is not a long term solution to either opium replacement or food security in Afghanistan. Moreover, cotton is one of the most water inefficient and chemically dependent crops that could possibly be "chosen" for cultivation in this area. UNEP (2003) pointed out that cotton crops were being irrigated even during drought, which was having a negative impact on communities living downstream from the cotton production.[1]

Similar arguments apply to tree planting projects such as that being encouraged by the US government which is intended to provide jobs for "ex-combatants".[2] In many areas tree planting - no matter how well intentioned this is – will not help communities meet their immediate economic needs, nor will it prevent run-off, the drainage of soil nutrients past the root systems or indeed the increasing salinity of dry land areas: the latter being a very serious problem for the future of agriculture in Afghanistan. Tree planting is costly and requires a thorough environmental assessment of the land intended for planting, including a detailed evaluation of the type of trees to be used and subsequent long term management of this land.

1 Opium production in Helmand Province could also have declined in 2003 perhaps in part to drought conditions and/or a resurgence in the Taliban who consider opium "un-Islamic" (UNDCP, 2003, Sedra, 2004). This year (2004) the overall national statistics based on a UNODC (2004) survey of farming households' intentions is expected to see another increase, surpassing all previous poppy production at over 80,000ha. 69% of all farmers interviewed in poppy growing regions of Afghanistan reported intentions to increase poppy cultivation in 2004, 16% to keep stable, and only 4% to reduce poppy cultivation. 11% provided no answer (UNODC, 2004).
2 Presumably not including those residing at Guantanamo Bay.

Tree planting is not being considered in this document primarily because there are no tangible short term incentives besides the obvious employment of thousands of low paid workers.[3]

If we aim to increase employment there are several better ways to achieve this in line with both opium replacement and the environmental objectives to be discussed later. As a long term strategy to rebuilding Afghanistan's natural resource base, tree planting will require comprehensive evaluation at local and national levels and a huge injection of foreign currency to secure in the long term via the required capacity building measures in areas of training, environmental planning, topological preparation and resource management. None of these activities have yet been initiated.

To assist Afghanistan in achieving mutually beneficial results as part of the international community (such as food security, poverty reduction, opium replacement, preservation of biodiversity and climate change mitigation) we must work with what we have, and to risk stating the obvious these aims depend entirely on the existing agricultural economy of Afghanistan.

We need to focus on enhancing the existing expertise in agriculture, including supporting community structures and governance with an emphasis on the local knowledge of irrigation systems, cultivation and the processing and/or marketing of agricultural products.

Cotton was never a widely grown crop in Afghanistan primarily because of the high altitudes to which cotton is not suited and also the cost. Most Afghans cannot afford to buy cotton products. Historically, the Afghan textile industry was famous for its rugs and weaving using natural long fibres from Flax, Ramie and Hemp. The shorter fibres of these crops produced a coarser grade of yarn that was, at least historically, used for the local production of affordable, hard wearing clothing and footware.

---

3 Even the attempt(s) by the international community to create an "Afghan army" have failed, among other things, because "troops" who have not been paid by the Interim Authority often desert the army to work in the drug trade, including farming. Farm Labourers can earn up to $6.8 *per day* for harvesting opium (UNODC, 2004). Income for a "soldier" can range between $30 for a rookie and $70 for a sergeant per month (Scott Tyson, 2003). How on earth can we realistically create the peace required to plant trees under these circumstances? Answer: pay people for the work they are preferably *trained* to carry out and provide suitable alternatives to replace poppy cultivation.

A central research objective emanating from this work will be to survey local knowledge bases in Afghanistan to establish processes best suited to topography, climate and society.

Although the central aim of this project is to relieve the pressure on the remaining forests of Afghanistan there are two fundamentally international issues that require urgent attention. The first of these is the production of opium. Historically, Afghanistan has always produced opium and cannabis for local consumption. These substances are both effective medicinal drugs and this project does *not* seek to eradicate the ability for communities to produce their own medicines. We do not advocate dependence on synthetic pharmaceuticals. The problem is in the industrial scale production of opium and its subsequent refinement into heroin destined for export and the escalation of a domestic drug problem in Afghanistan. The present level of poppy cultivation has completely saturated an already supply driven opiate market in Afghanistan - particularly in Kabul City - with very cheap and even 'free' opium (UNODC, 2003).

To complement opium replacement, we are also advocating a drug education and awareness programme in Afghanistan and encourage the active support of other donor organisations operating in the country to help get the message across to the young people of Afghanistan (under 18) who comprise around 50% of the population.

There are actually several inter-linking issues here that require urgent attention by the international community. A considerable and related problem to overcome is the arming of local militia groups and the support that has been afforded warlords and/or commanders who are allegedly assisting coalition troops in ousting the Taliban regime. The effect of this policy – which both the Pentagon and CIA warned against prior to the invasion (Gordon, 2002) - has been to re-empower groups so violent and criminal that many people in Afghanistan had initially welcomed the Taliban regime in 1996. According to Human Rights Watch "security has been put in the hands of those who pose the greatest threat to it" (Huber, 2003).

The situation for many (especially) women in Afghanistan is now more severe than it was under Taliban rule (see Appendix 1). How do we protect trees and soil when even women and children are not being afforded adequate protection in Afghanistan?

Following a week researching this topic in greater detail, I came to the conclusion that we must not give up securing a sustainable resource base for Afghanistan and the replacement of opium. Food security is such a fundamental issue that tackling the present crisis will have profoundly positive implications for civil society as a whole – provided that we are honest in our aims and can *demonstrate* our objectives to the various Afghan communities.

In order to make reconstruction possible the international community must intervene to create a properly trained (and remunerated) civilian police force and to disarm all fundamentalist militia groups, including members of the so-called 'Northern Alliance'. That is almost as urgent a requirement as landmine clearance and on both of these issues we call for an *urgent and immediate* response by the international community.

Perhaps we should also be asking more fundamental questions regarding the direction of civilisation or "progress" in the 21st Century, especially in terms of the relationship between certain industrial and military objectives focused on the Middle East and Central Asia. I refer specifically to oil, opium and the military control of these resources. Increasing tensions and violence in Uzbekistan and Georgia threaten to 'Balkanize' Russia (which has an intact nuclear arsenal), creating a perpetual state of conflict in Central Asia that would pose a grave danger to global security. We need to consider the lessons of our "war on drugs" and ask where we realistically expect a "war on terror" to lead.

To fail in this task following our invasion is to betray ourselves i.e. our modernity (freedom, emancipation, democracy and 'progress') *and* most importantly - the people of Afghanistan. In 2004, much of the country remains a war zone with high civilian and child casualties (Noor Khan, Associated Press, Jan 19th 2004), the death of foreign aid workers and a climate of fear that can only prevent meaningful reconstruction. More than 550 people have been killed over the past six months,

making it the most violent period in the two years that have elapsed since the fall of the Taliban regime (Sedra, 2004).

Besides the terror inflicted by continued coalition air strikes and lawless militiamen, industrial scale production of opium is a central and related problem. Non-governmental organisations can do little about geo-politics and military objectives, but we can certainly assist in the replacement of opium and thus help move the country closer towards a state of peace and prosperity.

Opium cultivation presents us with a very serious problem in Afghanistan, and not just as an illegal industry worth billions of dollars that people fight and die for control over (Norton-Taylor and agencies, 2004). Opium cultivation also poses a direct threat to food security. Given the agricultural requirements of opium cultivation, winter wheat crops continue to be displaced by opium; despite the fact that wheat is the nations' staple food crop.

While it is the case that endemic poverty in Afghanistan is the major incentive for farmers to grow opium, it is also likely that the armed militias who are profiting from this illegal trade are also *forcing* farmers into opium production. According to the UNODC (2004), 9% of farmers reported the "influence" of others as a reason for poppy cultivation, but many will be wary of talking about this situation: people have pride and do not like admitting to what may be perceived as weakness by themselves or others.

The rapid increase of opium production in post-Taliban Afghanistan would lend credence to this view, especially in terms of the number of provinces cultivating opium poppy for the first time in their history. It may seem logical to argue that opium farmers have the disposable income to purchase the food and goods that their families require but it is also the case that the replacement of wheat by poppy limits the control families have over their *subsistence*. Moreover, many farming communities are subject to opium taxes up to and perhaps even above 40% by local military commanders – or "warlords" (UNODC, 2004). Many farmers receive a much lower price than is assumed by the international community.

Where is the evidence for this? People are still starving and suffering malnutrition. If the 80,000ha of opium grown in 2003 did not bring farmers and communities millions of dollars to buy food, clothing and fuel we can only assume that this revenue is being controlled by the same criminal groups that seized power after the Soviet withdrawal in 1992 and who have since regained power (and "legitimacy") in 2001 by assisting coalition forces to 'oust' the Taliban regime. According to my research on this topic, those women with the courage to speak out in Afghanistan would seem to agree with this conclusion **(see Appendix 1)**.

Afghanistan presents a uniquely complicated scenario for reconstruction. There are a plethora of inter-related issues dealt with in this proposal and as such it is not my intention to concentrate too heavily on the drugs issue, although section one of this document highlights the connectedness of this global problem with particular regard to the worsening problems in Scotland. It is explicitly argued that since those allegedly fighting a "war on drugs" have only really focused their attention on the policing, incarceration and/or treatment of drug addicts, it is about time that we united to focus on an opium replacement project for the World's primary opium supplier.

Linking opium replacement with the inter-related issues of food security, poverty, land use, land degradation, water and forest resources will produce immediate and highly practical incentives for poppy farmers to reduce or even eliminate their export driven opium cultivation. The implementation of such a direct approach to Afghanistan's socio-environmental challenges and an increasingly serious drug problem in Scotland will produce an effective cross-sectoral strategy for meaningful reconstruction in Afghanistan.

Opium poppy growing in Afghanistan, Kunar province.

Picture: Anthony Fitzherbert, FAO, 2001

Left: Afghan women "chasing the dragon".

Right: A Heroin addict in Kabul City "flushes" his syringe.[4]

Below: Pre "war on drugs" heroin advert by Bayer (circa 1920).

BAYER

PHARMACEUTICAL PRODUCTS.

We are now sending to Physicians throughout the United States literature and samples of

ASPIRIN

The substitute for the Salicylates, agreeable of taste, free from unpleasant after-effects.

HEROIN

The Sedative for Coughs,

HEROIN HYDROCHLORIDE

Its water-soluble salt.

You will have call for them. Order a supply from your Jobber.

Write for literature to

FARBENFABRIKEN OF ELBERFELD CO.

40 Stone Street, New York.

---

4 Pictures taken from United Nations Office on Drugs and Crime: Community Drug Profile # 5 Assessment of problem drug use in Kabul City, July 2003.

1.1 Drugs in the 21st Century

1.1.0 Scotland: the facts

The opium produced in Afghanistan will more often than not end up in the EU, while a disproportionate amount of this heroin ends up on the streets of Scotland. 56,000 Scots or *one in ninety* of the population are heroin addicts according to the country's first heroin census, produced by Professor Neil McKeganey at Glasgow University (Thompson, 2001). Children are the ones who suffer most in all this; the children of addicts, children born into addiction and the lifestyle that this involves are more likely to suffer neglect, or be put into care due to parents being incarcerated. This in turn affects their education and increases the risk of them becoming heroin users. Poor education and unemployment are major contributing factors to drug use in Scotland *and* Afghanistan.

There are around 3,600 registered addicts in Aberdeen compared to 16,000 in Greater Glasgow, although the number of young addicts (17-29 years old) in Grampian is an increasingly worrying trend. Dr Wisley of Fraserburgh reports that one in five of the young men attending his practice, which covers 13,000 of the population, are heroin addicts.

Local addicts blame dealers for "introducing" the problem in order to fuel their own habits, but that is just the tip of the iceberg. With the overthrow of the Taliban in Afghanistan, and according to the UNDCP[5], opium cultivation increased by as much as 657% in some areas during 2002 (in relation to its 2000 level). In 2000, opium cultivation had fallen to an estimated 7606ha as the result of a Taliban enforced ban that reduced production by 91%, leaving the remainder controlled by the 'Northern Alliance' and other militias.

5 United Nations Drug Control Programme: Opium Poppy Survey, Afghanistan 2000, 2001, 2002 and 2003.

Opium production is currently estimated by the UNDCP to be in the order of 80000ha with more recent figures (UNODC, 2004) estimating production on >91,000 hectares of land in 2004.[6]

Three quarters of all Afghan opium is destined for Europe, which means in 2002/3 around 4000 metric tons did so. Thus we have a 15 percent increase in heroin related deaths in Scotland over the same period. (BBC Scotland, 28th August, 2003). There has been a 70 percent increase in drug related fatalities in Scotland since 1997 (The Scotsman, 29th August, 2003).

1.1.1 Supply or demand?

The global drugs trade is supply driven. Demand is created by flooding communities with cheap drugs, then altering supply to increase the cost, so and so forth, until lucrative "markets" are established. This applies equally to both Glasgow and Kabul. It is the people who *profit* from this industry that create the demand. It is not the poor farmers of Afghanistan making multi billion dollar profits from this trade in human suffering. They receive less than half a percent of the income generated by their opium poppy cultivation.

1.1.2 'War on drugs?'

With official figures suggesting that one in ninety of the Scottish population use heroin, (perhaps as much as one in fifty of the *adult* population) can we really claim to be fighting a war on drugs? We have an obligation to look long and hard at this situation. Research commissioned by the UK Home Office from a team at York University suggests that the annual economic costs are between £3.7 billion and £6.8 billion. Most of these costs fall on the criminal justice system because of high crime levels linked to drugs and include insurance payouts, repairs to damaged property, time lost at work and victim counselling. When the total social costs are added, the bill rises to between £10.9 billion and £18.8 billion.

---

6 Without insinuating that the Taliban were "ok" it should be made clear that they intimidated and even butchered opium farmers in order to reduce cultivation from 80,000 ha in 1999 to less than 8000 ha in 2000. The Taliban regime survived by living off stockpiled opium while also receiving area (per ha) payments from the international community for *not* growing opium.

This cost is attributed to problem users of heroin and crack cocaine, who the research says are responsible for 99% of these costs with each addict costing the taxpayer £30,000 a year (Johnston, 2002). According to Caroline Flint MP, Home Office drugs minister, the UK government is set to spend £503m on treatment provision alone in 2004 (The Guardian, Tuesday, February 24th, 2004).

In Fraserburgh, this (treatment) means prescribing tablets of the opiate substitute dihydrocodeine. Between February 1997 and April 1998 Dr Wisley prescribed 3662 tablets. For the same period in 1999-2000, 83,000 tablets were prescribed (Millar, 2001). In line with the massive increase in Afghan opium production during the same period until 2003, it is safe to assume this number has increased yet further, although there was also an increase in Scotland's drug deaths during the same period, most of which are attributable to overdoses on heroin and the clinically prescribed opiate, methodone – often in combination with each other.

Pumping money into treatment for drug addicts is not a *long-term* solution to this problem. The opium is still produced. It still finances arms sales and military and/or terrorist operations from Chechnya to Iraq and beyond. Moreover, the smugglers and dealers operating at the international level are presiding over the largest quantity of the purest heroin to ever reach the streets of the UK. According to Dr Herbert Schaepe, Secretary of the International Narcotics Control Board, 'The heroin coming in from Afghanistan now is so pure that smoking it will give users enough of a kick to get them hooked.' Dealers are increasingly marketing this high grade heroin to middle class consumers as "safer than injecting". While the quality is increasing, the price is falling due in part to the massive increases in Afghan poppy cultivation (Hill, 2004).

Most disturbing is that the money (laundered) is still finding its way onto Wall Street. The drug addict population continues to increase and the only people who profit are pharmaceutical companies who manufacture "substitutes", the criminals who "cut" the heroin and those who profit from our increasingly privatized prison system.

It is a *global market in human suffering*[7] worth upwards of 4 *Trillion* US dollars per annum.[8]

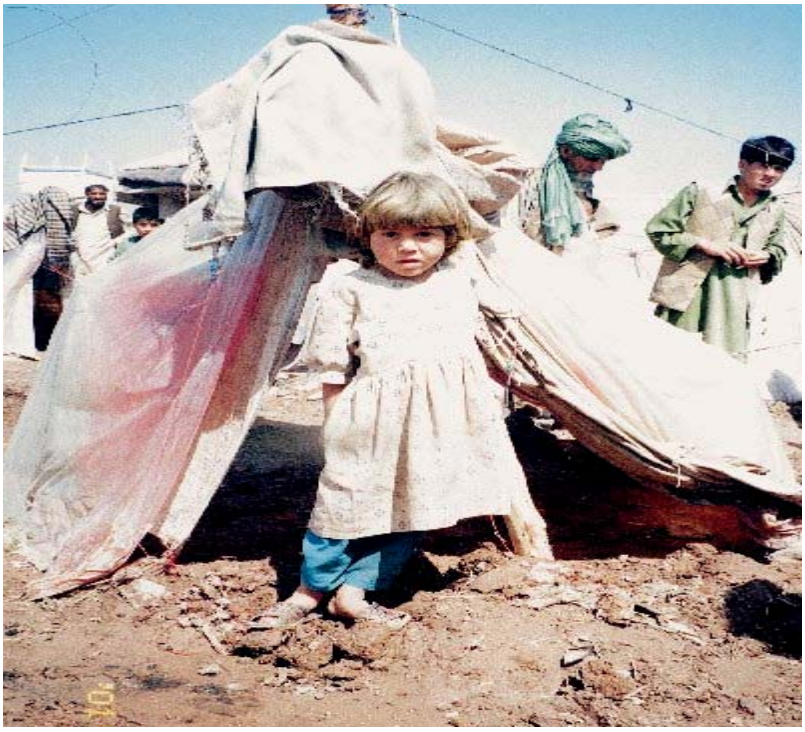
If we were to *actually* fight a 'war on drugs' we must supply alternative means of income to the farmers in Afghanistan (this applies equally to Colombia, Burma, Cambodia and Laos etc) and have these initiatives supported, implemented and verified by the United Nations. That is *one* point of this document: to create the impetus and pathway for radical change: beginning with a drastic reduction to 75% of the global opium supply coming from Afghanistan.

If we are able to drastically reduce the supply of illegal drugs, the demand will follow. There can be no question that this industry is supply driven. Education at home *and* in drug producing regions combined with a sustainable alternative income for opium and cocaine producing countries are the only realistic means to tackle a drug problem that results in community and family breakdown, increased crime rates and the unnecessary suffering of our children.

The future for global anti-addiction policy should begin with the sustainable long term replacement of industrial opium production in Afghanistan.

7 This phrase was so accurately used by Greg Palast in his bestselling book 'The Best Democracy Money Can Buy' to describe the "war on drugs".

8 This figure is based on a former investment bankers (Catherine Austin Fitz) estimate of money laundered through the international banking system (including the multiplier effect of dollar cash transactions) and does NOT include the profits made by either drug companies, private prison operators (Wackenhut) and other CIA proprietary companies such as Southern Air, Evergreen and the additional CIA contract operations that have been establishing a presence in the Uzbek capital since 2000, at a time when Uzbekistan was "awash" in a sea of poppies during the Taliban imposed opium ban in Afghanistan 2000. CIA operative Richard Secord has also travelled to Tashkent (the Uzbek capital). Secord's documented history of involvement in heroin smuggling, from Vietnam, Laos and Thailand in the 1960's and his criminal involvement in illegal operations, including drug smuggling during the Iran-Contra years (Ruppert, M.C 2001) should be sounding alarm bells to the international community. It would appear that the "war on drugs" is a literal concept.



"Migration, poverty and sadness led people to use opium, then it became habitual. Some refugees used opium to make their life easier as they were away from their family and country". [9]

9 Statement made by an Afghan male in an interview conducted as part of an assessment of drug use in Kabul by United Nations Office on Drugs and Crime (2003),

Section 2:

Problems and Solutions for Afghanistan in the 21st Century

2.0 Overview

Few children anywhere in the World have suffered more than those born in Afghanistan. In a country of 22 million people, children (16 and under) make up around 40 percent of the population. Around 4 million Afghanis have been made refugees as a direct result of war, foreign military occupation, drought and the socio-environmental destruction these have brought. Many children are orphans, unable to flee their hardship and have been left to fend for themselves in one of the most dangerous and impoverished countries on Earth. Some are able to find employment working 12 hour shifts (*and* then sleeping) in dangerous plastics factories (United Nations Environment Programme, 2003) while others find work harvesting opium gum or salvaging scraps from unmonitored and dangerous waste dumping sites.

Children harvesting opium gum

Picture: UNDCP Annual Opium Poppy Survey (Afghanistan) 2001.

Children search for scraps on dumpsite.

