



Coca leaf: A Political Dilemma?

APPG for Drug Policy Reform

September 2013

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Authorship

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This document is an independent publication commissioned by the APPG for Drug Policy Reform and written by the author in a private research capacity. The analysis and recommendations reflected in this document are those of the author and the findings should not be seen as necessarily reflecting the views of the BGIPU, its membership or the members of the All-Party Group.

Foreword from Baroness Meacher

The All-Party Parliamentary Group for Drug Policy Reform (APPGDPR) was formed in January 2011 to reflect a growing concern that the global 'War on Drugs' of the past 50 years had been a costly failure with appalling unintended consequences. The Group seeks to foster health focussed approaches to substance use based upon the growing body of evidence of cost effective policies. Apart from the significant work with the Global Commission on Drug Policy to organise an international event at the House of Lords, in 2011 (supported by Release, the IDPC and others) the Group has:

- Completed an Inquiry into alternative forms of regulation for new 'legal highs' which has attracted substantial media attention and has established the Group as a significant contributor to the drug policy debate.
- Submitted evidence to other Inquiries; including to the UK Home Affairs Select Committee on the UK Drug Strategy and the EU Select Committee on the EU Drug Strategy.
- Contributed to the British Medical Association report on drug policy launched in January 2013. The Chair was a member of the Advisory Board on that report.
- Initiated a number of debates within the UK parliament on aspects of drug policy.

The Group has an influential and active membership currently standing at over 90 members across all main Political Parties. APPGDPR is a body officially recognised by the UK Parliament within its established parliamentary framework.

The international conference at the House of Lords in November 2011 was attended by Ministers, Government Directors of Drugs Policy and Ambassadors from nine Latin American and five European countries. Included were senior people from Colombia, Mexico and Guatemala.

Two months later the Guatemalan President issued a statement calling for a Global Debate on drugs policy. The Guatemalan Ambassador to the UK made clear to me that the support from European countries at our meeting had persuaded his President that the time was right to speak plainly about this difficult issue. In April 2012 President Santos of Mexico chaired the OAS Heads of State Summit in Cartagena, Colombia and decided that drugs policy would be on the agenda. At that meeting it was agreed that the Organisation of American States (OAS) would oversee a year's work to produce two reports - an analytical report on current international drug policy and a scenarios report, analysing four possible drug policy scenarios and their likely effects.

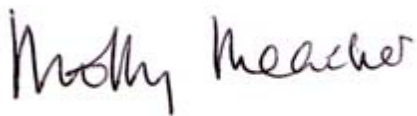
On June 4-6 2013 these reports were considered at the 43rd OAS General Assembly. The Guatemalan President invited two members of the APPG to attend that General Assembly as observers. John Mann MP and I attended with the financial support of the

Guatemalan government and the British Group Inter-Parliamentary Union (BGIPU). The question of drug policy reform will again be considered at a further OAS meeting in 2014. The APPG's work with European countries continues to encourage debate on drug policy reform in anticipation of the 2016 UNGASS on drug policy.

For the APPG one of the most disastrous consequences of the War on Drugs has been its impact on socioeconomic growth in the developing world. As a contribution to the important debate initiated by the publication of the OAS report we have released this report on the economic potential of coca leaf to the Andean region and the challenge that a new approach to the regulation of coca leaf poses for government institutions and the international aid community.

This report seeks to go beyond the argument of reclaiming coca use as an important cultural right for the people of the Andean Amazon region. It seeks to signpost the many potential economic development benefits from regulating rather than prohibiting the farming of coca leaf.

The 2016 United Nations General Assembly Special Session on Drugs (UNGASS) presents a unique opportunity for the UN to assess the impact of its Drugs Conventions in impeding research and development of the potential of the coca leaf and review its own potential role in strengthening government institutions to promote security, justice and employment.

A handwritten signature in black ink that reads "Molly Meacher". The signature is written in a cursive, slightly slanted style.

Baroness Molly Meacher

September 2013

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Executive Summary

For fifty years the World's attitude to and treatment of the coca leaf and coca farmers has been controlled by the UN Drugs Conventions beginning with the Convention of 1961 which prohibited the production, possession and purchase of the coca leaf as well as cocaine. The assertion of this report is that the illegal status of the coca leaf is based upon a misinterpretation of science, first of all in 1950 with the publication of the misleading study of the Commission of Enquiry on the Coca Leaf; and much later with the blocking of the publication of a report in 1995 by the World Health Organisation (WHO) which made abundantly clear that the coca leaf itself has "no negative health effects".

Formally, coca leaf can be used for medicinal and scientific purposes, as prescribed by the 1961 Single Convention. It can also be used as a flavouring agent, as long as all the controlled alkaloids are removed. However because coca leaf contains the cocaine alkaloid, the consumer countries had a choice: either invest in the strengthening of the government and judicial systems of the producer countries and allow coca leaf to remain a legal product; or include coca leaf within the Conventions and invest in a war on drugs with massive weapons sales and fumigation programmes. The US, in particular, chose the latter course.

During the past 50 years, fragile government institutions and judicial systems in some Latin American countries have been further weakened and corrupted by wealthy criminals whose fortunes have been inflated by the cocaine trade. This report does not, however, seek to comment upon the status of cocaine.

The adverse consequences for coca farmers of the application of the UN Conventions to coca leaf cannot be overstated. They have inhibited important research into the potential of the coca leaf for farmers and communities, particularly in the Andean nations. The policy of spraying coca leaf farms in Colombia has caused appalling poverty. Also, the temptation for poor farmers and their families to work for the drug barons has been and continues to be irresistible while few, if any, alternatives are available. The WHO study of 1995 concluded that the coca leaf has positive therapeutic, cultural and social functions for indigenous Andean populations. We need to understand the full range of possibilities and the taxation potential of the range of products based upon the coca leaf, but this will be problematic while coca remains a controlled substance with the formal UN position being that it is harmful and addictive.

If countries do legalise coca production in their own countries, as in Bolivia, then the implications of the fragile government institutions for the production of legal coca leaf products while prohibiting the production of cocaine need to be fully assessed and

addressed. The rule of law and government institutions, most particularly those in the security and judicial sectors, will need to be strengthened before real progress can be made to enable the Andean Countries to benefit from a legal market in coca leaf products.