Picture by Soren Hvilshoj, UNEP 2003

Despite the tremendous difficulties faced, many adults and their families are now returning to their country (1.8 million refugees returned in Dec 2002). Decades of war and more recently drought, have contributed to a continuingly unstable and volatile environment. The environmental pressures of war and drought have seen a rural population of 94 percent (of total population) decline to around 78 percent in recent years. This is a steady trend across all 32 provinces (UNEP, 2003).

Urban migration would make sense if there were the jobs, industry and infrastructure to support increasing populations in the urban centres but this is clearly not the case. UNEP (2003) reports that access to clean drinking water and electricity in the urban centres is either non-existent or very limited. Moreover, there are also severe problems in urban areas with waste disposal and sewage, both of which have a direct negative impact on the possibility of there being any suitable drinking water when comparisons are made with the minimum EU standards for drinking water.

The situation of the majority of people living outside the urban centres is so bad in some areas that it is *forcing* migration to the towns. Food security is a fundamental part of this crisis.

The ability of communities to produce enough food is dependent on several factors, all of which are inter-related. War and drought obviously play a major role in this problem. Afghanistan is perhaps the most land-mined country in the World, while unexploded ordinance from over 20 years of conflict is a massive problem in general. The CIA estimates that Afghanistan has more than 10 million unexploded landmines. War has taken its toll on the soil via the removal of vast areas of forest and woodland that would have otherwise supported communities with a steady income in the past. Loss of forest cover in Afghanistan ranges from at least 50 and 70 percent across all 32 provinces (UNEP, 2003).

The intensive use of landmines in some areas has forced people to move permanently or to farm on marginal land thus expanding agricultural activities into more ecologically fragile areas with limited or no success.

Water resources are also a major problem for Afghan society, although despite the fact there has been a three/four year drought in the region, UNEP (2003) points out that on the basis of 'broad calculations' Afghanistan as a whole uses less than one third of its potential 75,000 million m^3 water resources (p53). Such calculations, no matter how broad, would lead one to assume that conflict and the resulting social disruption has been the most damaging impact on Afghanistan.

For example, Kabul's water system is losing up to 60% of its supply because of leaks and illegal use. Alex Kirby (BBC, 29 January, 2003) quotes Dr Klaus Toepfer, UNEP's executive director:

"Over 80% of Afghan people live in rural areas, yet they have seen many of their basic resources - water for irrigation, trees for food and fuel - lost in just a generation. In urban areas the most basic necessity for human wellbeing - safe water - may be reaching as few as 12% of the people."

Conflict is responsible for huge disruption and destruction of water supply mechanisms, including the local and regional governance structures that in the past kept the system of water delivery running effectively. UNEP (2003) noted that even under recent drought conditions water was being fed into irrigated land to support cotton crops at the expense of communities living downstream.

It is also likely that the allied aerial bombardment of Afghanistan (post-9/11) will have had a serious impact on the *Karez* system (underground aquifers) used to feed crops and which have supported agriculture in rural and often remote areas for several hundred if not thousands of years. A considerable amount of research on topics such as this is still required.

With the collapse of local, provincial and national governance structures all aspects of civil and economic society have been adversely affected, not least in areas of environmental concern. In particular is the illegal logging of Afghanistan's remaining forest resources, most of which are destined for the export market to neighbouring Pakistan. Lack of governance has created a lawless and dangerous environment where communities have lost control over their natural and local resources (UNEP, 2003).

Lack of governance brings us to the last point I wish to make in this overview, and that is the rapid and widespread cultivation of the opium poppy in almost every province of Afghanistan since the over-throw of the Taliban regime. There used to be roughly five or six provinces cultivating this crop in 1994, which has increased to 28 out of 32 in 2002/3 (UNDCP, 2002, 2003). Opium production will continue to increase in volume unless immediate support is given to both communities and farmers to find economic alternatives. We must also assist Afghan civil society to demilitarise the militias who control and profit from this industry.

Opium cultivation is seriously affecting food security by displacing wheat crops in all of the major irrigated and rain-fed agricultural areas of the country. A total land area of around 91,000ha is now estimated to be dedicated to poppy cultivation. The estimated yield of fresh opium will range from between 5000 and 6000 metric tons in 2004 (UNODC, 2004), most of which (75% according to United Nations Drug Control Programme) will end up as heroin in the European market.

We cannot and must not blame Afghan farmers for cultivating this crop. In perhaps the poorest country on earth, the income derived from poppy will (in theory) enable families and entire communities to survive; to buy in food and clothing. But we must decide how serious we are about actually fighting a "war on drugs". In fact, it is probably about time that we dispensed with this terminology altogether as it is far from helpful. We need to acknowledge that the "war on drugs" has been an abject failure in terms of its aims and objectives compared with what has actually been achieved. We need to ask some fundamental questions about the proponents of this "war" – especially given the fact that since allied forces 'liberated' Afghanistan and gave legitimacy (and weapons) to the militias who fought the Taliban, opium production increased by as much as 657% (UNDCP, 2001) in some areas, while other provinces began poppy cultivation for the first time in their history.

During the Taliban's brutally imposed ban on poppy cultivation (1999-2000) it was the Northern Alliance who maintained and presumably protected poppy cultivation on around 6-7000 hectares (ha) in the north of Afghanistan. At that time Uzbekistan was said to be "awash" with opium poppies (Ruppert, 2001).

Speculation is not within the remit of this document, these are simply the facts. The purpose of this document is advocacy and to help find a solution to this problem before the situation makes any meaningful reconstruction in Afghanistan impossible. To put this statement in perspective it is worth noting that Afghanistan's opium crop is worth a gross 2-300 billion US dollars per year on the international market and although the farmers receive less than one percent of this amount, they *can* potentially earn around $12,000 dollars from cultivating one hectare of land (farm-gate price for opium gum is around $300/kg). On the other hand farmers would be very lucky to make $400 dollars (US) from one hectare of wheat.

Overall Afghanistan could potentially earn upwards of 30 million US dollars from its opium cultivation. Think about it. In the UK we are going to spend over £500 million on treatment alone; several billion pounds when we consider the total social costs associated with our habit. It is rather expensive, especially when we could completely end the industrial scale supply of heroin by rebuilding Afghanistan, something we are meant to be doing anyway. The international community should announce an immediate 10 billion dollars to de-arm militias, begin a national de-

mining programme and to implement an immediate opium replacement project. These initiatives should then be followed by similar action with regards clean water, sanitation and housing provision. Then we can start planting trees. We owe this to the people of Afghanistan.

The trade in opium adds yet more instability to an already untenable situation with recent reports (Norton-Taylor and agencies, 2004) highlighting the escalation in fighting that parallels the rapid expansion in poppy cultivation. A considerable amount of money is at stake and in a country where the average annual wage is $177 (US) an illegal industry worth several billion dollars can only exacerbate an already tragic security situation. Most of the “aid” pledged by the US and UK governments is now to be used for ‘counter terrorism’ and ‘security’ in Afghanistan. Two years on and there are still seriously large numbers of civilian casualties in what the military describe as a “hot war”.

The number one priority for the international community should be in the implementation of cross-community, and preferably national projects, that aim to stabilize Afghanistan by providing suitable economic and environmental alternatives to opium cultivation with an emphasis on non-military objectives such as landmine clearance, water and food security. The international community cannot attempt to address environmental problems such as water and waste management in Afghanistan until such times as there is the required peace to enable progress. Opium cultivation represents a significant barrier to achieving peace in Afghanistan and one that is inextricably linked to the agricultural economy. [10]

10 Much of the data in this document is based on United Nations evidence and statistics but due to the history of conflict and the present security situation even this information is often less than 100 percent accurate. Examples of statistical inaccuracy include details on the “average family” and parameters such as wood fuel consumption. Wherever possible FAO and United Nations most up to date evidence is used and extrapolated on based on the available and most appropriate data.

2.1 Socio-environmental problems in Afghanistan

Afghanistan's forest cover has declined from 4.5% closed forest[11] and 48% combined open[12] forest and woodland[13] in the late 1970's, to possibly as little as 0.5% of total land cover in the last 20 years.

Present evaluations are difficult given the security situation but in 2002 woodlands could not be detected by satellite surveying equipment suggesting reductions in foliage density to below 40 trees per hectare or in some places complete deforestation (UNEP, 2003).

While decades of conflict have severely limited development in the fuel and energy sectors of Afghanistan, the people have had to rely on an ever dwindling natural resource base to meet their domestic heating and cooking requirements. Besides shrubs and animal dung, trees are the primary source of biomass for meeting these needs.

Based on UNEP data from Badghis Province, shrubs and dung provide up to 50 percent of a family's annual fuel requirement with trees making up the other half, equivalent to between 2000 and 4000kg of wood, or 20-40 trees given about 100kg per tree if Pistachio is used (UNEP, 2003).

In 2004, the rural population will equal roughly 74 percent of total population or 16.3 million people. Calculating for a similar proportion of actual (4 million) refugees will reduce this number by around 2.9 million. Based on broad numbers regarding family size - Afghanistan has the highest infant mortality rate in the World at 5.6 births per woman and around 150 deaths per 1000 births – we can assume that this rural population constitutes around 2 million households.

Broad calculations concerning a family's wood fuel requirement suggest that the deforestation rate resulting solely from the requirement for cooking and heating fuel is close to 2 million hectares per annum. [14]

---

11 Defined as +70% projective foliage cover.
12 Defined as 51 – 80% projective foliage cover.
13 Defined as 20 – 50% projective foliage cover.
14 UNEP, 2003 estimates that 18 million people depend exclusively on use of fuelwood for cooking and heating.

In the late 1970's around 55% of the total land area was forested to some degree, thus at such rapid deforestation levels it would only take four and a half decades to deforest the *entire* natural resource base of Afghanistan. Add to this the deforestation that has occurred as a result of over two decades of conflict, the ongoing industrial and often illegal logging and we can safely say that deforestation in Afghanistan has gone beyond crisis level. Estimates suggesting that 0.5% of total land cover remain as forest could be considered optimistic, especially since the density cannot be registered by satellite equipment. By definition: there are no forests left in Afghanistan.

If action is not taken now, there will certainly be complete and total deforestation well within 5 years. The gravity of this situation cannot be understated. Without either forest resources or suitable replacements people will perish during the bitterly cold winter months and starve because they do not have the means to cook, regardless of whether or not there is food.

Further, the loss of forest resources poses an immediate and long term threat to the environment and therefore the agricultural base currently supporting up to 80 percent of the Afghan population. Without trees there will be a rapid encroachment of desert into agricultural areas. Desertification poses an irreversible threat to food security. Once soil has been degraded to this extent it is more or less impossible to achieve any level of agricultural productivity or indeed to embark on tree planting projects.

Biomass – the term covering all plant life - is providing an unquantifiable but substantial proportion (perhaps as much as 90%) of the Afghan energy requirement for cooking and heating, especially in rural locations. This energy comes at an artificially low price when we take into account the destruction of habitats, reduction in water catchment areas, soil erosion, landslides, reduced agricultural production and in some areas a complete loss of revenue from agriculture through desertification. It is very difficult to account for the suffering of future generations if this situation is not immediately addressed.

Since 80 percent of the Afghanistan population depend directly on agriculture, a new methodology must be found that can put a complete *and* immediate stop to the process of deforestation. Given the dependence on biomass for meeting the

country's heating and cooking needs only a like-for-like replacement can work, unless the international community intends to purchase all 2 million + households solar ovens.[15] The international community should seriously be considering underwriting the cost of such technology, but in the meantime the only practical alternative is fast growing woody biomass that can either be used as a direct replacement for fuelwood or as a means of generating revenue for communities.

Tree planting is costly and the benefits take many years before they can be realised economically. In short, tree planting is not an attractive option because it does not solve the immediate needs of communities. Moreover, I would be inclined to argue that from even the most environmentally conscious perspective, tree planting is only of limited use value in terms of addressing problems such as desertification, agricultural run-off, landslides and desertification. Moreover, inadequately planned plantation forests are a serious fire risk.

Large Scale tree planting cannot be done without providing an immediate and sustainable alternative to forest resources as both cooking and heating fuels. We need to prepare the ground for tree planting. The key issue we must not forget is food security and the general ability of people to maintain their families and communities at an economic level.

2.2 Agriculture in Afghanistan

Despite years of conflict and limited arable land, Afghanistan has a history of plentiful food production and much of the nation's foreign exchange earnings come from agricultural products (textiles) and forest harvests (nuts and fruit). During the 1970's, fruit, raisins and nuts accounted for 40 percent of total foreign exchange earnings. Deforestation is again a direct threat to this aspect of food security as the forests that provide this income and food continue to be used for heating and cooking fuel, while many areas are still subjected to industrial logging.

15 Various innovations are possible varying in cost from $30 per unit to $10,000 per unit. Solar Household Energy (http://www.she-inc.org) discovered that solar cookers could be used at least eight months of the year in the northern town of Mazar-i-Sharif and for more than 10 months in the southern town of Qandahar.

Historically there has been and continues to be an astute agricultural knowledge base that supports bio-diverse and sophisticated systems of crop rotation.

Winter wheat is the primary food crop with bread being the staple food. Per capita consumption is estimated to be 167kg per year (UNEP, 2003). Barley is cultivated at higher altitudes for grain and at lower altitudes as a green fodder crop. Below 1500m altitude double cropping is common depending on rain water / irrigation supply.

Wheat is sown in autumn and early winter, followed by a second summer crop of rice, maize or pulses depending on location. Rotations often include combinations of cereals with pulses and fodder crops such as annual clover and perennial alfalfa (UNEP, 2003). From an environmental point of view this type of rotation is ideal and entirely sustainable given that they have the least impact on soil systems in terms of chemical inputs, and can actually improve soil fertility by naturally fixing nitrogen.

However, there are problems for Afghan agriculture, not least the ongoing drought conditions and security situation. Opium production is a major concern as the poppy competes directly with winter wheat. Cotton cultivation is to some extent also a problem as it requires a considerable chemical input and is water intensive compared to most other crops. UNEP (2003, p63) points out the need for assessment regarding the water use efficiency of crops. This issue will be addressed more fully in the following sections.

An often missed point when we talk of food security is the *quality* of the food being produced. The Afghan diet is *severely* lacking in essential fatty acids, vitamins and protein: as a result, malnutrition is endemic, especially among children.

The dependence on protein deficient cereal crops must be addressed and where possible the solutions to this problem should be linked to the specific socio-environmental concerns detailed throughout this document.

Much of Afghanistan is mountainous (63%) and so the availability of agricultural land is in short supply. It is testimony to the ingenuity and cultural knowledge of Afghan farming communities that adequate food supplies have been produced consistently

over time using sustainable methods from so little arable farmland. Only 5% of total land cover (3.3 million hectares - Mha) is irrigated and regularly cropped, while an additional 4.5Mha - representing 7% of the total land mass - is cultivated under rain-fed systems. Given the increasingly erratic weather patterns, rain-fed arable land is often cultivated opportunistically.

Based on the latest estimates (UNDCP, 2004) opium production will account for 1.2% of total arable farmland in 2004 and given the value of this crop it is likely to displace wheat on the most fertile areas of land on both irrigated and rain-fed areas, especially if failure to produce has repercussions for farming communities and/or families.

The UNEP post-conflict environmental assessment (2003) also points out the need to combat pests in agriculture and draws attention to the locust infestation that affected half of all agricultural land in the north of the country during 2001.

Pest management and the search for alternatives to pesticide use should be a priority for decision makers in Afghanistan and we aim to address this situation comprehensively in the next section of this document.

We need to look at the long term situation and the similarly long term desires of the people of Afghanistan that will enable the country to develop independently of foreign aid and loans. To begin this journey towards self sufficiency we must build capacity in the agricultural sector for value added products and implement a land management strategy that can be extended to marginal areas. In doing so, the industrial production of new and renewable biomass will create raw materials for use immediately as cooking and heating fuel, while building the capacity for industrial development in the areas of construction, road building, gas and petroleum equivalents.

Initiating this first step *i.e. securing the industrial resource base* should be viewed as a long term strategy for capacity building that will see Afghanistan shift from the use of raw (unprocessed) biomass to the production of clean and renewable energies within 5 years. In section 4 we will outline the future possibilities.

Developing strategies for energy provision using Afghanistan's existing agricultural resources (people, knowledge and land) will allow us to address concerns related to both the growing demand for energy and the unsustainable depletion of

Afghanistan's natural resource base. Creating the foundations for new industry in rural areas will greatly assist poverty reduction objectives, while action to enhance food security will also help to reduce the pressures on Afghanistan's expanding urban centres.

The importance of agriculture in Afghanistan necessarily means that it would make sense for energy policy to be closely linked to capacity building in that area. Again, given the low baseline from which Afghanistan must rebuild, early decisions on institutional arrangements and the choice of fuels will have far reaching implications for the future development of Afghanistan.

For example, besides problems of governance and/or corporate pricing mechanisms for fuel, the *types* of fuel used will require infrastructure suited to a long term approach for energy provision and transportation. We should consider both international treaties addressing this issue (i.e. UNFCCC)[16] and the global direction of the fuel economy. Over the next 50 years our dependence on fossil fuels, particularly oil and coal, will necessarily decrease as a result of price, availability, environmental damage and suitable/available alternatives. Afghanistan is therefore in a unique situation to be a model of sustainable development in both agriculture and energy provision which will be elaborated on further in sections 3 and 4 of this document.

We have identified three key problem areas for the Afghanistan economy that relate directly to the agro-environmental context.

- The acute shortage of forest (biomass) resources for cooking and heating fuel.

- Desertification and zero land management strategy outside the main irrigated farming areas.

- Pressures to maintain yields in the face of persistent pests.

16 United Nations Framework Convention on Climate Change, Kyoto Protocol.

There are several issues that should be considered here. The latter point creates the apparent 'need' for additional chemical inputs which are both costly and have a negative impact on long term food security by adversely affecting soil systems. The logic on this point simply being that the international community should be encouraging (and financing) the use of best possible methods, including the clean-up of land contaminated by chemicals that have either been banned in developed countries (i.e. pesticides) or are being phased out (i.e. carbon polluting and toxic fuels).

On this issue there should be some concern over the "disappearance" of banned (EU) agricultural chemicals in Afghanistan. In 1991, 7000 metric tons of the persistent and toxic / carcinogenic pesticide BHC (benzene hexachloride, or Lindane) was stored in Mazar-i-sharif, Pul-i-Khumri, Aibak, Kunduz and Khulum, according to UNEP 2003.

During 2002 vehicle mounted and hand held sprayers applied almost 30,000 litres of pesticide but there was no information available to UNEP on the location of the chemicals documented and stored in 1991. Under the circumstances it would be safe to assume that many of these chemicals have been used over the last decade, either in an agricultural and/or military capacity. UNEP 2003 also found dangerous and illegal chemicals such as methyl-parathion widely available in Mazar-i-Sharif at $5 per bottle. This chemical affects the central nervous system and results in breathing difficulties, diarrhoea and possibly death.

We should be doing everything in our power to assist land remediation where toxic chemicals have been used while directing immediate attention to informing people of the dangers posed by using "miracle" products for pest control.

When sand dunes are moving due to the loss of stabilising vegetation there is little we can do other than to try and plant seeds or build fences to protect the roads. It is difficult building fences when there are no trees or no money to buy fences, not to mention the additional worry of landmines.

Perhaps the breakthrough we have been looking for with regards landmine clearance depends on the suitability of non-food plants for use in topological

chemical detection. Some development in this area involves the genetic modification of plants in chemical detection, which certainly carries positive implications for countries like Afghanistan.[17] Drought tolerant plants that are genetically modified to change colour when their roots come into contact with certain chemicals could revolutionise landmine clearance. This technology could also help to identify polluted land.

Of course, our first point of enquiry should be with the people who used dangerous "agricultural" chemicals and layed mines in the first place. The international community should *positively* encourage people (on all sides of all conflicts) with knowledge of chemical use and landmine placement to make that information public.

In consultation with farmers, we would hope to establish when and where dangerous agricultural chemicals have been used thus saving time and money on detection technology/testing. We can then use non-food plants with a proven ability to absorb chemicals from soil thus presenting immediate opportunities for bioremediation and ground water protection. Such plants can also be deployed to assist in our aims of preventing desertification, preserving forests, providing wood fuel, food and a host of other industrial products.

Based on a considerable review of existing scientific literature (Deeley, 2000, revised 2001) we are advocating that hemp (*Cannabis Sativa L.*) be introduced to Afghanistan to assist with these objectives. Afghanistan has always cultivated an amount of Cannabis varieties suited to the local manufacture of high quality[18] hashish for both local consumption and international export. Thus, there already exists, to some extent, the knowledge base in Afghanistan to assist implementation of *industrial* varieties of this crop.

The methodology proposed has a substantial amount of scientific, industrial and cultural weight behind it and as part of my personal research this crop (hemp) has been shown to present us with several ***unique*** environmental, industrial and social

17 At the time of writing I have asked the Copenhagen based company Aresa for their thoughts on this and the surrounding safety issues for people and environment using both the plant they have developed for this purpose - Thale Cress (Arabidopsis thaliana) – and others.
See **Appendix 2** for further details.
18 Compared to hashish called "soap bar" that is manufactured illegally from Morocco to Yorkshire.
See Appendix 5 for further details.

benefits. Moreover, it should be stressed that introducing industrial fibre and seed varieties will reduce the quality, value and practicalities of hashish production from native seed stocks.[19]

As will be demonstrated in the following section, hemp has the ability to play a pivotal role in opium replacement by presenting communities with an economic replacement with direct and immediate utility, especially as a heating or cooking fuel. Hemp will also assist in promoting methods of sound land management both inside and outside of the main agricultural areas.
Other tangible 'side effects' would be to enhance food security and make a practical contribution towards addressing climate change mitigation, including a host of inter-related environmental problems such as desertification, dry land salinity and ground water pollution.

Section 8 of this document details the legal status and international framework that provides guidance and governance on this topic.

19 See Appendix 4 for further details.

2.3 The Case for Industrial Hemp in Afghanistan

Overview

There are several relatively simple methods that can be employed to counter the socio-environmental problems described in the previous sections which link directly to the central theme of this proposal. Primarily, we aim to provide both environmental and economic incentives for farmers to embark on low maintenance systems of rotation agriculture in the replacement of opium. Low maintenance simply means that one of our central objectives is to reduce the amount of chemical inputs (pesticides and herbicides) necessary for achieving required crop yields, particularly in wheat: Afghanistan's primary food crop.

We are also interested in beginning a process of capacity building with regards to the long term viability of Afghanistan's resource base that will allow - in future - more extensive and technologically advanced applications of biomass in the energy and/or fuel sectors. This means providing both an *immediate* and long term alternative to forest resources as the primary source of biomass for use in heating and cooking applications. We like to think of biomass as *cellulose* rather than simply trees.

Hemp can provide the industrial quantities of biomass required to save and preserve Afghanistan's remaining forest resources, biodiversity and tourism potential while simultaneously improving food security and addressing the overtly socio-economic problems of poverty and urban migration.

On the basis of both academic research and industrial experience [detailed below] the incorporation of hemp into the Afghan agricultural economy will help promote environmentally beneficial methods of agriculture (via rotation cultivation and land remediation) that can help ***secure a long-term strategy of land management, ensuring that food shortages do not occur***.

This would be enhanced greatly by using hemp as a bioremediation crop to restore unproductive land back into full agricultural production *and* to include hemp as a buffer crop between agricultural land and desert areas – thus preventing desert encroachment and soil erosion. Land shortages are far more likely to occur in areas

and/or situations where there is a deficit of suitable land due to ***intensive*** agricultural practices combined with inadequate land management (Intergovernmental Panel on Climate Change [IPCC], 1996b).

It should also be pointed out that hemp itself is an important food crop – see section **2.4 and 3.**

Research shows considerable improvements in the soil quality of land used for hemp cultivation, especially when in rotation with other crops (Roulac; 1997). It has been demonstrated that Hemp is entirely sustainable given that it ***'suppresses weeds and is virtually free from disease or pests'*** (Ranalli; 1999, p64, van der Werf et al, 1999). Hemp requires only modest levels of (organic) fertilization. Because of these characteristics there are improved yields (in an industrial situation up to 10 percent) of the crop(s) following hemp in a rotation cycle (Roulac, 1997).[20]

This fact would tie in with the generally accepted view that we must introduce alternative crops into rotation patterns that can, 'allow control of those weeds, pests and diseases that still cannot be controlled in the cereal crops themselves, and perhaps more importantly [this would] help restore organic matter to the soil following years of depletion by cereal crops' (Forbes and Watson, 1992, p 257).

More recent research (2001) conducted by Dr. Gil Gorchs Altarriba[21] demonstrates that planting wheat on the same land following a hemp crop can increase the yield of the wheat by as much as 40 percent, while also reducing the need for chemical inputs to the wheat crop.

This fact is a major economic incentive for the farmer and forms a considerable environmental advantage over intensive, chemically dependent monoculture cropping – especially given the use value of hemp. Such observations may also tie in with the fact that *annual herbaceous* crops (including the *Cannabis* species to which hemp belongs) are generally leguminosae and have the ability to nodulate and fix (atmospheric) nitrogen (Lopez-Real, 1981). This is a possibility that requires

20 This is verified by Hemcore UK Ltd a UK based company that contracts hemp cultivation with farmers in the South East of England.
21 PhD research at Escola Universitaria d'Enginyeria Técnica Agrícola de Barcelona

further investigation where Hemp is concerned given the extremely large, varied and under-researched gene pool.

Linking with Universities and researchers in Afghanistan we will be able to make important advances in hemp research that *directly* benefit local communities.

Another significant characteristic of Hemp, probably emanating from genetic inheritance from weedy (*ruderallis*) forms, is the ability to grow on degraded and even polluted land. Ranalli (1999, p69) points out that Hemp is, **'able to extract heavy metals from the soil in amounts higher than many other agricultural crops'.**

This is a considerable ecological and economic advantage since it is largely the over-use of inorganic fertilisers that are responsible for much - if not all - of the heavy metal contamination of agricultural land. This is especially significant as the areas most affected by this kind of pollution are often (now) of marginal agricultural and/or economic significance. There are many benefits to be accrued by gradually bringing marginal land back into use for industrial and ultimately food crop production. This would also help with the protection of ground water resources.

Because of hemps proven ability to remediate land suffering from pollution as a result of pesticide and herbicide usage, the Hemp Industry Association draws attention to farmers in Canada who view hemp as a "transitional aide on the way to becoming organic".[22]

When considered in conjunction with the use value of this crop these characteristics have serious implications for the future viability of environmentally damaging crops such as cotton (*Gossypium L.*), which could - if desired - be completely displaced by industrial hemp in a sustainable textile industry (Alden et al, 1998). Or, farmers could simply rotate their cotton crop with Hemp to substantially reduce the chemical requirement of the cotton crop. Hemp and cotton can also be woven in blends.

22 See www.thehia.org for more details.

Hemp is well suited to the climate and topography of Afghanistan – hence the historical usage of Hemp, Flax and Ramie in this region in the manufacture of commodities ranging from the famous Persian rugs to durable clothing.

A long term strategy for sustainable land management will require crops suited to local environmental conditions, including unpredictable weather patterns such as heavy rain and drought. Unlike plantation forests, annual and/or perennial crops are better equipped to deal with these unpredictable conditions. Industrial hemp has some unique survival mechanisms for coping with both desiccation (drought) and excess water. While the plants themselves can grow up to *five metres* in height, the root systems can reach depths of up to *three metres* depending on cultivar, ecotype and soil quality (Bocsa and Karus, 1998) – these roots anchor the crops deep into the soil. An industrial hemp crop (80ha) planted in Nicaragua primarily for seed survived Hurricane Mitch more or less intact.[23]

The root system is very important as this helps to bind the soil and prevent erosion - hence our plan to use hemp as a buffer crop on the edges of marginal agricultural land to protect arable land from the encroaching desert. The root system also replenishes nutrients to the soil as it remains after harvesting. Hemp is also a self-thinning crop. As the plants rapidly grow (between 2 – 10 months growth cycle depending on desired use, cultivar and ecotype) the lower leaves are lost to the soil and are decomposed in biotic and abiotic processes that provide a nutrient rich, self-mulching effect which also serves to prevent loss of top soil, degradation and run-off or loss of nutrients when it rains.

Hemp seed can be selected for various uses, but we aim to emphasis the natural cannabis seed stock of Afghanistan especially in remote, inaccessible areas that are suffering land degradation due to a loss of trees and therefore organic root growth. Using wild (*ruderallis*) varieties in these areas could present several socio-environmental benefits besides land remediation.

---

23 Although this crop survived Hurricane Mitch it was illegally destroyed shortly afterwards on the advice of the United States Drug Enforcement Administration. Paul Wylie, Technical Director of Canadian-owned Hemp-Agro De Nicaragua SA, wrongly spent a year in a Nicaraguan prison before being exonerated in 2000. His story is published at www.hempconspiracy.com
For more information on hemp and the law see **Section 8** of this document.

For instance, crops require little or no management but can effectively replace all the goods and services supplied by the now depleted forest resources including fuel, food and shelter. Growing hemp on deforested hillsides would help prevent landslides, run-off and would also serve to prepare such land for future tree planting. More detail of hemps use value is detailed under subheading 2.4.

In addition to long tap roots, hemp has other advantages over other crops to cope with water shortage. Hemp produces over 60 chemicals called cannabinoids which are unique to the species. These collectively serve to repel insects, improve water use efficiency, prevent water loss and also protect the plant from excessive UV-B radiation. Pate (1999) points out that 'cannabinoids and their associated terpenes provide a survival advantage to the plant, particularly in the tropical biome'.

Hemp is a very versatile crop, not just in terms of use value, but also in terms of how it can be managed by farmers. The way in which this crop is managed ultimately depends on the economic functions that communities wish to derive from it and/or the environmental uses to which it is being put i.e. landslide prevention and even sewage effluent absorption (see below).

Density (and yield) can vary considerably between crops grown specifically for seed, fibre or both. The density of a seed crop can be anywhere between 4 and 30 plants per square metre (m^2) while a specific fibre crop density can range between 50 and 750 plants per m^2 (Ranalli; 1999, p67).

Several metric tons of wood can be produced in a hectare.

Recent research in Australia involves the use of hemp as a “mop-crop” for sewage effluent and separately in other research for tackling the problem of dry land salinity. Both of these issues are serious problems for Australia – as they are for Afghanistan – and the research that has been done in these areas has helped pave the way for government recognition and legislation to encourage the development of industrial hemp cultivation.

During a 100-day growing cycle, a one-hectare Australian trial produced 18 tonnes of hemp and soaked up 10 million litres of effluent.[24]

**Dr Keith Bolton, photographed by Jeff Dawson,
among his “mop crop” in New South Wales, Australia.**

24 See Appendix 4 for more information on this topic.

2.4 Economic Productivity of Hemp

2.4.0 Seed

One of the important aspects of this plant is that although referred to as "seed" (which technically speaking it is), the Hemp plant actually produces a nut or fruit. In the context of a world agricultural system that since the so-called 'Green Revolution' of the 1960's has seen massive increases in the production of protein deficient cereal crops, the introduction of Hemp into agricultural systems could represent a return of *natural* plant-based protein. According to Pate (1999), the hemp nut contains 20-25 per cent protein, 20-30 percent carbohydrates and 10-15 per cent insoluble fibre, 25-30 per cent oil as well as a rich variety of minerals. These include phosphorus, potassium, magnesium, sulphur, and calcium with modest amounts of iron and zinc.[25]

Hemp nut is therefore a very productive *and* easily digestible food source for both humans and animals (Pate, 1999). Particular benefit could be realised by using this ingredient in animal feed. Domesticated ruminants (cattle) whose diets are quite poor result in the emission of a substantial proportion of methane, which is a 'pervasive and significant greenhouse gas' (IPCC, 1996b, p757).

Food or 'seed cake' is obtained by either 'cold pressing' the seed or using higher temperature techniques to remove a greater percentage of oil (Pate; 1999).[26] This process would depend on the use and market for which the food is destined i.e. animal feed, industrial oil production or human consumption.

25 Zinc is an important enzyme cofactor for human fatty acid metabolism. It is also a fair source of carotene, a "Vitamin A" precursor, and is a potentially important contributor of dietary fibre…No other single plant source offers a more favourable human dietary balance of the two essential fatty acids, combined with an easily digestible complete protein'. (Pate; 1999, pp243-252)

26 I eat hempseed myself, both crushed raw and as a refined oil. Hemp seed is an excellent dietary supplement and a versatile cooking ingredient. I would recommend de-hulled hemp seed smoothies!

Yield of oil is equal to around 33 per cent of seed weight (Geof Kime, Hempline Inc, personal communication; 1999), so at a yield of approximately 1350 kg/ha[27] we would expect around 450 kg/ha of oil. This oil is a valuable commodity as it can be used in a variety of industrial processes ranging from paint manufacture and industrial machine lubrication to cosmetics and health products. These uses are also summarised in **section 2.4.3.**

Organic cold-pressed hemp oil by HempGarden UK Ltd.

Hemp Tagliatelle made in Switzerland by Valchanvre Inc.

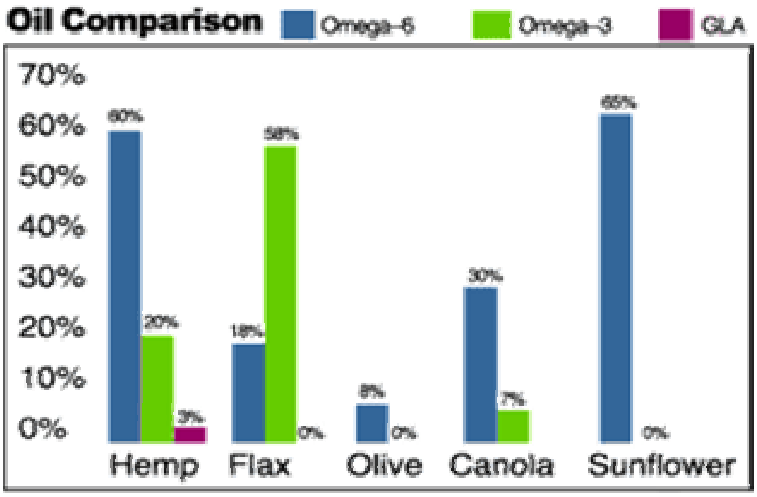
27 With the present monoecious and unisexual varieties a potential *seed* yield of 1200 to 1500 Kg/ha can be achieved'. (Bocsa; 1999, p179) In addition a non-branching dioecious variety grown in Finland (FIN-314) has produced record yields of 2 t/ha (Pate; 1999).

Cold-pressing the hemp seed using mechanical means like the facility the United States Agency for International Development (USAID) has established in Helmand Province for producing and marketing oils from high value crops would be completely practical. This would also provide an added economic incentive for communities to grow hemp rather than poppy. Like other high value oil or nut crops, hemp seed produces a highly valuable oil or butter that shares many of the same characteristics, although hemp has the potential to enter the market with a larger percentage share than most other natural oils given its unique properties and nutritional content.

Hemp seed is the single most nutritionally balanced source of food on the planet, surpassing both Soya and Sunflower oils in terms of nutritional content. Hemp seed is also a versatile and very tasty cooking ingredient. The following table compares hemp seed with the most commonly used food seed oils.

Figure 1

Hemp oil in comparison with other plant / vegetable seed oils.



Source: www.nutiva.com

According to Dr. Udo Eramus a PhD nutritionist from Canada and author of '*Fats and Oils: The Complete Guide to Fats and Oils in Health and Nutrition'* [28] the hempseed oil ingested from the hemp nut is "nature's most perfectly balanced oil.", which is to say that the balance of these Essential Fatty Acids (EFA, specifically Omega 3 and 6) in hempseed are in ***perfect*** proportion for human dietary requirements. EFA's are essential because the body cannot make them so they must come from food or supplements. EFA's help regulate eye and neurological functions, hypertension, hormonal balance, wound healing and cell growth, to name only a few.

In 1955 the Czechoslovakian Tubercular Nutrition Study concluded that hemp seed was the "*only food that can successfully treat the consumptive disease tuberculosis, in which the nutritive processes are impaired and the body wastes away*" (Robinson 1996).

Hempseed and flaxseed oils are also the *only* common oils that contain gamma linoleic acid (GLA). The International Journal of Cancer states that GLA can kill brain and prostate cancer cells and inhibit the spread of malignant tumours.

The introduction of such a beneficial food source would surely be welcomed by all communities in Afghanistan. Hempseed as a food source would dramatically improve the nutritional content currently available to the vast majority of the Afghan population. It would be especially beneficial for addressing the severe problem of childhood malnutrition.

28 Recommended reading: "Fats that Heal Fats that Kill" by Dr. Udo Erasmus, 1993, ISBN 0-920470-38-6

2.4.1 Bast Fibre (primary and secondary)

This particular component is best suited as a raw material in the manufacture of paper and/or textiles due to the low lignin[29] content and length of the fibres (Primary fibres 5-40mm, secondary bast fibres are uniformly about 2mm) (Ranalli, 1999). The ultimate fibre cells for textile manufacture range from 5-55mm and have an average length of 20mm (Ranalli, 1999). Its low lignin content has other environmental benefits given that wood (both soft and hard) used in the manufacture of paper involves the chemical removal of lignin. Pulp from hemp (bast fibre) can therefore be characterised as a non-wood pulp (de Groot et al, 1999).

In addition, long fibres add to the strength of paper while the yield in chemical pulping corresponds proportionally to the cellulose content of the raw material (Ranalli, 1999; de Groot et al, 1999; Biermann, 1993). In an Italian variety the bark (or bast, contains primary and secondary fibres) contained 67% cellulose, 13% hemicellulose, and 4% lignin while the Core ('woody core' or shives) contained 38% cellulose, 31% hemicellulose, and 18% lignin (Ranalli, 1999, p72). Given the rapid growth cycle of Hemp it can produce more paper pulp from less land than tree plantations intended for this purpose.

Hemp long fibre can also be used to manufacture a full range of textile products from industrial rope and cordage to fine silk-like material. Compared with cotton, hemp requires less chemical input and irrigation, while the fibres are considerably stronger and more durable. These characteristics of hemp fibre also explain why ancient manuscripts printed on hemp paper in China are still intact to this day.

29 Lignin content is especially significant for pulp paper manufacture as it interferes with hydrogen bonding and so negatively effects paper strength and polluting effluents are produced in the removal of lignin leading to lower yields of pulp due to the chemicals degrading effects on hemicelluloses (Biermann, 1993).

2.4.2 Woody Core

These (core) fibres account for 65 percent of the stem weight (de Groot, et al, 1999). Unlike most annual fibre crops that must be treated as straw (using straw material in the pulp process involves effluent treatment to remove silica), hemp has a 'very low silica content' (de Groot, et al, 1999). ***Of most significance is that the composition of the woody core is both botanically and chemically comparable to that of hardwood*** (de Groot, et al, 1999). It is argued that future technological developments could lead to this component being a 'valuable paper feed stock' in low pollution pulping systems as alkaline processes use around 50 percent less energy than do conventional systems (de Groot, et al, 1999).

According to the IPCC (1996b), there exist several advantages in using biomass in the energy sector not least because these can be used to offset or substitute directly for fossil fuels thereby reducing emissions of Greenhouse Gases (GHGs) such as carbon dioxide (CO_2) *and* for the sequestration of CO_2 via photosynthesis and the storage of carbon in managed soils. Biomass is a general term covering a large degree of diversity and chemical composition in terms of plant matter, which are of variable significance as a raw material or feedstock for the energy and transport sectors.

Fast-growing hardwoods are considered the best type of biomass most suitable for these applications in the context of climate change mitigation (IPCC, 1996b).

Given the chemical composition *and* rapid growth cycle of Hemp it is perfectly placed for use in these industries. There also exists at present much of the technology to translate this into a pragmatic climate change mitigation option with higher energy efficiency and lower unit capital costs than conventional methods of energy production (IPCC, 1996b).[30]

30 IPPC refers specifically to the biomass-producer gas-engine and the more advanced but available biomass integrated gasifier/gas turbine or BIG/GT (IPCC, 1996b, p606).

According to a paper published in Biomass and Bioenergy (Vol.15) '*Assessing the Ecological and Economic sustainability of Energy Crops',* which considers the viability of nine of the best possible energy crops[31] via comprehensive life cycle assessments considering both environmental and economic factors, Hanegraaf et al (1998, p351) conclude that, **'hemp comes out as one of the best options for energy cropping'.**

To this end hemp is perfectly placed to be used in both cooking and heating applications in order to preserve Afghanistan's remaining forests, considering also the numerous environmental benefits of hemp as a rotation crop in the main irrigated and rain-fed areas as well as a remediation crop for marginal land and land subject to erosion, landslides and nutrient loss.

Woman in field with a tall industrial hemp (seed) crop.