The Medicinal and Nutritional Properties of the Coca Leaf

The controlled status of coca leaf means that research into its medicinal and nutritional properties has been limited. Further research is necessary. However, there are emerging indicators that coca leaf has potential benefits in treatments for hypoglycaemia and diabetes, for those undertaking exercise at high altitude, in the treatment of anaemia and for preventing bone fractures and osteoporosis. Also, the miniscule quantity of cocaine absorbed safely through coca leaf consumption has potential medicinal applications to combat constipation, help restore a run-down immune system, and improve digestion.

Coca leaf has been found to contain a rich store of nutrients including high levels of potassium, phosphorus and vitamins B1, B2, C and E as well as protein and fibre. The calcium content is higher than in milk and eggs. Potential uses include nutritional supplements as well as coca wine and essential oil.

Commercial Applications of the Coca Leaf

The exploration of the commercial potential of the coca leaf has also been inhibited by the prohibition of possession, cultivation and supply of coca leaf by the UN Conventions. This report points to a wide range of products which have been investigated and/or produced in relatively small quantities but which could have commercial potential if the legal framework for the coca leaf were changed. These include insecticides, paper products, biscuits, flavourings, ointments and creams, coca oil and cosmetics.

Conclusion

We have evidence to indicate that the coca leaf, if liberated from the constraints of the UN conventions, may offer the Andean nations opportunities to develop local and exportable products of medicinal and nutritional value. Coca products for commercial markets only may also provide jobs and the potential for tax revenue.

We recognise the need for robust regulation of any coca leaf product development and restrictions to prevent land laundering, i.e. use of a licence to grow coca leaf for legitimate purposes which is in fact used to enable the supply to reach drug traffickers. Whether the land used for coca leaf cultivation should be limited to government owned or controlled land will need to be explored.

It will be essential to support government institutions in the Andean region in delivering a regime of regulation. This will require that current aid programmes which are fragmented and are not sufficiently focussed on justice and employment will need to be reframed and the work of relevant institutions at UN level such as the World Health Organisation (WHO), the UN Office on Drugs and Crime (UNODC) and the UN Development Programme (UNDP) needs to be urgently reviewed.

Recommendations Summary

Recommendation 1: UN Review

The 2016 UNGASS is an opportunity to review the role of the major UN institutions concerned with drugs and development aid to better align their programmes and to ensure a focus on strengthening government institutions to promote security, justice and employment. In particular, the potential for the UNODC and the UNDP (United Nations Development Programme) to work more closely together should be examined.

Recommendation 2: WHO Report

That the results of the 1995 'WHO/UNICRI Cocaine Project, Briefing Kit' report be published and the illegal status of the coca leaf within the UN Conventions be reviewed.

Recommendation 3: Advisory Council for the Misuse of Drugs (ACMD) review

That the ACMD undertakes a review of the legal status of coca leaf and makes recommendations.

Recommendation 4: Medical Research

That the apparent effectiveness of the coca leaf in the treatment of gastrointestinal symptoms, a run-down immune system, hypoglycaemia, diabetes, altitude sickness, anaemia, pain relief and other symptoms be fully researched and, if confirmed, medications should be developed.

Recommendation 5: Nutritional Value

That the World Health Organisation (WHO) be funded to produce a scientific report on all aspects of the nutritional value of the coca leaf and its potential as the raw material for the production of treatments and nutritional supplements.

Recommendation 6: Drug Therapy

That research into the potential of the coca leaf or metabolites of cocaine in the treatment of cocaine dependency be undertaken.

Recommendation 7: Commercial Research & Development

That a full economic analysis of the commercialisation of the coca leaf be undertaken, covering the economic costs, tax potential and benefits to the Andean Countries and the global economy.

Historical Perspective

Stringent international legislation prohibiting the production and possession of cocaine has for decades inhibited research into its raw material - the coca leaf. The potential of this harmless plant to provide a legal livelihood for Andean farmers has been ignored. Very little research has been done to explore products of real health and commercial benefit for the world, and in particular for the Andean Countries where coca grows so readily. The possibilities for taxation in these Countries has also been neglected.

Coca leaf has a long history as a medicine and serves as a raw material for local anaesthetics and many non-pharmacological products.

Understanding the wider picture of coca and its alternative uses is crucial to changing perceptions of the crop. Such understanding will also challenge the UN Conventions which have prevented the cultivation of coca crops for legitimate purposes. Opening the possibilities for the legitimate cultivation of coca could reduce the pressure on Andean farmers to grow coca for cocaine production, thus enabling them to live free from fear of the drug barons and the police.¹

This paper presents the known medicinal and nutritional applications of coca and some commercial alternatives for coca production that deserve further consideration and research. However, we will first give a brief account of the impact of the UN Drug Conventions on Latin America and also the need for reform of the Andean Region Government institutions.

¹ Brain P.F, Coward G.A, "A review of the history, actions, and legitimate uses of cocaine", *Journal of Substance Abuse*, 1989;1(4):431-51

The UN conventions and the war on drugs in Latin America

Drug policy across the world has, for the past 50 years, been substantially driven by the UN Drug Conventions of 1961, 1971 and 1988. 'The policy has focussed on the prohibition of certain substances including both cocaine and coca leaf.' Coca leaf was listed as 'a substance liable to abuse' in the 1961 single convention and the 1988 convention required that its possession, purchase or cultivation be made a criminal offence. In 2013, Bolivia finally achieved recognition of its traditional coca use by withdrawing from the Conventions and re-acceding with a reservation to exclude coca leaf. The US and 14 other states objected on the basis that legal coca chewing could lead to increases in coca production and the amount of coca diverted to the cocaine trade.² Nevertheless, Bolivia won their case.

The 'war on drugs' has been well resourced. Currently 4,000 US troops are deployed in Latin America to combat the drug trade.³ Despite this, Cocaine consumption increased – according to the United Nations, cocaine consumption increased by 27% between 1998 and 2008⁴ though it has fallen by a smaller percentage more recently. Furthermore, there have been many negative consequences from UN polices. According to the Global Commission for Drug Policy Reform, Latin America has suffered:

- *'a rise in organised crime caused both by the international narcotics trade and by the growing control exercised by criminal groups over domestic markets and territories;*
- *a growth in unacceptable levels of drug-related violence affecting the whole of society and, in particular, the poor and the young;*
- *the criminalisation of politics and the politicisation of crime, as well as the proliferation of the linkages between them, as reflected in the infiltration of democratic institutions by organised crime;*
- *the corruption of public servants, the judicial system, governments, the political system and, especially the police forces in charge of enforcing law and order'⁵*