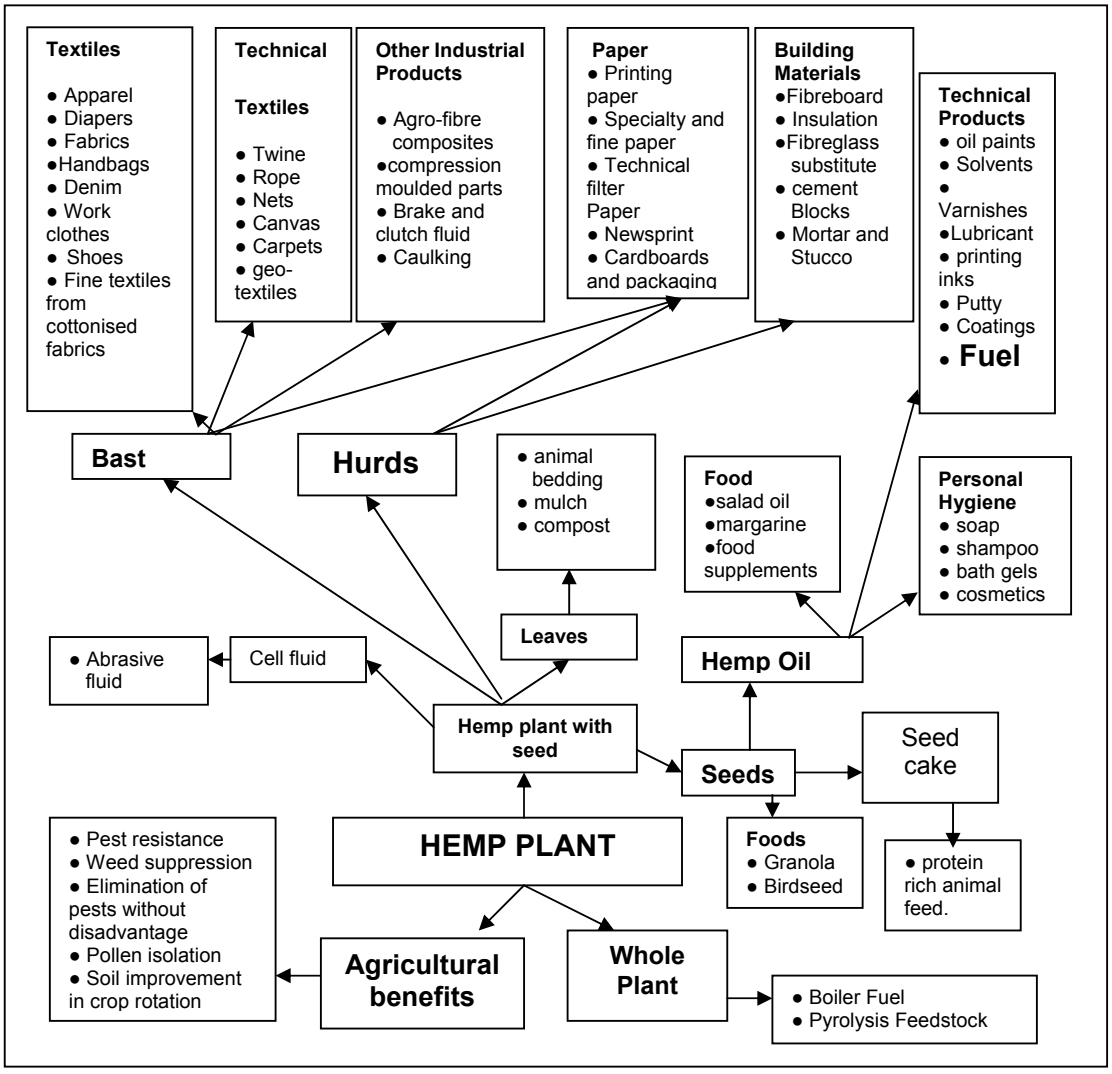
There exist today several available technologies for the processing of biomass into heating and/or cooking fuel. For example, "bio-compactors" that compress natural (biomass) fibres can produce "logs" with a similar calorific value to coal, right through to technologies that turn cellulose into ethanol fuel that can be used directly in regular petrol engines.

These technologies are elaborated on further in section 4 and 7 of this document.

31 These include Rape seed, Sugar beet, Winter wheat, Silage maize, Hemp, Miscanthus, Poplar, Willow and Grass fallow.

2.4.3

Summary of uses for (*Cannabis Sativa L.)* Industrial Hemp.



Note: Figure 1 was adapted from a diagram presented by Roulac, (1997) and is intended to summarize some of the key uses of Cannabis Sativa L. or industrial hemp. There are actually over *25,000* documented industrial applications for this crop which can be capitalised on more fully when Afghanistan has the capacity to manage large scale industrial cultivation and processing.

Section 3:

Industrial Hemp in Afghanistan

3.0 Introduction

In section 2 we explored the socio-environmental problems faced by Afghanistan and the subsequent case for introducing industrial hemp into the Afghanistan economy. This section will take this further to provide a direct idea of the benefits that farmers and communities can expect.

Capacity building in terms of industrial research, breeding projects, processing and market development will provide a solid industrial base for Afghanistan in the years to come. Introduction of hemp will also help create a solid foundation for addressing some immediate socio-environmental problems.

Hemp also presents us with opportunities for tree planting projects should these be funded in future. Hemp can literally prepare the ground for tree planting and also provide an immediate replacement for trees thus allowing time for tree planting and other sound land management practices to be implemented, including the capacity building required in areas such as training.

3.1 Intended positive impacts

- Hemp will integrate easily into existing, indigenous agricultural systems.
- This integration will reduce chemical inputs required in other seasonal and/or annual crops sharing the rotation cycle.
- Hemp will add value to the farms given the importance of this new industrial production i.e. fuel, building material and nutritious food.
- Employment will necessarily increase in all hemp cultivating/agricultural areas.

3.2 Biomass Production

A typical fibre crop cultivated on reasonably fertile land will yield approximately 15 metric tons of dry wood per hectare (t/ha). Although this crop has other components including roots (10 percent) and leaves (20 percent) representing the total biomass that would also include seeds (5-15 percent) if left to reproduce (Ranalli, 1999). Hemp has a naturally occurring sex ratio of 1:1 thus seed (re)production is seldom a problem. The total biomass increment of this particular (fibre) crop would be about 20 t/ha, increasing to around 23 t/ha when accounting for self-thinning.

Total biomass increment is a more important statistic when we are considering the climate change mitigation contribution of this project in **section 5** but for heating and cooking purposes, we are only interested in the amount of *dry stalk* yield.

At 15t/ha, 4000ha could produce around 60,000 metric tons of fuel wood, equivalent to the total annual fuel requirement of 20,000 families (based on wood consumption of 3000kg per year*).

Based on roughly 18 million people depending entirely on wood as the primary fuel source for heating and cooking the **total** demand for wood (i.e. including a 50% dependence on dung or shrubs*) in 2003 was around 7.7 million tons (Mt). In order to satisfy this demand from industrial hemp, Afghanistan would need to plant hemp on just over 5 million hectares (ha) of land.

As part of a land management strategy aimed at reducing the chemical inputs used to combat pests (in cereal crops via rotation) and improve the water use efficiency of (esp. Cotton) crop systems, hemp could make a serious contribution to meeting the countries domestic fuel needs while producing several environmental benefits in rotation cycles.

Moreover, there is land presently being lost to encroaching desert and the removal of trees. Using hemp as both a bioremediation crop in marginal areas and as a buffer crop between desert and agricultural areas presents two more immediate benefits while increasing the potential land availability. This requires quantification and a detailed pre-project assessment of land in Afghanistan.

In areas that are extremely remote, and where these socio-environmental problems are particularly acute, the use of hemp as fuel, food and land remediation crop could ultimately save lives.

Hemp is suited to a range of altitudes and topographies present in Afghanistan – hence the plants historical cultivation in this part of the World. The versatility of this crop is absolutely unique. On the one hand hemp presents us with a source of nutritional food and fuel, while on the other hand hemp can grow in areas where temperatures vary between desert and frost. Hemp will grow anywhere. The only exceptions to this are areas with permafrost.

Part of the capacity building and research objectives emanating from this proposal include detailed soil and topographical data collection combined with actual planting. Communities will be able to benefit immediately from any research in this area.

In order to produce the **absolute total** cooking and heating fuel requirement from hemp, thus *eliminating* the need to collect dung and shrubs – which could be left to preserve soil – would require 15.42 million tons of fibre, which in turn would require 10.2 million hectares of land. Using hemp in rotation with cereal crops and on areas of marginal or even zero agricultural significance such as deforested hillsides could help meet this total requirement in the short term.

3.3 Key Criteria for Location

- Land availability
- Agricultural areas that require the rapid implementation of sustainable land management in order to prevent desertification.
- Areas that experience a particularly acute shortage of fuel wood.
- Areas where rural depopulation and food security are a serious problem.
- Areas of significant poppy cultivation.
- Areas with a regional capacity for value added processing, such as Helmand Province food oil processing unit.
- Areas with high levels of cotton production.

Our research will also be used to determine the best method of processing required in the initial stages of this industrial development. For instance, it maybe the case that a lack of processing capacity means that the hemp fibre (wood) is used in a raw or unprocessed form in the same way as wood is used at present. Or it maybe the case that converting the biomass into charcoal is suitable. This will depend on local expertise and the best available local technology.

Section 7 outlines our plan for a farm-scale demonstration project in the UK that will be used for training, capacity building and technology transfer which is intended to run parallel with the Afghan opium replacement project.

3.4 Environment and Food Security

The ability of hemp to contribute to both environmental improvement and food security can be summarised as:

- High protein, nutritionally balanced and versatile cooking ingredient.
- Integration into existing crop systems complementary to current practice(s).
- Reduction in chemical usage, natural pest control among cereal crops.
- Increased yields of cereal crops sharing rotation cycle with hemp.
- Bioremediation of chemically polluted land.
- Prevention of desertification.
- Self-mulching crop that protects top soil from run-off/nutrient loss.
- Protection of ground water resources.

The rapid growth cycle and climatic adaptability of the Cannabis species will mean that areas maybe caught before total desertification occurs, this would be especially important for hillsides that have been deforested in the last 10 years. Not only would it be possible for varieties of cannabis to grow on such terrain but the characteristic of hemp described above would make it superior to tree growth for preventing run-off, loss of topsoil and erosion when it rains. In effect, hemp could also act to prevent mudslides and the devastation these often cause.

The self-mulching effect of rapidly growing plants will also return nutrients to the soil and in as little as one-two years of growth the land will be suitable for evaluated and well planned tree planting. In the meantime, people will have a regular source of fuel and food.

According to a paper prepared for the Food Security Working Group (Afghanistan) it is important for areas that are remote, inaccessible and have shorter growing seasons “to maximise the productivity of the scarce resources of water and land”. Hemp cultivation presents us with the realistic possibility of achieving this aim, while presenting several socio-economic benefits for communities.

In addition to producing hemp intended for heating / cooking fuel, these crops can simultaneously provide seed, which produces oil and a nutritionally balanced, protein rich food. Seed is therefore a crucial factor, not just in terms of capacity building for future industrial aims, but also as a very valuable and useful resource in its own right. This aspect of food security is linked to opium replacement in the following section.

3.5 Economics and Opium Replacement

In addition to domestic food consumption hempseed could also be traded for foreign currency depending on the desires of farming communities. The international price for hempseed is quite high given the unique properties perfectly suited to both food and cosmetic applications. The price of hempseed also reflects that fact that the only major exporters are the Peoples Republic of China, France and Hungary.[32] World prices for hempseed vary considerably but they tend to fluctuate between 30 and 40 cents (US) per pound, although if certified seeds are being exported for cultivation the price is even higher – between 40 and 50 cents per pound. The average price for bulk purchase of hempseed in Canada was 41 cents per pound in 1999.

If an average seed crop can produce 1000kg/ha of seed[33], even at the lower end of the pricing scale (30 cents US per pound) the value of this seed in the international market would be around $600 US dollars per hectare.[34]

A research project of only 100 hectares could produce a direct income of $6000 US dollars from the seed alone, although it is possible that this could be doubled in Afghanistan as two crops per year will be possible in some rain-fed and irrigated locations. If the oil could be processed locally (value added) using similar methods to those implemented by USAID in Helmand province, the product value is considerably higher, as will be demonstrated shortly.

A significant part of this project will include the establishment of secure markets for Afghanistan hemp-based products. For example, based on my enquiries there is

32 Although others such as Germany are catching up, especially in the organic market.
33 Some specialised seed varieties can produce more than 1400kg of seed per hectare.
34 Current price for English hemp seed (March 2004) is £750 per metric ton.

already considerable demand for organically produced “fair trade” hemp products in the food and cosmetic industries of North America and Europe, with 250 gram bags of organic hemp seed (unprocessed) retailing at more than $3 each.

On the issue of opium replacement, 90,000ha (land area estimated to be under opium cultivation in 2004, UNODC) of hemp would produce enough fibre (unprocessed wood) to provide fuel for around half a million rural families. It is difficult to say how many trees this will save as there are so few left. But it is safe to say that under the circumstances it would be an improvement on people suffering from cold, hunger and environmental degradation. Moreover, if 90,000ha of hemp was grown on the same land directly replacing poppy i.e. on the best irrigated and rain-fed agricultural areas, farming households could collectively produce a minimum (at 1000kg/ha) of 90,000 metric tons of high protein food that can also produce a valuable oil. At 250 litres oil per ton of hemp seed we could expect 22.5 million litres of high quality seed oil from this scale of cultivation.

Based on current (2004) market price for English (UK) hemp seed the value[35] of this seed crop (unprocessed) would be £67.5 million (pounds sterling). In other words, the value of the seed - not including the immediate utility of the wood or environmental improvement aspects – is more than double the income derived by farming households from opium, estimated at 30 million US dollars. If processed (cold pressed), the value of the oil from this amount of seed, again based on current (March 2004) English prices, is worth a staggering £162 million[36] or at the current dollar exchange rate *$291.6 million US dollars*.

Industrial hemp in Afghanistan would be a legal, taxable industry that presents a host of direct environmental benefits, which also happens to out-compete opium at the farm level.

This example is intended to demonstrate *gross value* - not utility. Production of this amount of seed would go some considerable way to enhancing food security as the products have both immediate utility for communities, and value added

35 Personal communication with hempgarden.co.uk, March 12th 2004.
36 25 litres wholesales for around £180, with 90,000 metric tons of seed producing 22.5 million litres of oil.

export/foreign exchange potential. Once pressed to extract oil, the remaining pellets (750kg per metric ton of pressed seed) can be milled into flour using traditional methods to be combined with wheat flour for bread making, enhancing the nutritional content of the bread, in effect adding a complete protein to Afghanistan's staple food.[37]

Using the same example based on direct opium replacement and assuming value added oil processing of the seed would leave 65,000 tons of nutrient rich meal and/or pellets that can either be used directly in animal feed or can be milled into flour for combination with Afghan wheat, presenting a unique opportunity to improve the quality of food available in Afghanistan. This is especially important in the context of the increasingly serious problem of childhood malnutrition.

3.5.1

Summary: economic benefits of hemp as direct replacement for opium

- Replacing 90,000ha of opium with hemp creates an immediate use value of heating and cooking fuel for 500,000 households.
- Rotation of hemp with wheat improves soil quality, reduces inputs and increases per hectare yield of wheat crops.
- Hemp will produce at least 90,000 metric tons (1000kg/ha) of seed with an unprocessed value of $188.26 million US dollars.
- Hemp will produce around 22.5 million litres of value added product via seed processing, equivalent in value to $291.6 million US dollars.
- After oil processing hemp meal or pellets can be milled using existing technology into flour which can be mixed with wheat flour for local bread making and consumption, equal to 65,000 tons of additional, locally produced organic food.

37 At the time of writing I am awaiting a sample of hemp flour from an English hemp company who have described the product as such: **"Hemp flour is the best and hemp bread is food for life."**

3.6 Regional and International Co-operation

We would look to instigate a co-operative scheme with all the nations neighbouring Afghanistan that could be integrated with existing but unmonitored agreements such as those dealing with regional water use, although this applies mostly to Iran. We should aim to build a regional capacity that moves the emphasis away from oil and gas and onto biomass derived alternatives using the available human, land and climatic resources.

Involving neighbouring countries such as Turkmenistan, Tajikistan and Uzbekistan will also help prevent the relocation of industrial scale poppy cultivation *and* contribute to regional stability.

This research is both social and environmental, with an obvious economic dimension. Our aim is to lay the foundations for industrial hemp production by fully developing specific seed and fibre hemp varieties perfectly suited to regional topography and climatic variations. Part of this capacity building will be achieved through the integration of hemp into sustainable systems of agriculture that are complementary to those already used in Afghanistan, primarily through a breeding project that will domestically produce the seed stock required for more extensive fibre cropping.

Given the crude use of hemp as a feedstock for heating and cooking fuel in the early stages of this project, we would point out that the greater the scale of this research the greater the immediate environmental and economic benefits will be.

There are also many regional similarities (soil, climate, topography) between the countries of Central Asia and as such we would expect interest in this project by Afghanistan's neighbours, and strongly encourage regional capacity building measures and inter-governmental co-operation.

There also exists the possibility of securing private funding that will assist the technological capacity building required for primary processing in partnership with

our colleagues in the European Union, Canada, Australia, New Zealand and South Africa, putting Afghanistan at the forefront of industrial hemp development.[38]

A future aim of this project would certainly include helping Afghanistan to capitalise on the numerous international markets that exist for hemp products and to extend them (such as in "fair trade" products) while creating brand identity for sustainably produced products in Afghanistan.

We estimate that every 100 hectares of hemp cultivation will employ a minimum of 70 people in cultivation and harvesting.

If we include processing, marketing, business development and services this figure would obviously be substantially higher.

3.7 Ownership

The issue of ownership is straightforward. The people of Afghanistan own the seeds; they provide the labour and use the product. We aim to help set up farming co-operatives between villages and between provinces that will collectively establish processing facilities creating value added products such as oil seed, seed cake for food/bread, building composites, textiles and ultimately renewable clean energy fuels such as ethanol.

To begin this process we are detailing our business proposal in section seven of this document and will be looking to the Asian Development Bank to assist with initial seed purchasing.

The point of this project is to create sustainable domestic industry for the benefit of people in Afghanistan and as such we will be strongly encouraging the distribution of income via high wages in hemp farming. Given the value of the crop and the immediate use value for communities, farmers could afford to pay workers at least 15 dollars (US) per day for labour, which is *double* the amount paid to skilled opium harvesters (UNODC, 2004).

38 If you require further information on this please contact me at marc@spiritaid.org.uk

This level of remuneration would reflect the fact that workers trained in hemp harvesting would be given practical and transferable skills in a variety of techniques associated with the different use values of this important crop.

We should also remember that hemp will be a legal and therefore taxable industry that will assist to strengthen local, regional and ultimately national governance structures.

Ultimately this industry will help rebuild Afghanistan.

3.8 Summary of Hemp in Afghanistan

Hemp presents a double dividend for economic growth in Afghanistan by providing both an immediate income while addressing environmental concerns that in doing so will help to maintain food security and prevent the loss of natural habitats and / or forest areas.

This economic dividend is increased when we consider the multi-dimensional use value of hemp. At the same time as producing an industrial quantity of biomass for use directly in cooking and heating applications, hemp will also produce a seed that is unsurpassed by any other food source on Earth in terms of nutritional content, thus helping to address immediate concerns of food security and importantly the *quality* of peoples' diet.

Multi-purpose fibre for fuel and seed cropping of hemp will confer economic benefits directly on local populations. Hemp cultivation will address several environmental concerns in a sustainable way while also having the ability - depending on quantity and/or level of production – to provide an important source of international trade.

Implementing a hemp breeding project in the first instance will help create the foundations - capacity building - required for more extensive fibre cropping and technologically advanced processing and therefore market potential.

Hemp cultivation for both food and biomass will enable Afghanistan's remaining forest resources to be persevered for future generations.

UNEP team with Afghan guides investigating pistachio forests near Farkhar village.