Crop eradication policy has had a particularly catastrophic effect in the coca growing regions. In Colombia it has centred on indiscriminate spraying of large areas of jungle and has had the effect of destroying all plant life in those areas, damaging the health of those who live there and any possibility for farmers of alternative crop growing. It also

² <https://www.unodc.org/unodc/en/frontpage/2013/january/bolivia-to-re-accede-to-un-drug-convention-while-making-exception-on-coca-leaf-chewing.html?ref=fs3>

³ Huffington Post 2/3/13 'America's Drug War in South America expanding'
http://www.huffingtonpost.com/2013/02/03/americas-drug-war-latin-america_n_2610624.html

⁴ Quoted in Global Commission for Drug Policy Report – 'War on Drugs': June 2011

⁵ Latin American Commission on Drugs and Democracy (2009): Drugs and Democracy: Towards a Paradigm Shift: Statement of the Latin American Commission on Drugs and Democracy: 2009

indirectly destroys other areas of jungle as coca production moves and new areas are cleared to make way for coca growing. According to a report by the Washington Office for Latin America (WOLA) the fumigation of over 2 million hectares of Colombian countryside has not diminished the production of coca leaf or cocaine but 'tend(s) to reinforce rather than weaken Colombian farmers' reliance on the coca crop'.⁶

Alternative development programmes have to date not made much impact because markets have been uncertain about alternative products and the infrastructure. Services for alternative trade have not been in place. Fumigation and destruction of the farms of coca growers does not enable them to enter alternative markets. For many the coca trade remains the only or only viable option for survival. Bolivia has a policy of allowing a certain amount of traditional coca production but a viable alternative development policy for coca farmers will require a functioning market for alternative products, access to finance for periods before products are sold and strong agrarian reform policy in general.⁷

⁶ WOLA (2008): Chemical Reactions: *Fumigation: Spreading Coca and Threatening Colombia's Ecological and Cultural Diversity*: Washington Office on Latin America: February 2008
<http://www.wola.org/sites/default/files/downloadable/Andes/Colombia/past/WOLA%20Chemical%20Reactions%20February%202008.pdf> (18/4/13)

⁷ Armenta A (2013): The illicit drugs market in the Colombian agrarian context *Why the issue of illicit cultivation is highly relevant to the peace process* : Transnational Institute: Drug policy briefing no. 40: February 2013:
http://www.tni.org/sites/www.tni.org/files/download/brief40_0.pdf

Strengthening Government Institutions: a priority

The challenge of minimising the leakage of legal coca crops into the hands of organised crime is the main pressure on fragile government institutions within the Andean region. The seminal report from the OAS published in May this year⁸ suggest a number of scenarios for the development of regional drug policy. One of the scenarios chosen, the “Together” scenario, highlights the need to strengthen government institutions more generally in order to effectively implement drug control policy.

A priority will be the reform of critical security section institutions including the police and criminal justice systems so that they can be effective but also enjoy public confidence in terms of justice and human rights. Such developments will be as necessary for the protection of lawful coca leaf industries. Although there is much that is being done, in Bolivia for example, much more will need to be done and the international community will have an important role to play in the economic development of each country and the strengthening of government institutions.

The example of Bolivia

Bolivia is the clearest example of a state approach to regulating the legal production of coca. In 2009 the Morales government expelled the US Drugs Enforcement Administration (DEA) and, in May 2013, the USAID agency and has continued to take full responsibility for regulating the licensing of legal coca production. To fund law enforcement operations without the aid of foreign governments is possible for Bolivia, since it has a fast growing economy based on raw materials. It uses satellite images of each coca plot, feeding into databases of information on coca growers. This can inform action to eradicate illegal growing and overproduction but the data is not comprehensive. Better information and more fully developed government systems will be necessary if overproduction of coca leaf is to be prevented.

The UN Office on Drugs and Crime (UNODC) has endorsed “Inter-institutional Coordination for Monitoring of Coca Crops”⁹ established in Bolivia. Although the data is contested it appears that the approach has been effective.¹⁰ The UNODC 2012 annual report stated that the area under coca cultivation in Bolivia had dropped from 31,000 hectares in 2010 to 27,000 hectares under these arrangements.¹¹

⁸ Organisation of American States (OAS) Scenario Team (2013): “Scenarios for the Drug Problem in the Americas 2013-2025”: OAS, Washington DC, USA, May 2013

⁹ UNODC Bolivia 2012 Report: http://www.unodc.org/documents/crop-monitoring/Bolivia/Bolivia_coca_survey_spanish_2012_web.pdf

¹⁰ William Neuman, The New York Times, 26 December 2012 <http://www.nytimes.com/2012/12/27/world/americas/bolivia-reduces-coca-plantings-by-licensing-plots.html?pagewanted=all&r=1&> [cited 18 May 2013]

¹¹ “Coca crop cultivation “falls significantly” in Bolivia, according to 2011 coca monitoring survey”, UNDOC website, 17 September 2012

A risk with regulation, linked to the export of coca products on the open market, is that licences to grow and export the product could be abused.¹² An example of this is “crop laundering”, whereby a piece of land is used covertly to grow coca for drug traffickers rather than for its official objective. However, in Bolivia, it is easy to distinguish between permitted and forbidden coca, using evidence of crop variety, as well as geographic region. Coca that is palatable for chewing is from a smaller bush with smaller leaves,¹³ whereas the high-alkaloid leaves good for drugs grow in lower-lying areas.¹⁴ So in theory a clear line could be drawn between the different types of coca in distinct regions.

Another potential risk is for products containing coca in an unprocessed form, such as in tea bags, to be bought in bulk as a legal supply of coca for use by drug traffickers. The Transnational Institute has already explored the economics of this hypothesis. Their conclusion is that this would not be economically viable at the current retail prices of semi-processed products such as coca teas and flours.¹⁵

There are other risks. The duty on imports of coca leaf, products like coca tea, could be too high, and discourage production of coca for legal products. The return offered for regulated, legal coca production could continue to be outbid by illegal drug traffickers, leaving farmers and law enforcers vulnerable to bribery and corruption. This suggests that successful regulation needs to be supported at international level both in terms of trade agreements and in terms of aid to strengthen the regulatory instruments of government.

The Role of International Aid

A reframing of international aid would be necessary to support the regulation of coca leaf production. At present, aid is closely associated with drug war objectives and it is increasingly being recognised that the promotion of drug prohibition is running counter to the goals of broader aid programmes. The experience of Bolivia was thus, before President Morales expelled the DEA, a US-funded drug control regime with direct US military participation. This had been hugely unpopular: the obvious difference in power between expatriate and local communities had provoked anti-colonial outbursts. If foreign partners were to be involved in regulation in the Andean countries in future, a different approach would be needed.