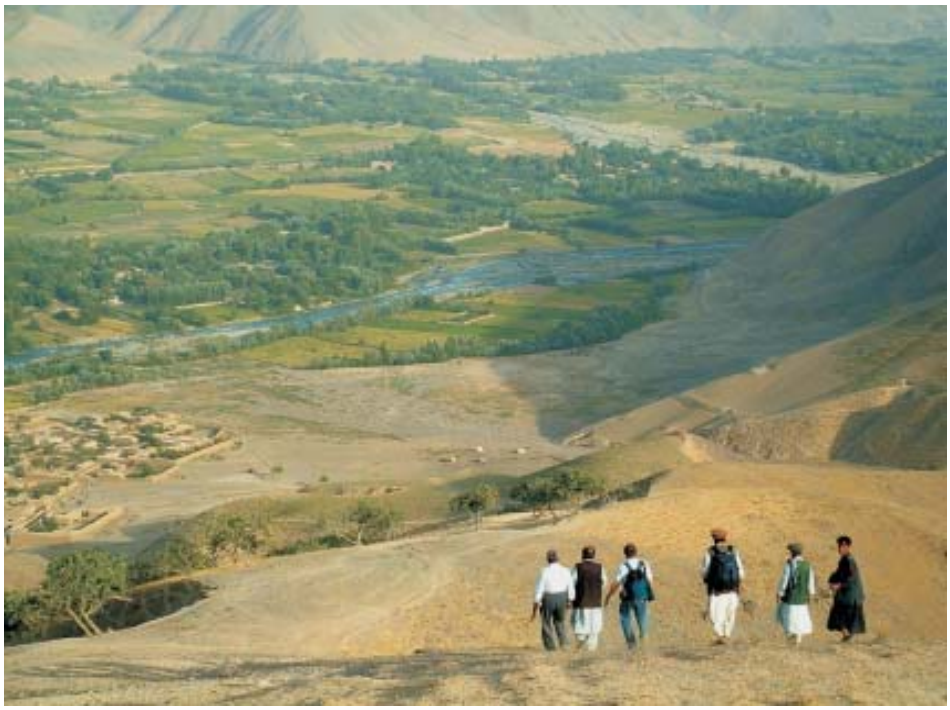


Photo: David Jensen UNEP 2002.

The following section will look in more detail at the technological innovations that Afghanistan will be able to capitalise on in future by building the immediate capacity for biomass cultivation specifically for renewable fuels and energy.

Section 4:

The Future of Afghanistan's Fuel Economy

4.0 Introduction

Despite the fact that fossil fuels are finite, non-renewable and cause harm to the environment through pollution and global warming they currently supply 86 percent of the world's energy requirement. While oil prices are subject to supply and demand there also exists a considerable degree of political control over this resource making our dependence on this unstable resource highly problematic.

Costs for petroleum can only be expected to rise. Given the chemical composition of hemp and both the ecological and economic advantages of its cultivation in sustainable agricultural systems, we intend to develop this as a key industrial crop (feedstock) for Afghanistan's future energy sector.

This section will highlight the possibilities of adopting a national biomass and land management strategy as the capacity building forerunner to state-of-the-art energy production - as opposed to the crude burning of wood, hemp or charcoal.

Biomass is stored solar energy that can be converted into electricity and/or fuel. The use of biomass will greatly reduce greenhouse gas emissions as burning fossil fuel or trees removes stored carbon and transfers it to the atmosphere (see section 5). In a combustion system, biomass releases carbon dioxide as it burns (although this is considerable less, especially when converted into gases) but biomass also needs carbon dioxide to grow thus creating a closed carbon cycle. In addition, substantial quantities of carbon can be captured in the soil through sustainable agricultural practices and land management (**see sections 5**).

4.1 Biomass use will Produce Economic Benefits

1. **Rural economies will grow because of the development of a local industry to convert biomass to transportation fuel. Because biomass feedstocks are bulky and costly to transport, conversion facilities will be located where the crops are grown. That means job creation in the poorest rural areas.**

2. **Farmers will see their income rise thanks to these new markets for both agricultural wastes and hemp crops (biomass) that can be grown sustainably and on marginal land.**

4.2 Ethanol Fuel

Most researchers in the environmental community have made strong statements in support of ethanol as a low-carbon fuel with large potential benefits to reduce life-cycle greenhouse gas (GHG) emissions. Ethanol also reduces carbon monoxide emissions and our reliance on oil. It contains no sulphur and helps to eliminate smog through its use as an oxygenate when mixed with gasoline. 7% of all gasoline sold in Canada is blended with ethanol and this figure is likely to increase as the government implements the Kyoto Treaty.

Brazil is currently the world's largest producer of ethanol fuel. In the year 2000 production of ethanol reached 3.4 billion gallons compared to the United States production of only 1.63 billion gallons.

Brazil's feedstock of choice is sugarcane while corn is favoured in North America.[39] Ethanol, a form of alcohol, is a liquid fuel that can be used by itself or blended with gasoline to create gasohol. Currently, ethanol is produced when yeast ferments the glucose (a basic sugar) contained in food crops such as corn, cane sugar and other starch based crops. These crops are expensive and in limited supply, making them too costly to produce ethanol on a large scale.

Beginning in the 1980's researchers worldwide attempted to modify the yeast genetically so that it could ferment glucose and another plant sugar, xylose, into ethanol. Yeast that could ferment both sugars could produce more ethanol from the same amount of plant material making the process more economical. At 30 to 40% of the sugar released from plant matter, called **cellulosic biomass,** is xylose, the other 60 to 70% is glucose. Fermenting only 60% of the sugar into ethanol is not cost efficient.

4.2.0 Cellulosic Biomass

Cellulosic crops will become the feedstock of choice. Data (Institute of Local Self Reliance, 1995) suggests a very large energy gain (70-80%) from converting cellulosic crops into ethanol. Many organisms can convert 6-carbon sugars in cellulose to ethanol, conversion of 5-carbon sugars in the hemicellulose fraction particularly xylose has been difficult.[40] Now it is possible to convert both sugars effectively using genetically modified yeast. Ethanol can be made from crop residues or wood that contains long chain carbohydrates which can be hydrolysed into fermentable sugars.

---

39 This choice however is not based on scientific data as more suitable crops such as Hemp have been neglected due to the United States confusing policy regarding the Cannabis species. As a consequence of this the 'choice' of feedstock for ethanol production is based on availability of feedstock rather than a scientific assessment of the environmental and economic implications. In short, this is a political decision. For example, the overproduction of corn in the US, within the context of the GAT agreement means that ethanol fuel production from corn is simply a means to secure an income for corn farmers. The US Institute for Local Self Reliance (1995) considers cellulosic crops to be economically and environmentally superior to starch based crops (i.e. corn) for ethanol manufacture.

40 Tim Castleman: Hemp as Biomass for Ethanol, December 1999.

There are currently 5 different technologies all trying to position themselves as forerunners to commercialise their technologies. Comparisons are therefore difficult due to differences in developmental processing. For our purposes, we narrowed our findings to the best possible technology that utilizes agricultural 'waste' as feedstock.[41]

4.2.1 Iogen Corporation

Iogen is a Canadian company that was founded in the 1970's. The company's research has grown from developing a steam explosion process for straw/wood to the production of ethanol from lignocellulosics and the production and marketing of enzymes for various related and different applications. Iogen is the only Canadian manufacturing company of industrial enzymes and has owned and operated a one-ton per day test facility, operational since 1985. It was at this facility that Iogen developed its state-of-the-art processing capabilities, expanding its ethanol plant to 40 tons/day in 2000.[42]

4.2.2 Technology

The Iogen process is an enzymatic hydrolysis process for converting lignocellulosics to ethanol. The unique aspects of the technology include the steam explosion pre-treatment, pioneered by Iogen while the proprietary enzymes are developed, manufactured and marketed by Iogen. Iogen has patents in Canada and other countries for aspects of both the steam explosion and enzyme production.
The pre-treatment step involves steam explosion with dilute acid conducted at elevated temperatures and pressures. The hydrolysis and fermentation steps are undertaken at ambient temperatures and pressures. Distillation is the normal ethanol industry process.

The Iogen process is currently suitable for agricultural residues such as wheat straw and corn stover. Hardwood residues are also a suitable feedstock. Hemp and

41 Wood Ethanol Report, 1999, Environment Canada, February 1999
42 Personal Communication Dr. Jeff Tolan, Iogen Corporation- July 19, 2001.

Sugarcane bagasse would have no problem being utilized as a feedstock. *After allowing the hemp stock to dry a pre-production process involving cutting the stock into half inch pieces is all that is required*. Iogen removes the lignin prior to the fermentation saying that doing so removes some of the inhibitors to the yeast and makes the process more effective.

Because of the relatively mild pre-treatment process the lignin as a co-product could be utilized for the production of a phenol-formaldehyde resin. However, ***Iogen is presently using the lignin as fuel for a co-generation facility in effect this 'by-product' of the ethanol process supplies all the power to their facility and sells surplus energy to the national electric grid.***

4.2.3 Economics

Since 275-300 litres of ethanol can be obtained per metric ton of dry weight biomass, at an average yield of 17t/ha around 5100L/ha.can be expected. A 10 million gallon per year facility would then require 7,446 hectares of hemp. Considering that in Afghanistan two crops per year can be expected, only half of the estimated land would at any one time be under Hemp cultivation. The other half would be cultivated for other food crops and nitrogen fixing legumes as part of existing rotation systems.

The primary costs associated with lingo-cellulosic ethanol production derive from the production of the enzymes needed to process the complex carbohydrate chain and the cost of the feedstock. Three facilities would require construction and these include an ethanol plant, an enzyme manufacturing plant and a co-generation facility to burn the lignin that will supply the power to all of the facilities as well provide an immediate income of $500,000 USD/yr. Construction costs for all three facilities are estimated at 100 million (US) dollars but this initial capital cost is offset by average returns on equity of 20%, the creation of employment directly and indirectly and reductions in fuel imports.

4.2.4 Benefits of Ethanol Fuel

- Excellent Quality Fuel- Adding 10% ethanol to gasoline boosts its octane 3 points creating premium out of regular gas.
- Environmentally Superior - Ethanol reduces pollution from auto emissions and is produced from renewable resources. It produces far lower greenhouse gas emissions than gasoline, helping combat global warming.
- Economical - Ethanol prices compete favourably with oil on a level playing field.
- Good Investment for Shareholders - Well planned, well managed plants are generating returns on equity as high as 20% over the past few years.
- Value added processing for Farmers
- Positive Economic Impact on Rural Communities.

. Increased use of biomass for energy would lead directly to reduced greenhouse gas emissions, reduced dependence on foreign oil, an improved rural economy and a major Afghan industry. Instead of importing oil, you can home grow biomass to provide the feedstock for many fuels and chemicals. Hydrolysis of cellulosic material to sugars and the subsequent fermentation (or other bio-processing) of those sugars can supply many of the fuels and chemicals (or equally good alternatives) for which we now depend on petrochemicals. The more we turn to such a sugar platform instead of petrochemicals the better off the domestic economy and environment will be.

4.3 Biodiesel

It was not until the oil crisis of the 1970's that the idea of using vegetable oil as an engine fuel was given serious thought. There was one obstacle; vegetable oil is too thick to use directly in modern diesel engine fuel injection systems. A simple refining process called **transesterfication** is once again making the use of vegetable oils a viable fuel source.

The process involves mixing ethanol with sodium hydroxide, mixing that with vegetable oil and letting the glycerine settle. Final products are ethyl soyate and glycerine. Biodiesel is a renewable diesel fuel substitute that is both economical to produce and environmentally sound. Japan Science and Technology recently predicted that the biodiesel market could reach $70 billion annually by 2005. France is the World's top producer of biodiesel using this material as heating oil and also in 50% blends with petrol diesel.

New processing techniques[43] have been developed that speed up the manufacturing process reducing both the construction and capital costs of biodiesel production facilities. Professor Boocock states that: "Production time is reduced from 70 to 10 hrs. Because of the speed of the reaction, a reactor isn't required in a plant saving on capital expenditures." That means a smaller facility can produce a large quantity of methyl ethers.

Researchers Bob Fox and Dan Genosar in Idaho have also improved upon the process method. With the standard method, a liquid base is added to a mixture of oil and alcohol that causes the chemical reaction forming biodiesel and glycerol. Hours later the reaction completes then the biodiesel, glycerol and unrelated compounds must sit in order to promote compound separation. The residual alcohol must then evaporate and acid is then added to neutralize the base, which was added earlier. The remaining acid is washed away, creating 3 gallons of wastewater for every gallon of biodiesel.

However, these researchers eliminated both the need for a base liquid and an acid to neutralize*. Since the process is now continuous there is no need to create unnecessary wastewater*. This amounts to a cleaner grade of both biodiesel and glycerol. Since high-grade glycerol is very valuable, close to $10.00 per gallon, sales would pay for the entire process.[44]

43 Prof. Dave Boocock, Prof. Chem-eng University of Toronto
44 Bob Fox and Dan Genosar, Idaho Falls, Idaho March 11/1999 Environmental News Service

4.3.0 Economics

Biodiesel plant production economics are highly dependant upon the cost of the feedstock. Feedstock costs represent 75-80% of the total cost of biodiesel production. Capital expenditures do not have a significant impact on the cost of producing biodiesel. Production plants can be more scale neutral than other technologies. Economic studies suggest plants can be sized to regional conditions[45]. This would present several advantages in Afghanistan, especially given the dilapidated state of conventional oil facilities.

Using farm waste as a feedstock will provide area farmers with an added value for their food crop. Area producers will have a long- term commitment from the biodiesel industry to buy their crops at market value and the biodiesel company will have a continuing supply of raw material.

4.3.1 Benefits of Biodiesel

- Biodiesel does not require new refuelling stations, new parts inventories or expensive engine modifications

- Biodiesel powered engines deliver similar torque, horsepower, and kilometres per litre as petroleum powered diesels.

- Biodiesel improves air quality by sharply reducing emissions, including particulate matter that regular petroleum diesel releases when burnt.

- Producing fuel from agricultural waste and specific energy crops such as hemp will provide enhanced income for farms and increase rural employment.

- Self sufficiency in fuel production will reduce the need to import fuel.

- Producing a surplus of renewable energy could be an important source of foreign exchange earnings.

45 Dr. Dermot Hayes, Agricultural Economist Iowa State University, International Liquid Biofuels Congress Curitiba Brazil. pp 46 - 47.

Section 5:

Climate Change

5.0 Introduction

The scientific observation of global climate change is in no way a new activity (Houghton, 1997). Neither is the phenomenon itself, which for millions of years has seen the World shift in and out of ice ages (around 20,000 years since the last ice age), with dramatic fluctuations in the mean surface temperature of the Earth. However, there have been unusually large changes over much shorter periods in the very recent past. Human activities such as the burning of fossil fuels and land use conversions particularly forest to agriculture and desertification, have artificially enhanced the 'greenhouse' effect leading to a greater proportion of radiation being kept in the atmosphere and in turn reflected back to the Earth's surface resulting in a rise in surface temperature.

Much of the evidence in support of human induced climate change is derived from ice-core data and the fact that since the industrial revolution (the actual date for which data seem available is 1750) concentrations of those greenhouse gases (GHGs) most responsible for climate change i.e. carbon dioxide (C02), Methane (CH4) and Nitrous oxide (N20) have increased by 30, 100 and 15 percent respectively. From ice-core data, these gases are now at higher concentrations than at any time in the past 160,000 years (IPCC, 1996b). Agriculture is broadly responsible for 50 percent of human generated CH4 and 70 percent of N2O emissions contributing to 20 and 5 percent of global warming respectively. Fossil fuel combustion and land use conversions (i.e. forest to agriculture, especially livestock production) are responsible for the increase in CO2, which accounts for 65 percent of the radiative effect associated with the *enhanced* greenhouse effect (IPCC, 1996b).

Enhanced (or accelerated) climate change represents a problem of phenomenal proportions for the maintenance of the natural equilibria on which the survival of (all) living organisms depend. Houghton (1997) considers that changes brought about by global warming to the hydrological cycle (water) will have the most dramatic impact.

At present we can observe many indicators of this disruption in the increasing incidence of extreme weather conditions such as storms, droughts and floods and the obvious devastation that these events cause. Climatic projections (IS 92a) of the IPCC that consider a business-as-usual scenario (in so far as no action is taken) predict an additional increase in atmospheric carbon of 1400Gt[46] with a subsequent rise in temperature of between 5 and 10°C by 2200 and conclude that, **'[t]he associated changes in climate would be correspondingly large and could well be irreversible'. (Houghton, 1997, p102)**

It is estimated that the cost of these changes could be realized as soon as 2050 and would be in the range of 1-1.5 percent of GDP for developed countries. **According to Houghton (1997) and IPCC (1996b) this figure is substantially higher (5 percent) for developing countries due to their greater geographical vulnerability to climatic variations and the fact that more of their income/expenditure depends on agriculture and water resources.** Although extrapolations are difficult given the overwhelming number of variables[47] the total cost could be around 2 percent of Gross World Product (GWP) or 400 billion US dollars *per annum*. This figure is increased, assuming that damage remains over time, giving a cost per ton of carbon of $50.[48]

On a global scale, human activities currently add around 3.3 thousand million tons (Gt) of carbon (annually) into the atmosphere equivalent to a 1.5ppmvv[49] annual increase, which represents 45 percent of total emissions (1.5 Gt from changes in land use and deforestation and 6Gt from fossil fuel emissions). The other 55 percent is removed by the land and ocean biota (Houghton, 1997). While this represents a simplified description of the problem there seems little need to repeat the comprehensive analysis of the IPCC (International Panel on Climate Change, 1990, 1996a, 1996b) although this vast body of research will be extensively drawn upon in this section.

---

46 one Giga Ton = one thousand million tons
47 How for instance do we adequately account for loss of species (biodiversity) as a result of climate change?
48 The cost of emitting one ton of carbon now given future damage (marginal costs), calculated using a discount rate means that estimates range between 5 and $125 per t/C (Houghton, 1997).
49 Parts per million volume.

It has been the weight of scientific knowledge about global warming that provided the impetus for the largest meeting of government representatives ever to have taken place. The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, 1992 (or 'Earth Summit') led to the signing of the United Nations Framework Convention on Climate Change (UNFCCC) by 160 countries, including Afghanistan – although the treaty is yet to be ratified by Afghanistan. This project could help that process.

It should be pointed out that responsibility and focus for action lies firmly with countries categorized as developed, resting as it does (other than simply liability) with fiscal ability to implement the objectives of the Convention and the socio-economic structures relevant to this, such as dominant industrial sectors and energy use/consumption.

While there are several predominantly regulatory mechanisms that could be implemented to mitigate climate change such as taxation, carbon quotas and tradable permits these all come with direct economic costs and are to varying degrees inequitable in terms of their disparate international impact. Especially as the world's largest polluter has not (yet) signed the Treaty.[50]

At the heart of the current proposal is a method to effectively address the problem of climate change complementary to advances within both agricultural and energy sectors of the economy. Moreover, this proposal aims to explicitly link these key areas of the economy with a mitigation strategy that will not only increase the value of these crucial industrial sectors but will also benefit people at every socio-economic level.

50 See Appendix 3: Observer report on leaked Pentagon document "climate change a bigger threat than terrorism".

5.1 Climate Change Mitigation Strategy

Our strategy acts *literally* on the scientific basis of climate change, considering this empirical basis as the practical catalyst for solutions rather than market and/or government regulation. Although regulatory policies would tackle the problem based on a scientific judgment in so far as the aim to reduce or abate emissions is a scientifically based goal; our strategy seeks mitigation through the application of scientific principles (in this case biology and chemistry) ***in addition to*** economic incentives - unlike regulatory mechanisms. Importantly this is a point that receives appraisal in literature dealing with the problem of climate change. The IPCC (1990, p402) states that,

‘ . . . the greenhouse problem is a pollution problem over space and time, and one in which increased absorption can reduce atmospheric concentrations of greenhouse gases as effectively as reduced emissions’.

This could be achieved in several ways.

● Preservation of carbon ‘sinks’. [51]

● Enhancement of sinks

● Creation of sinks

These ‘sinks’ include marine activities (such as the photosynthetic properties of plankton), which account for up to 50 per cent (or 2.1Gt C02) of the total (4.2Gt C02) ***sequestered*** carbon (Houghton, 1997). This section will concentrate on terrestrial mechanisms as they hold greater potential for enhancement by human activity (Afghanistan being landlocked) and also have a significant influence over the ability of the oceanic biota to sequester atmospheric carbon. Some of these (negative) influences include agricultural run-off, pesticides, industrial pollutants, sewage and indeed climate change itself (Lalli and Parsons; 1993).

51 As defined in the UNFCCC, a “sink” means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere. At present the terrestrial and oceanic sinks sequester 55 percent of all anthropogenic emissions, the remaining 45 percent is added to the atmospheric composition- resulting in global warming (Houghton, 1997).

Terrestrial mechanisms for C02 sequestration are mostly associated with the chemical conversions that occur in green plant tissue (chlorophyll) during the process of photosynthesis. Plants require large quantities of (especially) CO2 in order to grow, releasing oxygen as a 'by-product'. CO2, which represents 50 per cent of greenhouse gases (IPCC, 1996b), is converted along with other chemicals (or assimilates) into food by the plant.