¹² Natural, as opposed to synthetic, cocaine remains the lowest cost and highest quality supply of cocaine.

¹³ This variety grows for instance in the Yungas in Bolivia.

¹⁴ Such as that which grows in the Chapare or the Beni, in Bolivia.

¹⁵ Henman A, Metaal P, “Coca Myths, Drugs and Democracy Programme”, Transnational Institute Briefing Series, Amsterdam 2009 pg. 9 - 10

Colombia and Peru currently receive substantial aid from the USA.¹⁶ Much of this aid supports the Department of State's Andean Counter-Drug Initiative. According to the OECD Creditor Reporting System, "The DEA International Training Section (TRI) has been conducting international counter-narcotics training since 1969. TRI serves as the model for a variety of international law enforcement training efforts. The DEA's role has grown to include that of international consultant to law enforcement agencies, as well as foreign governments seeking to develop quality narcotics law enforcement programs, organisational infrastructures, and judicial reforms."¹⁷ Colombia also receives support from the UK's Serious Organised Crime Agency (SOCA) targeted to training the anti-narcotics police, intelligence sharing between countries and improving army and police force cooperation.

The social consequences of early interventions such as Plan Colombia, which focused entirely on crop eradication without addressing any of the wider impact, have now been recognised to a degree. The current US administration plans to spend \$84.6 million in the financial year 2014 on alternative development in Colombia via their Economic Support Fund.¹⁸ The benefits of investment in alternative development within a combined approach can be seen in the 'San Martin' Initiative quoted in the OAS report.¹⁹ The initiative in the San Martin region of Peru combined improved governance, investment in infrastructure, agricultural development, improved social organisation, international cooperation, improved law enforcement and environmental sustainability. In 1992, illicit coca crops occupied 28,600 hectares, with a gross value of 75% of the regional agricultural economy. By 2011, that area had been reduced to 468 hectares. Unfortunately, such comprehensive initiatives are isolated and combined aid efforts are not embedded in international institutions like the UN.

One of the major harms generated by the 'War on Drugs' has been its negative impact on socioeconomic development, but this linkage is not sufficiently acknowledged.²⁰ The discussion following the publication of the OAS report has focussed on the need to align drug control policy and development aid. It is argued that the two issues are interdependent. 'Drug-related violence and organised crime negatively impact development, while a lack of development also serves as a fertile ground for organised crime and the illicit drug economy.'²¹ The task of building a more robust joint approach needs to start at the top - 'more cooperation between the United Nations Office on Drugs and Crime (UNODC) and the United Nations Development Programme (UNDP)

¹⁶ In 2010 the USA gave USD659.8 million to Colombia (to put this figure in context it is useful to compare it to USD 2.64 million it received from the UK that year). In 2010, the USA gave USD172.6 million to Peru.

¹⁷ Colombia entry on OECD.StatExtracts [cited 19 May 2013]

¹⁸ Sun Wyler L (2013): 'International Drug Control Policy – Background and US responses': Congressional Research Service Report for Congress: USA, 13/08/2013

¹⁹ Op cit 8: pp 26/27

²⁰ The Nossal Institute for Global Health (2010): 'Dependent on Development: The Interrelationships between Illicit Drugs and Socioeconomic Development': The Nossal Institute, Australia, December 1010

²¹ Chatham House (2013): 'The OAS report on the Drug Problem in the Americas – The Way Forward': International Security Summary: Chatham House, London 31st July 2013

would certainly help in this regard'.²² At an organisational level obstacles to communication between the fields of development aid and drug policy have been identified as: the continued stigmatisation of drug users making it difficult for aid agencies to engage with the issue; the assumption that drug control is primarily a policing and criminal justice issue; and short term policy cycles working against the longer term commitment necessary to build joint programmes.²³

The contribution of illicit drug markets to international violence and the problem of aligning different aid programmes as a response has been an issue within the wider development field for some time. According to the World Bank's World Development Report published in 2011, illicit drug markets along with other kinds of trafficking now constitute one of the major contributors to global violence.²⁴ However, the main counter identified for this problem which is to strengthen government institutions to provide security, justice and jobs is not being delivered effectively. The reasons for this include a lack of co-ordination and integration between programmes; short termism; unwillingness to take risks and to adapt to the particular circumstances; and complexities within individual states. The main issue is that '*confronting this challenge effectively means that institutions need to change*'.²⁵ The UNGASS scheduled for 2016 will provide a good opportunity to review the institutions.

Recommendation 1: UN Review

The 2016 UNGASS should consider a review of the role of the major UN institutions concerned with drugs and development aid to better align their programmes and to ensure a focus on the strengthening government institutions to promote security, justice and employment. In particular the potential for the UNODC and the UNDP to coordinate better together should be examined.

²² Op cit: 21

²³ Institute for Development Studies (IDS), (2013): Bringing Development in – tackling the negative effects of illicit drugs and drug policy on development: IDS event briefing, Brighton June 2013

²⁴ World Bank (2011): 'World Development Report 2011: Conflict, Security and Development': The International Bank for Reconstruction and Development (World Bank), Washington, 2011

²⁵ Op cit: 24

The Coca Addiction Fallacy

Scientists acknowledge the fact that the coca leaf, left in its natural form, has no addictive properties at all.²⁶ There is no empirical evidence to suggest that the coca plant has a potential for addiction.²⁷

The supposed rationale for the international prohibition of coca leaf in the 1961 Single Convention came from "The Commission of Enquiry on the Coca Leaf study" published in 1950. It was prepared by a commission that visited Bolivia and Peru over a period of 3 months in 1949 to "investigate the effects of chewing the coca leaf and the possibilities of limiting its production and controlling its distribution". This 'purpose' of the study suggests that its conclusions had been reached before the work began. The Enquiry concluded that the effects of chewing coca leaves were negative. However, not a single field study had been carried out to support that conclusion. The report referred to Coca users as "addicts" despite the fact that chewing coca was defined as a habit, not an addiction. How is it that 50 years of global policy has been based upon such a dubious study?

An unpublished World Health Organisation report in 1995 concluded that coca leaf in itself "appears to have no negative health effects and has positive, therapeutic, sacred and social functions for indigenous Andean populations."²⁸ But publication of that report was blocked by the US Ambassador at the annual World Health Assembly.²⁹ Nonetheless, there are a range of possibilities for the development of a legal coca leaf industry with taxation potential for the producing Countries if coca leaf were released from the stranglehold of the Conventions.