The resulting growth and storage of carbon is realized in terms of **biomass**. It should be noted that mature forests, such as those found in tropical regions of the World represent 'climax vegetation' that absorb only small amounts of Carbon compared to new plant growth.[52]

Only those (developed) countries listed in Annex 1 of the Convention are committed to 'protecting and enhancing its greenhouse gas sinks' (Article 4, part 2a). The reasons obviously being that for many of the Worlds countries these areas represent important sources of income. In effect they are a natural resource and under international law the sovereign state has ultimate control over their exploitation, although in Afghanistan lack of governance and illegal logging is widespread. These once forested areas are often turned into *sources* of greenhouse gases, as fertile, often forested land (as a scarce resource) is converted for either agricultural uses such as livestock, to replace chemically degraded land or, as is predominately the case in Afghanistan, the (*natural*) biomass is used as (firewood) fuel.

'Deforestation, the changing of land out of forests, is the single most important land use related cause of the increase in atmospheric concentration of carbon dioxide.' (Adger and Brown, 1994, p233)

By this rationale and in line with the philosophy behind this proposal, regional and national authorities could implement strategies for reforestation. Such a policy would be directly in line with the commitments (Article 4) agreed to under the Convention; **including the Annex 1 (developed) countries additional commitment to provide financial assistance for developing countries to achieve the Conventions**

52 This is not to trivialize these areas; they are protected by international agreement (CBD, signed at Rio 1992 by 153 countries plus the EU) protecting the biological diversity located in these, mainly tropical regions. In addition, old growth forests represent a substantial store of above and below ground carbon the removal of which becomes a source of atmospheric carbon and other greenhouse gases (IPPCC,1996b).

objective(s). Provided, of course, that other international agreements (i.e. Convention on Biological Diversity) are respected in the process. For instance,

'(a)s much as 60 percent of Indonesia's roughly 2 million hectares of plantation (forestry) is thought to have directly displaced natural forest.' (Adger and Brown, 1994, pp24-25)

It is important to strike a balance between economic and environmental objectives although this is not always possible. Plantation forests in several respects are not the solution, although given that World consumption of paper (275 million tons in 1995) is expected to increase to around 480 million tons in 2010 (Mattoon, 1998, p20) it is certainly an *economically* attractive option for governments or the speculative investor.[53]

One of the key disadvantages of plantation forest is the time (5-25 years) required (especially in the beginning of such a project prior to the establishment of a growth cycle) before any economic benefits can be realised. This fact goes some way to explain why plantations have displaced many natural 'old growth' forests.

Regardless, the option of plantation forestry is less attractive or literally impossible for the small landowner or farmer given the scale and initial investment required.[54] This fact is reflected in the comparatively small amount of forests that are managed for goods and services[55] even under conditions more favourable than those found in Afghanistan.

53 Global paper manufacture also accounts for a substantial proportion of industrial effluents released to water and therefore impacts on terrestrial and marine environments negatively.
54 IPCC (1996b,p776) considers the average cost of plantation forestry to be around $400/ha.
55 Forests globally cover 4.1 Gha, 0.1 Gha are plantations and 11% of the total are managed. This varies by region as 20% of mid-latitude, 17% of high latitude and less than 4% of low latitude forests are managed (IPPC, 1996b,p776)

An ideal environmental policy approach to climate change mitigation would include the following objectives:

- Sequestration of atmospheric carbon dioxide.
- Prevent the destruction of natural ecosystems (biodiversity).
- It *would not* burden developing countries with costly socio economic regulations .
- It *would not* require significant changes to current land use (i.e. displacing people or activities).
- It *would* have a minimal environmental impact and/or address other environmental/pollution problems.
- It would also provide (socially equitable) economic incentives for *global* implementation.

(Adapted from UNFCCC, 1992 and IPCC 1996a, 1996b)

This proposal follows the conclusions reached by the IPCC (1996a, 1996b) which hold that it is advantageous to have a cross-sectoral (or multi disciplinary) approach to the problem of climate change given the context in which policy decisions must be taken. Linking policies in the areas of transport, agriculture and forestry with the cross-sectoral dimensions of energy, land use and society's demands for resources is integral to establishing effective mitigation policy. One definitive argument arising from the work of the IPPC demonstrated in both the model of Low CO2-Emitting Energy Supply Systems (LESS) and Integrated Model to Assess the Greenhouse Effect (IMAGE 2.0, IPCC, 1996b) is that the strategic use of biomass in the above areas will have the most profound mitigation potential in both present and future scenarios.

'If the development of biomass energy can be carried out in ways that effectively address concerns about other environmental issues and competition with other land-uses, biomass could make major contributions in both the electricity and fuel markets, as well as offering prospects of increasing rural employment and income.' (IPCC, 1996b, p15)

While there is little doubt regarding the credibility of this well researched statement, conclusions are sensitive to variables 'such as the productivity of biomass energy plants, the rate of technological progress in agriculture, and the rate of population and income growth' (IPCC, 1996b, p816). Climate change also posses problems for the growth of 'new' biomass and for the areas of natural and plantation forests that already exist given that small (1^{o}C) alterations in mean annual temperature can potentially affect the 'geographic distribution of biomes or bio-geographic regions (IPCC, 1996b, p101).

The implications of this mean that while a standardized approach to biomass (i.e. for energy purposes) is highly desirable in terms of processing costs, the choice of biomass is an important factor given that climate change will continue for many years after atmospheric carbon levels have been stabilized.

Annual and perennial crops are far less vulnerable to changes in climate than are slow to medium growth forests (IPCC, 1996b, p389) and some such as Hemp share many of the bio-chemical characteristics of hardwood.

The strategic utilization of biomass in agriculture and industry represents an economically favourable alternative to, for example, the regulatory or 'top down' price fixing of fossil fuels - which in the long term will only achieve mitigation objectives through economically negative activities. Moreover, a strategy designed to create equilibrium between both people and their environment has far greater practical potential in terms of implementation, inclusiveness and in meeting *all* the objectives of the 1992 Convention.

5.2 Hemp and Climate Change

Like all green plants and agricultural crops there is a delicate balance in photosynthetic potential and increased levels of atmospheric carbon dioxide and variations in other plant assimilates. This is made even more salient in terms of the interplay between biosphere and atmosphere as there are links and interplay between every aspect. Increased C02 and increased temperature impact on every possible variable that plants require for growth, as this section will explore. In addition, the ability for any crop (or indeed agricultural practice) to contribute towards climate change mitigation will depend on the extent of ***total*** benefits rather than simply the amount of atmospheric carbon that can be converted into biomass during photosynthesis. It is first necessary to establish some baseline data in the context of enhanced atmospheric carbon dioxide for Hemp.

For the purposes of this section it is necessary to count the entire plant in this equation, as we are interested in the total or gross rate of photosynthesis in relation to ***total*** biomass rather than (just) dry product of *economic* value.

When the same cultivar is planted, all other factors being equal, at different densities i.e. 120m^2 and 50m^2 the respective yields would be around 15 t/ha and 20 t/ha (van der Werf et al; 1999, p95). This again, however, represents the economically valuable matter. Due to self-thinning at higher densities, the amount of matter subject to biotic and abiotic decomposition is severely under estimated which van der Werf et al (1999) considers to be around 3 t/ha. Densities vary considerably between crops grown for seed (4/m^2) and fibre (100/m^2)(Clarke; 1999, p2) and can vary anywhere between 4 to 30 plants per m^2 for seed and 50 to 750 plants per m^2 for stem/fibre production (Ranalli; 1999, p67). A fibre crop, with a typical dry stem yield of 15 t/ha (60-70 percent of total biomass) has other components of roots (10 percent) and leaves (20 percent) which represent the total biomass that would also include seeds (5-15 percent) if left to flower (Ranalli, 1999).

Total biomass of this particular (fibre) crop would then be about 20 t/ha, increasing to around 23 t/ha when accounting for self-thinning.[56]

The root system as mentioned is ecologically important as this can prevent soil erosion. Hemp primary root can reach depths of up to 3 metres although this depends on several factors including cultivar, ecotype and soil quality (Bocsa and Karus, 1998).

Given this data concerning gross primary biomass, a figure of around 23t/ha can be assumed. However, there exists little data to verify an exact figure for the amount of carbon sequestered during photosynthesis and estimates range between half (Houghton, 1997) and one third of gross biomass (Geof Kime, Hempline Inc., personal communication; 1999). Thus it could be assumed that around 11.5 t/C02 per ha is sequestered if half of gross primary production or 7.6 t/ha if one third giving an average of 9.5 t C02 per ha. Assuming increased biomass as a result of the CO2 fertilization effect would also increase this figure by approximately 10 percent. This however is tenuous given the possibility of negative feedbacks to offset such advantages by for example decreasing water use efficiency (Bazzaz and Sombroek, 1996). We will not therefore include this theoretical increase.

It is apparent from this and the information/data detailed in section **2.0** that there are many physiological and phenotypic factors that would serve to make Hemp resilient to climate change. For instance, the ability to adapt to dry conditions and the possibility that Hemp could retain its water use efficiency under such conditions would enable the plant to take full advantage of the 'fertilization effect' of increased atmospheric carbon. As yet no research has been conducted to elaborate more fully on this possibility and so one of our primary objectives is to gather data in this area. In addition there are many other advantages that could be derived from the substantial gene pool of Hemp in terms of climate change adaptation, increasing the sustainability of agriculture and (more generally) for specific economic uses (see section 2).

56 Self thinning has environmentally beneficial aspects for agriculture as canopy formation of the Cannabis crop develops, old growth (leaves, which are high in Nitrogen) die and so perform a self-mulching function, creating in effect a mini-ecosystem fertilizing the soil, preventing soil erosion and run-off (Roulac, 1997).

Every 100ha of hemp cultivation will sequester roughly 950 metric tons of atmospheric carbon. Moreover, using hemp as a bioremediation and buffer crop in combating desertification and soil erosion will also increase the carbon stored in the soil.

This will form a key aspect of our research.

5.3 Practical Implications for Afghanistan

Introducing a strategic land management system based around the utilisation of agricultural waste and specific energy crops like Hemp will put Afghanistan in a unique position for implementing the requirements of all international environmental Treaties including the distinct yet related international Conventions covering areas of biodiversity, desertification and climate change.

The proposed introduction of Hemp as a renewable biomass resource fits well with all the recommendations set out in these Treaties, especially the United Nations Framework Convention on Climate Change or Kyoto Protocol.

Under our proposed introductory hemp breeding project and the use of hemp directly as a fuel would qualify this project for considerable international funding including assistance with capacity building and ultimately the implementation of the processing technologies that we drew attention to in section 4.

However, as we are intending to use Hemp as a raw biomass replacement to preserve forested areas we shall concentrate on this in terms of the direct practical implications.

There are two key assumptions regarding land use / availability and the expected yield of the Hemp crops. Our best-case scenario will assume a yield of 17.5 dry tons/ha and the worst- case scenario (in effect half the optimum yield) will assume a yield of 8.75 dry tons/ha. Given the chemical composition of hemp described in section 2 we are also assuming a similar calorific value to “regular” wood.

Going on the best case scenario regarding the yield (t/ha) of dry fibre from hemp 5Mha of land will produce the equivalent total weight of wood consumed in Afghanistan for heating and cooking applications in 2003. The worst case scenario (yield of 8.75 t/ha) would require around double this area of land to satisfy total woodfuel demand. In either scenario the amount of atmospheric carbon converted into biomass would be around 15.2 million metric tons per annum, which does not include the amount of carbon stored in soil systems as a result of sound land management.

Any progress that can be made to replace forest resources as the primary source of biomass for heating and cooking will assist Afghanistan to preserve the country's natural resource base for generations to come. This will also help the country to capitalise on the promotion of these areas for alternative revenue such as tourism and the continued sustainable harvesting of forest resources, such as nuts, fruits and berries - including the continued investigation into novel uses of biodiversity in areas such as medical science.

Initiating an industrial hemp breeding project in the first instance will provide a level of capacity that will enable Afghanistan to embark on more extensive fibre cropping in the future. The ability of Afghanistan to develop an alternative biomass resource base will also make the country an attractive location for private investment in biomass and/or specifically hemp processing technology, including the energy technologies we examined in section 4. Investment in biomass derived transport fuels such as ethanol will confer several environmental and economic advantages to Afghanistan.

According to the Argonne National Laboratory, vehicles using E10 (ethanol in 10 percent combination with gasoline) derived from high cellulosic crops - such as Hemp - would achieve 8 - 10 percent reductions in greenhouse gas (GHG) emissions and can mean reductions of between 61 -91 percent if used in E85 (ethanol 85 percent) combination with gasoline.

Even on a small scale this would be particularly beneficial for Afghanistan given the level of urban air pollution resulting from the burning of low quality diesel in transportation and the environmental impact of partially destroyed oil processing facilities.

For example, UNEP samples in Qandahar, Mazar-i-Sharif, Kabul and Heart found high concentrations of polyaromatic hydrocarbons (PAHs) which are toxic, carcinogenic and pose an obvious health risk. Benzo-a-pyrene is a pollutant believed to cause lung cancer and was found in highest concentrations in Mazar-i-Sharif (UNEP, 2003).

Addressing climate change with a national biomass strategy will not only contribute towards the mitigation of global problem but it will improve the quality of life for the people of Afghanistan. Again, I would strongly emphasis the low baseline from which Afghanistan has to rebuild and stress the need for capacity building that will confer immediate as well as future benefits.

Securing a renewable resource base in Afghanistan, along with food security, poverty reduction and land remediation is the first step in process.

Section 6:

International Funding Resources

UNEP conducted a screening of potential National Development Framework initiatives in Afghanistan that would qualify for Clean Development Mechanism funding and identified the following areas:

- Afforestation
- Reforestation
- Natural and biogas/fuel development

The ideas outlined in this document would cover every aspect of these programme areas.

The Clean Development Mechanism (CDM), is part of the United Nations Framework Convention on Climate Change (UNFCCC), which under the Global Environment Facility has a mandate to assist in arranging funding programs that mirror our project.[57] Several areas of concern need to be addressed including: enhancement of carbon sequestration, conservation of biodiversity, prevention of land degradation, food security and poverty alleviation. In sections 2, 3 and 4 we have addressed these areas of concern and answered the issue of a sustainable energy program.

The CDM is the only Kyoto mechanism addressed directly to the developing countries. Article 12 of the Kyoto Protocol defines the CDM and states its three purposes. They are first: to assist country Parties not included in Annex 1 “in achieving sustainable development,” second, to assist country Parties not included in Annex 1 “in contributing to the ultimate objective of the Convention,” and third, “to

57 Carbon Sequestration Options under The Clean Development Mechanism to Address Land Degradation, Food and Agriculture Organization of the United Nations Rome 2000.

assist Parties included in Annex 1 in achieving compliance with their Quantified Emission Limitation and Reduction Commitment (QELRC) ***emission trading.***

Given the scope of the project we are proposing and the fact that it meets all the requirements set out in the UNFCCC a national plan for Afghanistan should be co-ordinated to access international funding in terms of both implementation of this project as a function of capacity building for meeting immediate and future energy requirements including the production of clean transport fuels.

The United Nations Convention to Combat Desertification (CCD) also has mechanisms for funding this type of project. The main objective of the CCD is to address the urgent need to reverse land degradation due to deforestation and unsustainable land use and management practices. This project would undoubtedly go some way to achieving these objectives and should also be incorporated into a national biomass strategy for Afghanistan.

The CCD project contributes to the development of regional and national programs linking the United Nations Framework Convention on Climate Change (UNFCCC) - Kyoto Protocol, the Convention to Combat Desertification (CCD), and the Convention on Biodiversity (CBD) focusing on synergies among the three conventions. The CCD has a funding mechanism called the Global Mechanism (GM), which does not lend money of its own but rather acts as a facilitator to locating funds by promoting multi-source funding approaches and arrangements.

There should also be possibilities for funding under the sustainable development and capacity building initiatives of **Agenda 21**. This project would also be able to take full advantage of international carbon trading,[58] not just in terms of creating carbon sinks (biomass) for use in fuel production, but also in the storage of carbon in managed soil systems and the promotion and use of the clean, renewable energies that can replace fossil fuels as described in section 4.

58 The value of carbon trading to this project is substantial with the price for carbon currently at around $28 (US) per metric ton an *average* hemp crop will sequester around 9 metric tons of atmospheric carbon per hectare.

Section 7:

Proposal for UK hemp industry demonstration project and technology transfer

Due to the concerns arising from the present security situation in Afghanistan, we are advocating that a demonstration and training project should be set up in the UK to help begin this process, although we would also like to encourage the immediate planting of hemp in Afghanistan to be used as fuel and food in the very short term given the existing capacity to, for example, mill seed into flour for bread making, process seed into oil and to use the raw fibre as a direct replacement for trees as heating and cooking fuel, land remediation etc. The only capacity this short term implementation requires is the distribution of hemp seed to farming households.

However, the project needs to be sustainable for the long term, and what we mean by this is that we should not expect the people of Afghanistan to live in a technological dark age where they have to rely to methods we (in the West) have not required for over one hundred years. By setting up a working example of a multipurpose industrial hemp farm that maximises the use value of this crop using simple and transferable technological innovation, we can provide the infrastructure and environment for technology transfer and capacity building aimed at securing the maximum utility of a new and renewable resource base in Afghanistan.

Located on 10 hectares of farmland in the UK, we will be able to demonstrate the direct on-farm, community and industrial applications of industrial hemp in partnership with private capital, including expertise in the areas of renewable fuel/energy production, architecture, building composites, textiles and food production. [59]

The central aim for this operation will be to provide a working example of the project that can be used and replicated directly in Afghanistan. We intend to run training courses for farming households in hemp cultivation, planting and land management

59 A full list of official partners and industrial consultants will be provided in the feasibility study.

along side the transference of business skills that will assist communities in Afghanistan to reap the rewards of this unique opium replacement project.

The proposed project will be run on a not-for-profit basis, although it will certainly generate some considerable revenue given the utility and sales of end products. The money generated by this venture will be used to bring Afghan farmers to Scotland to have first hand experience of a working hemp farm, including the technologies that will benefit Afghan communities in the 21st Century, and beyond.

The purpose of this should be obvious. A tangible working project that maximises utility of the resource base in Afghanistan will provide the transferable skills required for long term industrial capacity building in Afghanistan and enable us to demonstrate the ***absolute*** potential of this project in the only way that can be understood completely – be seeing it working and being able to touch, cook with, provide warmth and even eat the end products, all on-site.

Areas of technology that will be invested in:

- Bio-compactor
- Decorticator
- Oil extraction / biodiesel facility

At the present time all of these technologies exist in either a commercially viable working state or where decortication is concerned some applications have been commercially developed and others exist only as prototypes. Developing the use of these technologies in the UK will help us deliver a high quality long term service to the people of Afghanistan that will certainly benefit future generations.

7.1 Decorticator

This particular technology separates the short from the long fibres as described in sections **2.4.1** and **2.4.2** of this document. This allows an important duel usage to be capitalised on that will see the long fibres used in both textiles and paper making while the short fibres and dust can be used in renewable energy provision that maximize both efficiency and energy conversion.

7.2 Bio-compactor

This technology will enable hemp fibre and all other farm waste to be compacted into briquettes for use directly in both heating and cooking applications. This is far more sophisticated and energy efficient than simply burning fibre.

Existing models are 90% efficient. Running on a steam motor, this technology requires only 4% of the fuel produced to run indefinitely and produces bricks with a similar calorific value to coal – only we don't have to wait thousands of years! The bio-compactor also has applications in the manufacture of building composites.

7.3 Business Development

Not only will this demonstration project help people to understand the absolute total benefits that industrial hemp will afford Afghanistan but there is a strong international and community dimension to the underlying philosophy behind this action.

In addition to taking visitors from Afghanistan on training weeks, we can also provide an outlet for the many Afghans living in the UK who *already* posses skills in areas such as spinning, weaving, agriculture and business development. Thus we will be able to create a "home from home" environment for the visiting Afghanis. All employees (full time and part-time) of the proposed demonstration farm will be paid for their labour according to UK law. We intend to pay particular attention and actively encourage the participation of Afghan women in this project, especially as many farming households in Afghanistan are now headed by women.

There are also lessons to be learnt from this proposal in the UK.

We are proposing a *working model of sustainable development and agriculture* that will produce benefits directly for the population at home, which can also be transferred to other regions of the UK.

In the UK/EU we urgently require renewable fuels and energy in order to meet our Kyoto commitments. If we cannot practice what we preach with regards to global environmental agreements, how on earth can we expect others to take us seriously? Implementation of this proposal is also therefore a long term project for sustainable development in the UK.

To begin this process we require funds to conduct a feasibility study that will develop a community based project for hemp to be used in textiles, building composites, fuel and food in a rural but internationally accessible[60] location in the UK. The author of this document will be responsible for the compilation of this study, which is expected to take between two and three months to complete and will be published for public viewing as well as being distributed to collaborating agencies in the UK, Afghanistan and internationally.