Besides the UN Conventions, the legal status of coca leaf could potentially also be reviewed in third countries. In the case of the UK, the Transnational Institute has previously suggested³⁰ that the Advisory Council on the Misuse of Drugs (ACMD) undertake a review of the coca leaf aimed at a possible reclassification or complete un-scheduling. It has argued that the current status of the coca leaf under the Misuse of Drugs Act is not based on any scientific evidence.

²⁶ Weil AT., "The therapeutic value of coca in contemporary medicine," J Ethnopharmacol. 1981 Mar-May;3 (2-3):367-76 & Hanna JM, Hornick CA., "Use of coca leaf in southern Peru: adaptation or addiction," Bull Narc. 1977 Jan-Mar;29(1):63-74

²⁷ Commission of Enquiry on the Coca Leaf, Bulletin on Narcotics - 1949 Issue 1

²⁸ Transnational Institute (2012): Fact Sheet: Coca Leaf and UN Drug Conventions:
http://www.tni.org/sites/www.tni.org/files/download/fact_sheet_on_coca_and_the_conventions.pdf

²⁹ Henman A, Metaal P, "Coca Myths, Drugs and Democracy Programme", Transnational Institute Briefing Series, Amsterdam 2009 pg 14

³⁰ Jelsma, M., TNI Submission to the House of Commons Select Committee on the cocaine trade, June 2009

Recommendation 2: WHO Report

That the results of the 1995 'WHO/UNICRI Cocaine Project, Briefing Kit' report be published and the illegal status of the coca leaf within the UN Conventions be reviewed.

Recommendation 3: Advisory Council for the Misuse of Drugs (ACMD) review

That the ACMD undertakes a review of the legal status of coca leaf and makes recommendations.

The Medicinal Properties of the Coca leaf

In its chewed form, coca is widely known to act as a mild stimulant, suppressing hunger, thirst, pain and fatigue. Few scientific studies have been carried out into coca's medicinal properties, but there is some evidence from W Golden Mortimer M.D., a New York physician, that dates back more than a century.³¹

Other more recent studies have looked at the specific contributions of coca to blood sugar levels and its use as a food supplement for the absorption of its proteins and other nutrients.

Treatment of Abnormalities in Blood Sugar Levels Coca Leaf: a Possible Treatment for Diabetes?

Andrew Weil, director of the Arizona Centre for Integrative Medicine at the University of Arizona, recognises coca leaf as a normaliser of carbohydrate metabolism and a source of treatment for hypoglycaemia and diabetes mellitus.³² Based on studies by Bolton and Buchard,³³ Weil argues that coca plays a role in stabilising blood glucose levels among populations heavily dependent on carbohydrates and prevents development of hyperglycaemia and reactive hypoglycaemia.³⁴

Although there is little publicly available evidence about the use of the coca leaf as a treatment for diabetes, a more recent study examined the effects of coca chewing on glucose tolerance. The results suggest that coca chewers, at high altitude do not experience hypoglycaemia.³⁵

Antidote for Altitude Sickness

Although the longevity of the coca chewing habit in the Andean region may in itself act as supporting evidence for its effectiveness against altitude sickness, and we know that non-locals who live and work at high altitudes regularly take coca tea. Nevertheless there appears to be insufficient measured evidence to rate coca's effectiveness for this purpose.

³¹ Golden Mortimer, W, *History of Coca, The Divine Plant of the Incas* J.H. Vail & Co., New York 1901, Pg. 491 -492

³² Weil, A.T., "The Therapeutic Value of Coca in Contemporary Medicine", *Journal of Ethnopharmacology*, 1981, 3: 367 - 376

³³ Bolton, Ralph, "Andean coca chewing: A metabolic perspective", *American Anthropologist* 1976, 78: 3; Burchard, R. E. "Coca chewing: A new perspective." In V. Rubin ed. *Cannabis and Culture*, 1975, The Hague: Mouton

³⁴Weil, A.T., "The Therapeutic Value of Coca in Contemporary Medicine", *Journal of Ethnopharmacology*, 1981, 3: 367 - 376

³⁵ Galarza Guzmán M, Peñaloza Imaña R, Echalar Afcha L, Aguilar Valerio M, Spielvogel H, Sauvain M. *Medicina (B Aires)*. 1997;57(3):261-4

In 2010, a study conducted by the Association of Clinical Biochemists of India³⁶ on the effect of chewing coca on biochemical and physiological parameters at high altitude, revealed that oxygen saturation, blood pressure, and pulse rate are not significantly affected. Glucose levels, however, showed a positive hyperglycaemic response. The energy requirement for exercise at high altitude is thus met. "These experimental findings suggest that chewing coca leaves is beneficial during exercise and that the effects are felt over a prolonged period of sustained physical activity."

There is further circumstantial evidence that coca leaf may be beneficial at high altitudes for other reasons. Given the coca leaf has a reputation as an asthma reliever it may be that the same ability to relax and open up the airways is what reduces both asthma and altitude sickness. The bronchodilation properties of the Coca leaf are yet to be explored.

Anaemia Treatment

Coca has very high iron levels, globulin alkaloid, blood thinning agents, chlorophyll, and vitamins C and B complex; also the ability to increase blood pH levels. Therefore coca is said to facilitate oxygenation and thereby to increase the respiratory capacity of red blood cells.³⁷ Coca flour produced in the Andean Region, mainly in Peru, Bolivia and Colombia, is used to reduce anaemia.

Coca as a Stimulant

The minuscule quantity of cocaine absorbed through coca leaf consumption works as a stimulant, similar to caffeine and nicotine. This natural stimulant has medicinal applications such as laxation and increased energy levels. Weil explains how the natural stimulants work to improve digestion. In response to *"painful and spasmodic conditions of the entire gastrointestinal tract, Coca appears to restore the smooth musculature of the gastrointestinal tract. It may be superior to belladonna, atropine, and other parasympathetic blocking drugs in that it produces no uncomfortable side-effects; in fact, the side effects of coca leaf are usually perceived as desirable"*.³⁸

As well as being useful for combating constipation, coca leaf stimulant properties help restore a run-down immune system, perhaps explaining its reputation as a cold medicine.

³⁶Casikar V, Mujica E, Mongelli M, Aliaga J, Lopez N, Smith C, Bartholomew F, "Does Chewing Coca Leaves Influence Physiology at High Altitude?", *India Journal of Clinical Biochemistry* (July-Sept 2010) 25 (3):311-314

³⁷ Sánchez MC, Ordóñez KL, Riveros B, "Características Medicinales de la Coca (*Erythroxylum coca*)", Universidad del Quindío, 2012, Armenia, Quindío, Colombia

³⁸ Weil, A.T., "The Therapeutic Value of Coca in Contemporary Medicine", *Journal of Ethnopharmacology*, 1981, 3: 367 - 376

Analgesic Properties

Coca can act as a mild analgesic but its effectiveness depends “on the quantity of leaves consumed and the manner in which they are ingested”.³⁹

Antibacterial Properties

There are a limited number of studies of the antibacterial properties of plants closely related to coca. A study in Brazil⁴⁰ of six related species to coca that are used in traditional medicine for the treatment of infectious diseases and other medical conditions were screened in vitro for their antifungal and antibacterial properties. The results tend to support the traditional use of these plants for the treatment of respiratory and gastrointestinal disorders and/or skin diseases, opening the possibility of finding new antimicrobial agents from these natural sources.

Recommendation 4: Medical Research

The apparent effectiveness of the coca leaf in the treatment of gastrointestinal symptoms and a run-down immune system, hypoglycaemia, diabetes, altitude sickness, anaemia and pain relief should be fully researched and, if confirmed, medications should be developed.

³⁹ Fuchs A, Burchard R.E, Curtain C. C, Roberto P, De Azeredo, Frisancho A. R, Gagliano J. A, Katz S. H, Little M. A, Mazess R. B, Picón-Reátegui E., Sever L. E, Tyagi D. and Shear Wood C, “Coca Chewing and High-Altitude Stress: Possible Effects of Coca Alkaloids on Erythropoiesis”, *Current Anthropology* 1978; 19 (2): 280

⁴⁰ Brazilian Journal of Microbiology: http://www.scielo.br/scielo.php?pid=S1517-83822012000400009&script=sci_arttext

The Nutritional Value of Coca Leaf

In discussing the nutritional value of coca, it is important to note the observation of the 2009 review of Coca Myths, published by the Transnational Institute⁴¹ that the argument about this issue has been highly political. Since the rise in coca flour's popularity as a source of nutrition, an anti-coca lobby in Lima⁴² has been dedicated to undermining, with little scientific evidence, the argument that coca could be a good source of calcium.⁴³ At the same time, the chemical research into the vitamin and mineral values in different varieties of the coca leaf remains limited.

The best known and widely recognised study on this subject was that conducted by Duke, Aulik and Plowman, and published in 1975 by Harvard University.⁴⁴ This study concludes that every 100g of coca leaf contain the following nutritional values:⁴⁵

Harvard Study - Nutritional Value of Coca Leaf (Duke, Aulick, Plowman 1975)		
A study done by a team at Harvard University found that the coca leaf contains a rich store of nutrients, more than many other well-known food plants. These were analysed individually in the full study, and then lumped together for a general comparison, which we publish here:		
	COCA (100 grs)	Average nutrients of 30 food plants (100 grs)
Calories	305	279
Proteins	19.9 g.	11.4 g.
Fats	3.3 g.	7.9 g.
Carbohydrates	44.3 g.	37.9 g.
Calcium (mg)	1749	99
Phosphorus (mg)	637	270
Iron (mg)	26.8	3.6
Vitamin A (iu)	10000	135
Vitamin B1 (mg)	0.58	0.58
Vitamin PP (mg)	3.7	2.2
Vitamin C (mg)	1.4	13.0
Vitamin B2 (mg)	1.73	0.18

FOODS USED FOR COMPARISON PURPOSES:

10 CEREALS
Amaranthus caudatus, *Oriza sativa*, *Avena sativa*, *Chenopodium pallidicaule*, *Chenopodium quinoa*, *Hordeum vulgare*, *Secale cereale*, *Coix lachryma jobi*, *Zea mays* and *Triticum aestivum*.

10 VEGETABLES
Canna edulis, *Capsicum spp.*, *Allium sativum*, *Arracacha xanthorrhiza*, *Ipomoea batatas*, *Cyclanthera pedata*, *Cucurbita maxima*, *Allium cepa*, *Brassica oleracea* and *Tropacolum tuberosum*,

10 FRUITS
Persea americana, *Ananas cosmosus*, *Musa sapientum*, *Cocos nucifera*, *Passiflora mollissima*, *Annona cherimolia*, *Prunus persica*, *Fragaria spp.*, *Annona muricata*, and *Ficus carica*.

According to this study, the nutritional values are high relative to other plants. The essential minerals in coca, such as potassium, phosphorus and vitamins (B1, B2, C and

⁴¹ Henman A, Metaal P, "Coca Myths, Drugs and Democracy Programme", Transnational Institute Briefing Series, Amsterdam 2009

⁴² e.g. the Instituto de Investigación Nutricional (IIN) del Perú

⁴³ In *Mundo Médico*, September 2005

⁴⁴ Duke J, Aulik D, Plowman T, "Nutritional value of coca", *Botanical Museum Leaflets*, Harvard University 1975

⁴⁵ Nutritional value of coca leaf, Duke, Aulik, Plowman, Harvard, 1975. Reformatted source: Henman A, Metaal P, "Coca Myths, Drugs and Democracy Programme", Transnational Institute Briefing Series, Amsterdam 2009, pg. 7

E) and also nutrients such as protein and fibre are a source of fortitude for the human body. The calcium content of coca leaf is 74 times the calcium content in a selection of 30 food plants; and the iron content in coca is more than 7 times that in the same selection of 30 other food plants, to take two examples. It seems remarkable that such a nutritious plant should be so little used commercially, whether in pill form, tea or flour.

Sceptics claim that consuming coca as a food supplement in the form of flour is impractical in normal dietary habits and lacks the protein values found in the fresh leaf.

But there has been much misinformation in sources quoting the nutritional value of coca, apparently driven by political considerations. Previous to this study, Gutierrez Noriega⁴⁶ among others concluded in their research that coca contained no nutritional or energy value. At one point in 1968 coca chewing was claimed to be the cause of malnutrition among residents of a Peruvian village.⁴⁷ However Collazos et al, in their study of 1965, demonstrated that there is nutritional value in coca, especially nitrogen, calcium and iron. Also assimilation of vitamins in coca leaves is effective.⁴⁸ But since the 1975 Harvard study, the general consensus is that coca is a modest but reliable source of valuable micro-nutrients and the debate has shifted from the nutritional value in coca to its likely absorption.