On the basis of the feasibility study we hope to raise further revenue to complete a bankable business plan and estimate that we require around £250,000 to implement a farm-scale demonstration project.

This money will be used to secure tenure on 10 hectares of farmland for a period of 10 years and includes all running costs, including processing capacity of a self-sustaining business that will provide an income to Spirit Aid Ltd for the purpose(s) detailed in and subject of this document.

In the short term, we will be applying to the Asian Development Bank for funding to purchase Afghan farmers hemp seed in order to begin the process of opium

60 i.e. close to an international airport.

replacement. The two projects (UK and Afghanistan) will be intended to run parallel with one another and be complementary.

The Asian Development Bank is presently encouraging farmers in Fiji to grow hemp since many people have become unemployed due to the near collapse of the sugar cane industry in that part of the world. The research on which the ADB have encouraged hemp cultivation was independently commissioned and undertaken by a company (Lincoln International Limited) in New Zealand.

This is a truly international project that will bring together expertise from every corner of the globe; all dedicated to the sustainable rebuilding of Afghanistan.

Section 8:

Industrial Hemp and the Law

The 1961 United Nations Single Convention on Narcotic Drugs (Article 28, section 2) states that it (the Convention) **'shall not apply to the cultivation of the cannabis plant exclusively for industrial purposes (fibre and seed) or horticultural purposes'**. It is therefore a matter for individual Member States (UN) to decide on whether or not to cultivate hemp, and that would also include Cannabis for medicinal purposes.

Around 36 nations around the World, including *all* developed nations with the sole exception of the United States of America, are presently engaged in industrial hemp cultivation. The industry has been rapidly expanding since the business communities of Canada, Australia and the European Union successfully lobbied to have restrictions lifted. This was led by farmers and the business community in France and Hungary. These countries (along with China and India) never followed the unilateral US policy of an outright ban. The US ban is possibly breaching international law and the constitutional rights of farmers in the US.[61]

61 The US Constitution and Declaration of Independence were both written on finest quality hemp paper. The ban certainly flies in the face of common sense and scientific knowledge.

Industrial hemp belongs to the species Cannabis and since the 1920's this species has been subject to numerous attempts at eradication in the US. Many researchers (Herer 1991, Lupien 1995, Roulac 1997) point to a conspiracy on the part of timber, petrochemical companies and their political allies that served to eliminate hemp as a source of competition in the raw cellulose, fibre and pulp markets in the 1920's. The evidence of this "conspiracy" theory is quite over whelming.

In the UK there are several commercial hemp enterprises producing everything from horse bedding for the Royal Stables (Hemcore UK Ltd) to the latest global research on medical applications of drug varieties. GW Pharmaceuticals - a private company - has a licence from the UK Home Office for researching the use of high narcotic (THC) content Cannabis for medicinal purposes. Proven medical uses include the areas of analgesics, appetite stimulants, blood thinning and muscle relaxants.[62]

Even in the United States of America, some individual States such as California have a distinct policy that allows the medical use for what they call "medical marijuana" for sufferers of Cancer, AIDS and Multiple Sclerosis (MS). As a natural substance, Cannabis has been used for treating human medical conditions for several millennia, all over the World from ancient China to the Andes. The seed - as an EFA rich food source – also has an important role to play in disease prevention by boosting the human immune system.

In the last couple of decades there has been much renewed interest in this potentially lucrative area of medical science which is often paralleled with increasing concerns about the safety of synthetic drugs designed for the same uses. People regularly overdose on analgesics such as paracetamol, whereas in more than a thousand years of human consumption there has not been one reported case of a Cannabis overdose.

Despite the fact that hemp farmers and the environments they work in have been benefiting from cultivation of this crop all over the world, the US government has continued to "wage war" on this plant on its own soil, much to the dismay of American farmers and entrepreneurs. However, as recently as February 6th 2004,

62 See Appendix 5 for further information.

the US courts (9th Circuit) ruled in favour of the Hemp Industries Associations petition *preventing* the US Drug Enforcement Administration's (DEA) three year attempt to have the seeds (the single most nutritionally complete source of food on the planet) made illegal.

The seeds have no significant narcotic properties, containing as they do less trace quantity of THC than poppy seeds do in terms of opiate content, or in the case of orange juice - alcohol content. The Bush administration did not appeal the Courts decision (September 2004) - therefore the decision stands: hemp food is not only good for you, but it is 100% legal - even in the USA!

Most countries who take advantage of international law by cultivating hemp apply regulation on the issue of THC content. In the EU, for example, THC limits for industrial hemp are set at 0.3 percent. This is a very strict limit and actually posses some problems for breeding and/or research purposes. Since industrial hemp adapts to environmental stresses (i.e. increased UVB radiation and desiccation) by producing more cannabinoids (THC is one of 60 other, mostly non-narcotic, chemicals) we would recommend a THC limit of up to 3 percent in Afghanistan. Any crop less than 5-6 percent THC has *absolutely* no value as a narcotic. Varieties being cultivated solely for their drug content tend to range between 10 and 30 percent THC content.

Moreover, the methods of cultivation and timing of harvesting for narcotic grade and industrial cannabis are mutually exclusive. It is impossible to harvest female flowers (these contain most THC) *and* to produce seed. After fertilisation by male plants the THC containing female buds produce seed. It is also the case that in an industrial situation removing the male plants to prevent fertilisation (if one wished to produce hashish for example) is a practical impossibility. However, we recommend that Afghanistan also considers capacity building for medicinal research and development on the Cannabis species as this could be an important source of revenue and indeed low cost, natural medical treatment for a broad range of conditions at the local level – as has been the case historically for several millennia.

Section 9:

Concluding Summary

Replacing poppy cultivation with hemp will provide Afghanistan with enough fuel to supply the total annual requirement of wood fuel for around half a million rural households. This assumes poppy is being grown on at least 80,000ha of land and that 3000kg of wood can meet more than half of a families woodfuel cooking and heating requirement.

In addition, the seed from this crop – assuming a below average yield of 1000kg/ha will produce around 90,000 tons of high protein, nutritionally balanced food. This seed can be pressed into valuable oil – replacing opium at the present industrial level in Afghanistan would produce seed oil with a value over **$290 million US dollars**.

Using traditional methods, the remaining pellets of seed can be milled into nutritional flour that can be combined with wheat in bread making, or pasta, or whatever else people wish to eat. Hemp seed is an extremely versatile source of food and while it is undeniably the most nutritionally complete source of food known to humanity – it is also very tasty, a pleasant coincidence!

When we consider the environmental benefits of hemp cultivation discussed in section 2 there would certainly be a strong case for integrating the legal cultivation of this crop into the Afghan agricultural economy.

Afghanistan has always produced a certain amount of cannabis for medicinal and/or recreational use both for the domestic market and international export, thus there is to some extent already the knowledge base that could easily shift to industrial hemp production for wood substitution and food with minimal training.

However, as we are interested in the long term success and sustainability of this project we are committed to training and hope to set up a complete farm-scale demonstration of this project in the UK that can be used for training and technology transfer to the Afghan population.

There is an urgent need to address the depletion of Afghanistan's forest resources as this will have severe repercussions on all socio-environmental parameters in the years to come. Industrial hemp cultivation represents a pragmatic approach to the replacement of wood for heating, cooking and transportation fuels.

While recognising the need for the international community to assist with tree planting projects we must be realistic about this. Firstly, unless donors are willing to dedicate millions of dollars and provide extensive training to *non-military* groups, tree planting will not be sustainable. Socially, there will be no immediate economic benefits from tree planting (in terms of harvesting and use) and it should also be stressed that planting trees on hillsides without adequate preparation is simply time and money wasted.

Using hemp on deforested hillsides will have an environmentally superior impact compared to trees given the rapid growth cycle, long root systems and self mulching effect. Combined, these processes would be preparatory to any sustainable tree planting projects that may be undertaken in future.

Hemp can provide the same environmental and economic benefit as trees but in the space of months rather than years.

Given the large variations in climate and topography (soil) of Afghanistan it is unlikely that tree planting would be successful unless comprehensive evaluation is undertaken in the first instance. Planting hemp on deforested areas will help to prepare the land for tree planting at a later date while providing the immediate incentives required to implement, for example, a national conservation strategy to protect the remaining trees. Beginning a strategy that combines sustainable land management both inside and outside of the main agricultural areas with a biomass

replacement project for fuel wood is the only realistic means we have of addressing the huge socio-environmental challenges facing Afghanistan in the 21st Century.

By putting this initial capacity in place we will effectively secure a long term industrial resource base for Afghanistan that will - in the near future - be able to meet the demands of more technologically advanced fibre and fuel industries.

Why should we assume that "progress" should mean a dependence on oil and gas?

The international community has an obligation to ensure that the reconstruction of Afghanistan is done using the best available methodology and that all reconstruction efforts are aimed squarely at providing long term solutions to both local and global environmental concerns.

I am assuming that this document will meet with some 'scepticism' from those in the United States who do not understand their own government's policy on hemp or the international law that this (US) policy breaches. In the face of record breaking opium crops since the liberation of Afghanistan and the subsequent escalation of a heroin problem that poses a serious threat to communities from Afghanistan to Pakistan to Scotland, those who continue to advocate a misguided "drug war" should put aside their political dogma and help us tackle these serious problems using the best possible and available methods.

Industrial hemp will address the most immediate and pressing concerns of Afghanistan and will help build the capacity required for future sustainable development in line with international law and *all* relevant United Nations Treaties.

Section 10:

References

Adger W.L and Brown K. (1994) 'Land Use and the Causes of Global Warming' Wiley Ltd.

Alden et al. (1998) 'Industrial hemp's double dividend: a study for the USA' in Ecological Economics, 25, pp291-301.

Alfsen et al (1995) 'The Cost of soil Erosion in Nicaragua' in Ecological Economics, 16, pp129-145.

Bazzaz, F.A and Sombroek, W.G (1996) 'Global Climate Change and Agricultural Production: Assessment of Current Knowledge and Critical Gaps' in Global Climate change and Agricultural Production (Eds. Bazzaz, F.A and Sombroek, W.G) Wiley.

BBC Scotland 'Drug Death Toll Rises' Thursday, 28 August, 2003. http://news.bbc.co.uk/1/hi/scotland/3188573.stm

Biermann, C.J (1993) 'Pulping and Papermaking' Academic Press Inc.

Bocsa, Dr Ivan and Karus, M (1998) 'The Cultivation of Hemp: Botany, Varieties, Cultivation and Harvesting' Hemptech.

Bocsa, Dr Ivan (1999) 'Genetic Improvement: Conventional Approaches' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

Clarke, R.C (1999) 'Botany of the Genus Hemp' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

Deeley, M.R (2000) Cannabis: an economically and environmentally viable method for climate change mitigation pp70 University of Strathclyde, Glasgow UK (revised 2001) Summarised version published in Journal of Industrial Hemp Vol.7 No.1 September 2002. Haworth Press NY.

De Groot, B., G.J van Roekel Jr, J.E.G van Dam (1999) 'Alkaline Pulping of Fiber Hemp' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

De Haan F.A.M (1987) 'Effects of Agricultural Practices on the Physical, Chemical and Biological Properties of Soils: Part III - Chemical Degradation of Soil as the Result of the Use of Mineral Fertilisers and Pesticides: Aspects of Soil Quality Evaluation'. In Scientific Basis for Soil Protection in the European Community (Eds. Barth, H & L'Hermite, P. Elsevier) Applied Science Publishers Ltd, London.

De Meijer, E.P.M (1999) '*Hemp* Germplasm Resources' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

FAO (2000) 'Advisory Committee on Paper and Wood Products' Sao Paulo, 27-28 April 1999. Published on-line by the FAO
(see http://www.fao.org/montes/fop/fopw/acpwp/40/indus.htm.)
FAO (2001) see FAO stat. Online database.

Forbes, J.C and Watson, R.D (1992) 'Plants in Agriculture' Cambridge University Press.

Gordon, Michael. R (2002) 'CIA Warns That Afghan Faction May Bring Chaos' The New York Times Feb 21st 2002.

Hanegraaf et al (1998) 'Assessing the Ecological and Economic Sustainability of Energy Crops' in Biomass and Bioenergy Vol.15, Nos 4/5, pp345-355. Elsevier Science Ltd.

Herer, Jack (1991) 'Hemp and the Marijuana Conspiracy: The Emperor Wears No Clothes', Van Nuys, California, HEMP publishing.

Hill, Amelia (2004) 'Super-heroin dealers target middle classes' The Observer, Sunday March 7, 2004

Houghton, J (1997) 'Global Warming: the complete briefing', Cambridge University Press.

Huber, J (2003) 'Afghanistan: the Taliban's smiling face' Le Monde Diplomatique, March 2003.

IPCC (Intergovernmental Panel on Climate Change) '1990: Climate Change: The IPCC Scientific Assessment', Report prepared for IPCC by working group I (Eds. Houghton, J.T, Jenkins,G.J and Ephraums, J.T) Cambridge University Press.

IPCC (1996a) Climate Change 1995: Economic and Social Dimensions of Climate Change. Contribution of Working Group III to the Second Assessment Report of the Intergovernmental Panel on Climate Change'. (Eds. Bruce, P; Lee, H and Haites, E.F) Cambridge University Press.

IPCC (1996b) Climate Change 1995: Impacts, Adaptations and mitigation of Climate Change: Scientific-Technical Analyses. Contribution of working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change. (Eds. Watson, R.T; Zinyowera, M.C; Moss, R.H and Dokken, D.J) Cambridge University Press.

Khan, N (2004) 'US helicopter fires on house in Afghan village, killing 11, officials say' Associated Press, January 19th 2004.

Johnston, P (2002) "Hard core of addicts cost nation '£19 billion'" Telegraph, February 13, 2002.

Latta, R.D and Eaton, B.J (1975) 'Seasonal Fluctuations in Cannabinoid of Kansas Marijuana' in Economic Botany, 29, pp153-163.

Leemans et al (1996) 'Land Use Change in Global Climate Change Models' in Global Climate Change and Agricultural Production (Eds. Bazzaz, F.A and Sombroek, W.G) Wiley Ltd.

Lopez-Real, J.M (1981) 'Plant-microbial Interactions' in Biological Husbandry: a scientific approach to organic farming (Ed.Stonehouse, B) Butterworths.

Lupien, J.C (1995) 'Unravelling an American Dilemma: The Demonization of Marijuana' MA Degree thesis, Pepperdine University, USA.

Mattoon, A.T (1998) 'Paper Forests' in World Watch Vol.11 no.2

Millar, Stewart (2001) 'Port in despair as fishermen get hooked on heroin' Monday January 29, The Guardian

Norton-Taylor and agencies (2004) 'NATO happy to ignore explosion in Afghan opium output, says Russia' Monday, February 9, 2004, The Guardian

Palast, Greg (2002) 'The Best Democracy Money Can Buy' Pluto Press, London

Pate, D.W (1999) 'The Phytochemistry of Hemp: Its Ecological and Evolutionary Implications' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

Pate, D.W (1999) 'Hemp Seed: A Valuable Food Source' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

Ranalli, P (1999) 'Agronomical and Physiological Advances in Hemp Crops' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

Robinson, R (1996) The Great Book of Hemp, Park Street Press.

Roulac, J (1997) 'Hemp Horizons: the comeback of the worlds most promising plant' Chelsea Green Publishing Company.

Ruppert, M.C (2001) 'The Lies About Taliban Heroin. Russia and Oil: the Real Objectives With Heroin As A Weapon of War. A Replay of CIA's Vietnam-era Drug Dealing' Michael C. Ruppert and *From The Wilderness Publications* October 10, 2001.

Sedra, Mark (2004) "Taliban Still larger than life" Asia Times online, March 11, 2004

Scott Tyson, Ann (2003) "Desertions deplete Afghan Army" The Christian Science Monitor, December 17, 2003 edition

Sloane, Peter (2001) Food Security Strategy For Afghanistan: consultation document prepared for the working Team on food Security. *draft document*.

Tolan, Jeff, Iogen Corporation (613) 733-9830 Ext. 3407 - Personal Communication, July 19, 2001

The Guardian, Tuesday February 24, 2004. see: http://society.guardian.co.uk/drugsandalcohol/comment/0%2C8146%2C1154569%2C00.html

Thompson, Tanya (2001) 'One in 50 a Heroin Addict' 15th Nov. Scotsman Publications Ltd.

United Nations Drug Control Programme (2000) Annual Opium Poppy Survey (Afghanistan).

United Nations Drug Control Programme (2001) Annual Opium Poppy Survey (Afghanistan).

United Nations Drug Control Programme (2002) Annual Opium Poppy Survey (Afghanistan).

United Nations Drug Control Programme (2003) Annual Opium Poppy Survey (Afghanistan).

United Nations Environment Programme (2003) Post-conflict Environmental Assessment. Afghanistan.

United Nations Office on Drugs and Crime (2004) Afghanistan: Farmers' Intentions Survey 2003/2004 February 2004.
United Nations Office on Drugs and Crime (2003) An assessment of problem drug use in Kabul City. Community Drug Profile # 5, UNODC Country Office for Afghanistan July 2003

United Nations Framework Convention on Climate Change, New York, 9th May 1992 (Reprinted, London: HMSO 1995)
Van der Werf, H.M.G et al (1999) 'Crop Physiology of Cannabis *Sativa* L.: A Simulation Study of Potential Yield of Hemp in Northwest Europe' in Advances in Hemp Research (Ed. Ranalli, P). Food Products Press (imprint of The Hawthorn Press, Inc).

Verloo, M and Willaert, G (1990) 'Direct and Indirect Effects of Fertilisation Practices on Heavy Metals in Plants and Soils'. In Fertilisation and the Environment (Eds. Merckkx R., Vereecken H. and Vlassak K.) Leuven University Press, Belgium.

Note:

United Nations (UNDCP and UNODC) documents can be downloaded from the following website URLs.

For Reports on Afghanistan visit: http://www.unodc.org/afg/en/reports_surveys.html

For year specific Opium Poppy Surveys in Afghanistan visit: http://www.unodc.org/unodc/search.html?search-category=ROOT&scope=opium+survey+afghanistan&browse-category=&ui=sr&chunk-size=20&page=1

For specific questions regarding this document or to arrange press interviews or meetings, all correspondence and enquiries can be sent by email to marc@spiritaid.org.uk

Appendix 1

Afghanistan's Women after 'Liberation'

***Znet.com, Los Angeles Times, Sydney Morning Herald,**, December 29, 2003*
by Meena Nanji

Last week in Afghanistan, at the Loya Jirga's (Grand Assembly) convention to debate Afghanistan's new constitution, an extraordinary thing happened. Malalai Joya, a 25-year old female social worker from the rural province of Farah, said what no-one up to now has dared say: that many of the Jirga's chairmen were criminals who had destroyed the country and instead of being given influential positions in the Jirga, they should be tried for their crimes in courts.

A furor ensued with many in the mujahideen-(holy warrior)-dominated Jirga shouting "death to Communists". Joya's microphone was cut-off and she was temporarily removed from the room 'for her own safety'.

It was an extraordinarily brave stand by Joya. Many Afghans share her sentiments yet most are too afraid to voice them in public. With death threats received, Joya herself is under UN protection for the duration of the Jirga.

The 'actions' she was referring to took place largely during the reign of the Jehadis (most religiously conservative mujahideen) from 1992-6. The Jehadis, notorious for throwing acid in the faces of women, slicing off their breasts and other atrocious acts, gained power during the 1980's when the U.S saw fit to fund, arm and train them in the fight against Soviet occupation. During their rule, they terrorized the civilian population with blanket rocket shellings, rape, torture and killing, to such a degree that when the Taliban emerged in 1996, they were initially welcomed.

After the fall of the Taliban these same Jehadi leaders, including Buhruddin Rabbani, Abdul Sayyaf, and members of the Northern Alliance, have re-emerged, with disastrous consequences for Afghans, especially women.

Earlier this year, I visited Kabul to finish shooting a documentary about Afghan women. Two of the three women I had been 'following' had refused to return to an Afghanistan dominated by the mujahideen, who, they said, would only bring more violence to the country. They remain in Pakistan. The one woman who has returned now lives a life of almost total sequestration.

For most women, life has not changed much since the ousting of the Taliban. While ostensibly there are increased opportunities: women can go to school, receive health care and gain employment, in reality few women can take advantage of these possibilities and they are largely restricted to Kabul. According to the many aid workers and Afghan women that I spoke to, women continue to be very fearful of the armed US-backed mujahideen who exert control over much of the country. Most women, even in Kabul, still wear the burqa (the head to toe garment that covers the

whole body) as a protective measure against public humiliation and physical attack. The U.N and international human rights groups recently released reports detailing increased incidents of beatings, kidnappings and rape by U.S-funded regional warlords and their militia, stating: "local militia commanders…violate women's rights and commit sexual abuse with impunity".