Rich Source of Calcium and Protein

With regards to protein, coca has 19.6% protein content⁴⁹ suggesting a potential as a key nutritional supplement. According to some academics⁵⁰, coca's high calcium content could be used for treating bone fractures and to prevent osteoporosis. Coca is arguably the largest source of calcium found to date, but there are those who question how absorbable this calcium is. Factors that improve the human absorption of calcium include the presence of vitamin D and K2 and protein³. The ratio of calcium to phosphorous needs to be at least 2:1 as the latter inhibits the absorption of calcium. The nutritionist Sacha Barrio, a media figure in Lima who takes a more optimistic view of coca's benefits, maintains that in coca this ratio is a comfortable 5:1, which explains the many anecdotal accounts of its use in arresting osteoporosis and healing broken bones.⁵¹

⁴⁶ Gutierrez-Noriega C " El cocaísmo y la alimentación en el Perú" *Anales de la Facultad de Medicina* , Lima, 31: 1, p. 3-92; 1948

⁴⁷ Buck, Sasaki, Hewitt, "Coca Chewing and Health", *American Journal of Epidemiology*, USA 1968

⁴⁸ Collazos-Chiriboga C., Urquieta R y Alvistur. E, " Nutrición y coqueo" *Revista Viernes Médico*, 16:36, 1965

⁴⁹ Sánchez MC, Ordóñez KL, Riveros B, "Características Medicinales de la Coca (*Erythroxylum coca*)", Universidad del Quindío, 2012, Armenia, Quindio, Colombia

⁵⁰ Sánchez MC, Ordóñez KL, Riveros B, "Características Medicinales de la Coca (*Erythroxylum coca*)", Universidad del Quindío, 2012, Armenia, Quindio, Colombia

⁵¹ Barrio Healy S, "Anatomía de la Hoja de Coca", Lima: Juan Gutemberg Editores, Impresores EIRL 2008

However according to the Lima based Centre for Information and Education for the Prevention of Drug Abuse (CEDRO)⁵² the high concentrations of calcium in coca are said not to be easily assimilated by the human organism, due to “intoxication” by alkaloids dangerous to human health. But there is little science behind this assertion and according to the Transnational Institute, the head of the Faculty of Pharmacy in Lima and Adriana Cordero, the author of the study on which CEDRO’s warning had been based,⁵³ denied such findings claiming manipulation by the anti-coca lobby.

Coca Flour

Coca flour is the powder resulting from grinding coca leaves. Because coca leaves contain more calcium than milk and eggs, and more protein than meat, as well as vitamin A, coca flour has been recommended as a nutritional supplement for geriatric patients, many of whom are intolerant to traditional sources of calcium such as dairy products. In an article in September 2004, the Peruvian newspaper *La República*, gave various examples of effective treatment for several geriatric diseases such as chronic anaemia, depression, osteoarthritis, urinary infections, and as a general immunity/defence enhancer.

The flour can be consumed as energizing biocapsules⁵⁴ which are recommended for treating obesity by suppressing hunger; increasing energy levels and intellectual and physical performance; reducing anxiety, irritability, stress levels, depression, memory loss and osteoporosis; strengthening bones and teeth; and improving digestion.

Some argue their effects are still unproven. According to CEDRO, none of the experimental studies on the nutritional value of coca reveal satisfactory results, especially on how the human body is able to process the nutrients and minerals. Furthermore in “admixtures of grain flours in pastas, breads, cakes and biscuits, or as an additive to soups and porridges, few cooks or bakers would recommend more than 5% coca flour in the total mix. In this proportion, it simply cannot be ingested in quantities likely to make a serious impression at the level of basic carbohydrates, oils and proteins”.⁵⁵

Coca Wine

In 1870 Angelo Mariani introduced to the elite market a kind of coca wine called *Vin Mariani* which enjoyed great success in Europe. John Stith Pemberton then produced in the USA, a competitor drink under the name *Vin français cola*, which likewise contained

⁵² Centro de Informacion y Educacion para la Prevencion del Abuso de Drogas, “La Hoja de Coca en la Alimentacion” <http://www.cedro.org.pe/ebooks/hojacocaalimentacion.pdf>

⁵³ Cordero Vilca, T A, “Evaluación nutricional de la proteína de la hoja de coca” (*Erythroxylum coca* Lamarck var. *coca*), Universidad Nacional Mayor de San Marcos. Facultad de Farmacia Y Bioquímica, 2002

⁵⁴ Coca Indigena website: http://cocaindigena.org/index.php?option=com_content&task=view&id=10&Itemid=12

⁵⁵ Henman A, Metaal P, “Coca Myths, Drugs and Democracy Programme”, Transnational Institute Briefing Series, Amsterdam 2009

coca but in which he had replaced the wine by an extract of the cola-nut.⁵⁶ However, just as the many physiological and pathological effects of its action began to be investigated in earnest, the enthusiasm for coca-based tonics and medicines were cut short by a sudden turn in the US scientific literature.⁵⁷

However to this day there are still many enterprises in Latin America selling coca wine⁵⁸ with controlled levels of alkaloids, micro-nutrients and aromatic spices.⁵⁹ It is generally advertised as a tonic aiding recovery from colds, depression and other sicknesses, by restoring energy levels. It is also said to relax the larynx, relieve throat inflammation and tone the vocal chords.

Essential Oil

Methyl Salicylate is an essential oil⁶⁰ commonly used to treat muscular pain, as a flavouring agent and as an odour-masking agent. It is also one of several antiseptic ingredients in Listerine mouthwash produced by Johnson & Johnson. According to the Phytochemical Database of the American Department of Agriculture, *Erythroxylum novogranatense var novograntense*⁶¹ in coca leaves, contains appreciable amounts of this essential oil.⁶²

Antioxidants

Among the antioxidants present in coca leaves are vitamins C, E and provitamin A as well as selenium, zinc, copper and other vegetable agents. There are those who advocate the use of coca leaf as an antioxidant due to the high levels of vitamins C and E. However CEDRO argues against this usage as there are other sources of these vitamins that do not expose people to alkaloids such as cocaine.

Recommendation 5: Medicinal and Nutritional Value

That WHO be funded to produce a scientific report on all aspects of the medical and nutritional value of the coca leaf and its potential as the raw material for the production of treatments and nutritional supplements.