In addition, women are still subject to the demands of their husbands or male relatives, many of whom do not want to grant them any degree of independence. Women face a lack of choice in their personal lives and vocation; forced and under-age marriages are common, and education for girls is still contested.

The Ministry of Women's Affairs, ushered in with much fanfare by the U.S and the U.N., is of little help in advancing women's rights. Many believe it exists largely in name to keep international donors happy. With an ill-defined mandate, it has no legal jurisdiction and no implementation power. Additionally, many women working in the Ministry are from the elite and deeply conservative themselves, with little interest in changing the status quo.

Faitana Gailani, the wealthy founder of the Afghan Women's Council, an NGO purportedly working for 'women's rights', exemplifies this perspective. The New York Times reported that after Malalai Joya's impassioned plea in the Loya Jirga, Gailani explained to her that for the country to move forward with unity, women had to proceed carefully.

"Till when should we keep quiet?" Ms. Joya asked

Gailani's response: "Till we are strong, till the country is strong, till our democracy is strong, till women's situation in this country is strong. Then we can open our mouths."

Meanwhile, the few rights women do possess are being curtailed. This is largely due to the role of the Chief Justice of the Supreme Court, Fazl Hadi Shinwari, an ally of the pro-Wahabbi Saudi-backed fundamentalist leader Abdul Sayyaf. In violation of the existing constitution, Shinwari is over 80 and has training only in religious, not secular, law.

For women, President Karzai's appointment of Shinwari is a nail in their coffin. He has packed the 9-member Supreme Court with 137 sympathetic mullahs and called for Taliban-style punishments to implement Shari'a law. He has also brought back the Taliban's dreaded Department of Vice and Virtue, re-named the Ministry of Religious Affairs, which now deploys women to stop public displays of "un-Islamic" behavior among Afghan women.

If a woman reports being beaten or raped, and by some miracle her complaint reaches court, the overwhelming attitude is: "what did she do to provoke this action?" She is held responsible while the perpetrator is considered merely reactive. Shari'a law is invoked to support this belief. Women who do report abuses are often put in prison, and held indefinitely against their will, purportedly as a protection for themselves. The real reason they are held, speculate some, is to serve as examples for other women: "if you report a man for his abusive behavior, you will go to jail".

The litany of laws passed this year governing women's conduct reads like a page out of the Taliban handbook. They include the banning of co-education classes, restrictions on women's ability to travel, the banning of women singing in public. The biggest blow yet to women's rights was dealt in November, when a 1970's law prohibiting married women from attending high school classes was upheld. This is a major step backwards for women and girls, as many under-age girls are forced into marriage and now have no hope of improving their lives. The Ministry of Women's Affairs has done nothing to protest the law.

In areas outside Kabul, conditions are much worse. Girls' schools have been set on fire. In Herat, under Governor Ishmael Khan, women cannot travel with men who are not related to them, and if women are seen with 'un-related' men, police may send them to hospital for "chastity tests". In addition, male teachers are banned from teaching women, a move endorsed by Chief Justice Shinwari.

What is particularly ominous about Afghanistan's situation is that the oppression of women is once again being given legal and religious sanction: State apparatus is being actively used to de-recognize their human rights. It is vital that Americans speak up now against this. Malalai Joya's courageous stand must be supported and her charges investigated. The U.S should stop its current support of fundamentalists and demand that women's rights be explicitly protected in Afghanistan's new constitution.

Meena Nanji is a filmmaker based in Los Angeles and New Delhi. She is currently working on a documentary about the lives of three Afghan women, entitled View from A Grain of Sand.

The Washington Post, Mar.20, 2002
By Peter Bouckaert and Saman Zia-Zarifi

KABUL -- Achter Mohammed was expecting quite a different kind of welcome when he returned home to Afghanistan from 15 months of exile in Iran. But what mattered to the Uzbek warlords in power in his hometown was that he was an ethnic Pashtun, and probably had brought back some money from work in Iran.

Three Uzbek commanders took Achter Mohammed straight from the bus to their military base and began beating him with heavy wooden sticks, repeatedly leaving him unconscious. They stole everything he had worked so hard for in Iran, including his presents for his family. When they finally released him, he returned home to find everything there gone, too.

Fourteen-year-old Fatima had begged the Hazara soldiers not to rape her, saying she was young and a virgin. One of the soldiers threatened her with his gun, ordering her to undress or be killed. Two different soldiers raped her, and then three others raped her mother. The mother asked why the soldiers were doing these things. She was told "You are Talibs and you are Pashtun." Before leaving, the soldiers beat Fatima's crippled father unconscious, and carried off all of the family's possessions. "There is nothing left for us; marriage and honor are gone," Fatima's mother told us.

For ethnic Pashtuns in northern Afghanistan, it is payback time. They are paying for the sins of the Taliban, simply because most of the Taliban leadership were also ethnic Pashtuns. In the past month, Human Rights Watch has visited dozens of Pashtun communities in northern Afghanistan, personally documenting the devastation. We visited village after village that had been stripped bare by ethnic militias who had sometimes even taken the window frames. We found case after case of beatings, looting, murders, extortion and sexual violence against Pashtun communities.

In one village 37 men had been killed in front of their families because they did not have enough money to buy their own lives. Many of the villages were like ghost towns, abandoned by hundreds of Pashtun families after weeks or months of attacks. And the violence has not stopped. Our sudden arrival scared off two armed Uzbek men who had come to extort money from the Pashtun elders in one village in Faryab province. In Samangan province, 200 miles away, a village elder had been forced to give up his flock of sheep to a local commander the morning of our visit.

Appendix 2

Information from Aresa: private company and manufacturer of GM plant for landmine detection and bioremediation.

On a yearly basis between 200 and 300 m$ (source: UN) are spent on de-mining funded by governments. Further significant amounts are spent as a part of military peacekeeping operations as well as private funds and funds from individual countries improving internal infrastructure. On top, the World Bank issues significant loans with the purpose of clearing land.

Regulations:
The quality guidelines for the clearing of landmines from the United Nations are 99.6% clearance. In practice, however, the clearance should be 100%, before the areas can be brought back to normal. According to UN an area must be checked twice before clearance can be established.

De-mining is needed when:
Refugees are moved back to their homeland like in the case of Afghanistan.
Related to programs regaining lost land.
Related to programs promoting international investments (e.g. South Africa).
Key areas are developed for different purposes (airports, roads, railroads, industry etc.)

The plant:
There are many reasons for choosing the plant Thale Cress (Arabidopsis thaliana) as a first choice for development of the biotetection system:

The plant has a fast growth rate (growth cycle of 6-8 weeks).
The plant is naturally growing all around the world (except from the poles)
The plant is a well studied genetic model system, thus, data, knowledge are available.
It is a true advantage that the plant is an obligate self-pollinating plant in order to avoid spreading of genetically engineered plants to the environment.
Male-sterility can be introduced into the genetically engineered plants in order to eliminate the risk for spreading pollen. Thus, the plants developed by Aresa neither germinate nor set seeds unless a specific growth hormone is added to the plants, so plant growth can be strictly controlled.

http://www.aresa.dk/

Appendix 3

Mark Townsend and Paul Harris in New York
Sunday February 22, 2004
The Observer

Climate change over the next 20 years could result in a global catastrophe costing millions of lives in wars and natural disasters..
A secret report, suppressed by US defence chiefs and obtained by The Observer, warns that major European cities will be sunk beneath rising seas as Britain is plunged into a 'Siberian' climate by 2020. Nuclear conflict, mega-droughts, famine and widespread rioting will erupt across the world.

The document predicts that abrupt climate change could bring the planet to the edge of anarchy as countries develop a nuclear threat to defend and secure dwindling food, water and energy supplies. The threat to global stability vastly eclipses that of terrorism, say the few experts privy to its contents.
'Disruption and conflict will be endemic features of life,' concludes the Pentagon analysis. 'Once again, warfare would define human life.'
The findings will prove humiliating to the Bush administration, which has repeatedly denied that climate change even exists. Experts said that they will also make unsettling reading for a President who has insisted national defence is a priority.

The report was commissioned by influential Pentagon defence adviser Andrew Marshall, who has held considerable sway on US military thinking over the past three decades. He was the man behind a sweeping recent review aimed at transforming the American military under Defence Secretary Donald Rumsfeld.
Climate change 'should be elevated beyond a scientific debate to a US national security concern', say the authors, Peter Schwartz, CIA consultant and former head of planning at Royal Dutch/Shell Group, and Doug Randall of the California-based Global Business Network.

An imminent scenario of catastrophic climate change is 'plausible and would challenge United States national security in ways that should be considered immediately', they conclude. As early as next year widespread flooding by a rise in sea levels will create major upheaval for millions.

Last week the Bush administration came under heavy fire from a large body of respected scientists who claimed that it cherry-picked science to suit its policy agenda and suppressed studies that it did not like. Jeremy Symons, a former whistleblower at the Environmental Protection Agency (EPA), said that suppression of the report for four months was a further example of the White House trying to bury the threat of climate change.
Senior climatologists, however, believe that their verdicts could prove the catalyst in forcing Bush to accept climate change as a real and happening phenomenon. They also hope it will convince the United States to sign up to global treaties to reduce the rate of climatic change.

A group of eminent UK scientists recently visited the White House to voice their fears over global warming, part of an intensifying drive to get the US to treat the

issue seriously. Sources have told The Observer that American officials appeared extremely sensitive about the issue when faced with complaints that America's public stance appeared increasingly out of touch.

One even alleged that the White House had written to complain about some of the comments attributed to Professor Sir David King, Tony Blair's chief scientific adviser, after he branded the President's position on the issue as indefensible.
Among those scientists present at the White House talks were Professor John Schellnhuber, former chief environmental adviser to the German government and head of the UK's leading group of climate scientists at the Tyndall Centre for Climate Change Research. He said that the Pentagon's internal fears should prove the 'tipping point' in persuading Bush to accept climatic change.

Sir John Houghton, former chief executive of the Meteorological Office - and the first senior figure to liken the threat of climate change to that of terrorism - said: 'If the Pentagon is sending out that sort of message, then this is an important document indeed.'

Bob Watson, chief scientist for the World Bank and former chair of the Intergovernmental Panel on Climate Change, added that the Pentagon's dire warnings could no longer be ignored.

'Can Bush ignore the Pentagon? It's going be hard to blow off this sort of document. Its hugely embarrassing. After all, Bush's single highest priority is national defence. The Pentagon is no wacko, liberal group, generally speaking it is conservative. If climate change is a threat to national security and the economy, then he has to act. There are two groups the Bush Administration tend to listen to, the oil lobby and the Pentagon,' added Watson.

'You've got a President who says global warming is a hoax, and across the Potomac river you've got a Pentagon preparing for climate wars. It's pretty scary when Bush starts to ignore his own government on this issue,' said Rob Gueterbock of Greenpeace.

Already, according to Randall and Schwartz, the planet is carrying a higher population than it can sustain. By 2020 'catastrophic' shortages of water and energy supply will become increasingly harder to overcome, plunging the planet into war. They warn that 8,200 years ago climatic conditions brought widespread crop failure, famine, disease and mass migration of populations that could soon be repeated.

Randall told The Observer that the potential ramifications of rapid climate change would create global chaos. 'This is depressing stuff,' he said. 'It is a national security threat that is unique because there is no enemy to point your guns at and we have no control over the threat.'

Randall added that it was already possibly too late to prevent a disaster happening. 'We don't know exactly where we are in the process. It could start tomorrow and we would not know for another five years,' he said.
'The consequences for some nations of the climate change are unbelievable. It seems obvious that cutting the use of fossil fuels would be worthwhile.'

So dramatic are the report's scenarios, Watson said, that they may prove vital in the US elections. Democratic frontrunner John Kerry is known to accept climate change as a real problem. Scientists disillusioned with Bush's stance are threatening to make sure Kerry uses the Pentagon report in his campaign.

The fact that Marshall is behind its scathing findings will aid Kerry's cause. Marshall, 82, is a Pentagon legend who heads a secretive think-tank dedicated to weighing risks to national security called the Office of Net Assessment. Dubbed 'Yoda' by Pentagon insiders who respect his vast experience, he is credited with being behind the Department of Defence's push on ballistic-missile defence.
Symons, who left the EPA in protest at political interference, said that the suppression of the report was a further instance of the White House trying to bury evidence of climate change. 'It is yet another example of why this government should stop burying its head in the sand on this issue.'

Symons said the Bush administration's close links to high-powered energy and oil companies was vital in understanding why climate change was received sceptically in the Oval Office. 'This administration is ignoring the evidence in order to placate a handful of large energy and oil companies,' he added.

Appendix 4

Saturday, March 6, 2004

Man, that's good sewage — but hemp trial has dope dealers in a spin

Daniel Lewis, Sydney Morning Herald

If Keith Bolton has his way, hemp — the great symbol of the hippy North Coast — will be coming to a sewage treatment plant near you very soon. And to your wardrobe, your pantry, your car and your medicine cabinet.

Interestingly, the strongest opponents of the Southern Cross University academic's dream are the drug dealers in nearby Nimbin.

Man has cultivated hemp for fibre, food and medicine for at least 6000 years and Dr Bolton says that, after a 70-year "blip in history" caused by prohibition, it is time to embrace hemp again to help save the planet.

Dr Bolton is director of the University's Centre for Ecotechnology in Lismore. For the past three years he has been experimenting with hemp as a "mop crop" that can soak up effluent.

At Bangalow, he recently harvested his first crop grown at a sewage treatment plant. In its 100-day growing cycle, the one-hectare trial produced 18 tonnes of hemp and soaked up 10 million litres of effluent.

Hemp is one of the mop crops being tested because it has so many commercial uses, needs no herbicides or pesticides and "grows like the clappers".

Of the hundreds of different varieties of hemp, only about 10 per cent have sufficient levels of the tetrahydrocannabinol (THC) to give people a high.

Industrial hemp — with very low THC — can be used to make everything from ethanol and clothing to paper and cosmetics. Its seeds are rich in protein and omega fatty acids and can be used in a variety of foods.

"I am hopeful that our legislators have the courage, integrity and wisdom to allow the Australian hemp industry to reach its full potential," Dr Bolton said.

Phil Warner is the managing director of Ecofibre Industries, which helped Dr Bolton grow his crop and has spent the past 10 years developing industrial hemp plants suited to Australia.

He said that while it was now legal to grow industrial hemp crops in Queensland, Victoria and Tasmania, NSW only allows small trial crops that must be licensed by the Health Department.

If you smoked an entire paddock of Dr Bolton's crop you would get a headache rather than a high, and that is why he has his opponents among the drug community.

"They are concerned that the pollen from my low THC crops will contaminate their high THC crops, reducing their virility," Dr Bolton said.

"Their concerns, to an extent, are founded. Hemp is wind pollinated, so the pollen from the male flowers may travel several kilometres. I think that we will just have to learn to coexist."

Friday, November 28, 2003

Hemp crops to battle salinity

Australian Broadcasting Corporation

AUSTRALIA — Farmers may soon have a new crop to market and a new tool to combat salinity, after legislation was introduced into State Parliament this week to allow for the creation of a commercial hemp industry. Under the bill farmers will be allowed to grow hemp under strict licenced conditions.

Ex-wheatbelt farmer Athol Chester, from Western Australia, says having had first hand experience with salinity, the crop has major potential in soil stabilisation and erosion control.

"At the farm at Cleary, we have no problems with the water alongside the lake, it's away from the lake where the water can't get away. Now this plant it will go down to 9 feet for water, it will use heaps of water. In Queensland they've now got it growing and it grows to 15 feet, but as far as the salt grows, there's heaps and heaps of farmers interested."

Appendix 5

Neil Montgomery a Social Anthropologist doing doctoral research at Edinburgh University has teamed up with GW Pharmaceuticals to survey and analyse the numerous impurities that permeate the poor quality cannabis resin that is the most commonly available form of cannabis used in the UK. Known as "Soap Bar", due to the shape of the quarter-kilo bars it is formed into, this notorious 'hash' has for a long time had the reputation among cannabis users of being little more than poison; a noxious substance that has been tolerated because nothing else was available.

Anecdotes speak of the stuff being mixed with rubber, plastic, wax, diesel, soil, molasses, ghee, even boot polish, and the list goes on. While investigating potential sources of 'soap' samples, CRISP (Cannabis Resin Impurities Survey Project) has started to collect 'soap' stories; anecdotes about suspected contaminants and unpleasant side-effects. The end result of CRISP will be a rigorous forensic analysis of the chemical constituents of 'soap' woven through an appreciation of notions, perceptions and recollections of 'soap' drawn from Montgomery's broader ethnography on the use of cannabis. This crucial research hopes to illuminate the health hazards associated with what has become the staple in the diet of UK cannabis consumption and link the gradually developing awareness of the quality of 'soap' with the recent increase in the home cultivation of cannabis plants.

Neil Montgomery, a recognised expert on the cultural aspects of cannabis use, is the Consultant Anthropologist to the UK Medicinal Cannabis Project, which is being conducted by GW Pharmaceuticals under license from the Home Office.

If you would like to submit 'soap' stories or offer any form of knowledge about 'Soap Bar'
please contact Neil via e-mail at Neil.Montgomery@ed.ac.uk
or
via standard mail to:
The Department of Social Anthropology, The University of Edinburgh, Adam Ferguson Building, George Square, Edinburgh. EH8 9LL.

Regards,
Neil

Neil M. Montgomery MSc FRSA FRAI
Consultant Anthropologist to the UK Medicinal Cannabis Project
0789 968 2223 (m)
0131 651 1529 (w)
http://www.ed.ac.uk/~naranja
Medicinal Cannabis.org

The following is taken from **RED EYE EXPRESS** issue NINE

Many other and more dangerous substances can be added during the preparation of this so-called hash. The reason why it is made and why it is sold is profit. Those who pollute and destroy real cannabis in this way are turning a highly beneficial and natural plant product into a health-destroying bad substance. You may get a 'hit' out of it, but it is not cannabis.

Those who sell such substances are either ignorant of real cannabis and its effects or they guilty of selling you poisons, ripping you off, and giving cannabis a bad name. Those people should be avoided - it is better to smoke nothing than to smoke the bad soap bars. After legalisation, those people will be prosecuted and may be put out of business in the same way as a publican who sells beer with dog's urine added to it.

In the meantime it is up to the customers to avoid these unscrupulous and ignorant suppliers

From RED EYE EXPRESS

MAKING SOAP BAR IN YORKSHIRE

While reading Robert Connell Clarke's excellent book, Hashish, we came across a section on low-grade export quality Moroccan hash, known in the UK as Soap Bar. It seems that soap is made from only a very small percentage of resin glands (referred to as pollen), and up to 90% non-resin cannabis plant material which is bound together with **bee's wax or pine resin and condensed milk** as the mixture is too dry and powdery to be bound any other way. As the mixture is very green due to the high percentage of plant material, it is then coloured with **instant coffee** or **henna** to give it that sandy brown colour! In order to give it a slightly resinous look, **turpentine** is then added, which also disguises the taste!

Well, as growers with an abundance of leaf material left over from a crop, we couldn't help ourselves. We had to give it a try!

We sieved off **10 grams of resin glands (pollen),** crushed up 200 grams of dried leaf and ran it through a sieve to reduce it to a very fine powder. We then heated this mixture in a bowl over boiling water and added 5 grams of **bee's wax**, five teaspoons of **condensed milk powder**, one teaspoon of **turpentine**, and a couple of pinches of **instant coffee powder** for colour. We continued to knead the heated mixture into a dough-like form, then pressed it under pressure and allowed it to cool. It bonded well into rock hard lumps, just like Soap Bar! To our delight, when we tested it with a flame, immediately we were treated with that old familiar smell of grade 'A' genuine Soap Bar! Crumpled like it too! Although there was virtually no resin glands in this so-called hash, we gave some to a friend and he had no complaints!!

By T. & K. For more information visit http://www.theredeyeexpress.co.uk/

As Buddha said, "Three things cannot be long hidden; the sun, the moon and the truth". To which George Orwell rightly added, [yes Buddha, but] "In a time of universal deceit, telling the truth becomes a revolutionary act".

Como dijo Buda, "Hay tres cosas que no se pueden ocultar por mucho tiempo; el sol, la luna y la verdad." A lo que George Orwell sabiamente añadió, [sí Buda, pero] "En una época de engaño universal, decir la verdad se convierte en un acto revolucionario".

Thank you for being part of it.

Muchas gracias por su interés