⁵⁶ This was the original Coca Cola, from which cocaine was finally eliminated in 1929

⁵⁷ Appelboom T, "Consumption of coca in history", Verh K Acad Geneesk Belg. 1991;53(5):497-505

⁵⁸ Coca Indigena website: http://cocaindigena.org/index.php?option=com_content&task=view&id=10&Itemid=12

⁵⁹ Compras Peru website (Peruvian Online Shopping forum): http://comprasperu.com/product_info.php?products_id=511

⁶⁰ An essential oil is a concentrated hydrophobic liquid containing volatile aroma compounds from plants. Essential oils are also known as volatile oils, ethereal oils or aetherolea, or simply as the "oil of" the plant from which they were extracted, such as oil of clove. An oil is "essential" in the sense that it carries a distinctive scent, or essence, of the plant.

⁶¹ The two main varieties are *Erythroxylum coca* (ancestral variety and grown in the eastern Andes and Amazon) and *Erythroxylum novogranatense* (drought resistant and grown in the highlands).

⁶² Plants in cosmetics, Potentially Harmful Components, Volume III, Council of Europe Publishing, 2006: 145

Coca Leaf in Therapy for Cocaine Dependency

A Bolivian doctor and psychiatrist, Jorge Hurtado Gumucio, argues that a primary condition of addiction to cocaine is socio-economic maladjustment and compulsive drug-search behaviour. Hurtado Gumucio's recommendation of the chewing of the coca leaf for the treatment of cocaine dependence is endorsed by the International Coca Research Institute.⁶³ According to his study, the level of social adaptation prior to treatment was only 28% whereas after treatment as many as 48.8% of the patients were socially adapted, suggesting a reduction in susceptibility to addiction.⁶⁴

More processed forms of the coca leaf may also have potential in the treatment of cocaine dependence. The Xenova Group is developing a cocaine vaccine called TA-CD which works by creating antibodies that attach themselves to the drug, and prevent it from going to the brain and thus limiting the rewarding effects from cocaine. The combination includes Norcocaine, which is a minor metabolite of cocaine.

We are familiar with successful heroin treatment clinics and the use of methadone in such treatment. Could cocaine treatment clinics also provide a valuable response to cocaine addiction?

Alternatively, CIDDH (Centro de Investigacion "Drogas y Derechos Humanos), a Peruvian NGO, and Dr. Teobaldo Llosa, M.D. member of the Peruvian Psychiatric Association recommend the use of coca flour in the treatment of cocaine addiction.

Recommendation 6: Drug Therapy

That research into the potential of the coca leaf or metabolites of cocaine in the treatment of cocaine dependency be undertaken.

⁶³ Hurtado Gumucio, J, "Cocaine the Legend About Coca Leaves and Cocaine", Edition, 2. Publisher, Accion Andina, ICORI, 1995

⁶⁴ Hurtado-Gumucio J, "Coca leaf chewing as therapy for cocaine maintenance", *Ann Med Interne (Paris)*. 2000 Oct ;151 Suppl B :B44-8

Commercial Applications of the Coca Leaf

Exploration of the commercial potential of the coca leaf has also been inhibited by the application of the prohibition conventions to this plant. All we can therefore do here is to point to the many and varied products, the creation of which has been shown to be feasible from the coca leaf. What is not possible at this stage is to indicate the commercial viability on a large scale of any of these products.

In the Andean region, coca leaf is used in the production of biscuits, pasta, granola bars, liqueurs, jam, toffee sweets and honey bars (more detail at Appendix 1).

Our researches have also found that the small quantities of cocaine found in coca leaf can function as a natural insecticide. Products as varied as paper, pain relieving ointments and cosmetics are all on sale in Latin America (see Appendix 1 for more detail).

The market for coca based nutritional products

Besides the medicinal applications of coca, there is a growing market for coca products in Latin America and beyond. Despite the controlled status of coca, several entrepreneurs are using the Internet to sell coca tea and flour using a health products niche of the market. According to an article published in March 2013 in the newspaper *Tribune de Geneve*, coca leaf sales have increased over recent years, and although some packages are seized by customs, much passes through and reaches the increasing number of consumers. Coca leaf enterprises that have commercialised various coca leaf products include Bolivialand in Bolivia⁶⁵, ENACO, Andina Real, InkaNatural and Misky in Peru, and Cocaindigena and Coca nasa in Colombia.

In Bolivia the Vice-Ministry for Coca and Integrated Development is leading the “Coca Industrialisation and Commercialisation Programme”. Their aim is to stimulate a legal internal market, ensuring that coca producers are the direct beneficiaries of their production. In 2006 there were regional agreements⁶⁶ between Bolivia, Cuba and Venezuela to finance projects in different regions of Bolivia including “Ecological Coca”, “Tea Infusion Trimate Plant” and “Coca Flour”.⁶⁷ DIGCOIN supports the General Direction of Coca Leaf Industrialisation in Bolivia. It forms part of the Vice ministry for

⁶⁵Bolivia Land Company website:

www.bolivianland.net/UserFiles/File/Dest1Comun/ParaArticulos/Bolivia_Prod_Hojas_Coca_WebEsp.pdf

⁶⁶ ALBA and the Tratado de Comercio de los Pueblos, signed 28th April 2006

⁶⁷ Bolivia National Development Plan, 2006 website: <http://www.ine.gob.bo/pdf/PND/00.pdf>

Coca and Integrated Development, and works to control legal coca production at the local level ensuring it remains within the legal market at national level.⁶⁸

Besides the more traditional tea and infusions to aid health, mood and energy levels and for the treatment of cocaine dependence,⁶⁹ there are various other commercial applications of the coca leaf for medical or nutritional purposes.

Recommendation 7: Commercial research and development

That a full economic analysis of the commercialisation of the coca leaf be undertaken, covering the economic costs, tax potential and benefits to the Andean Countries and the global economy.

⁶⁸ Bolivia DIGCOIN website: www.vcdi.gob.bo/index.php/programas-y-proyectos-del-vcdi/unidades-ejecutoras/digcoin

⁶⁹ Hurtado-Gumucio J, "Coca leaf chewing as therapy for cocaine maintenance" *Annales de Médecine Interne* (Paris), International Coca Research Institute, 2000 Oct; 151 Suppl B: B44-8.

Conclusion

It should not be assumed that the existing UN conventions on drugs need to be redrafted to enable the commercial development of coca leaf even though a review of their fitness for purpose today is overdue.

There are existing lawful applications of legal exploitation of coca leaf by multinational companies with potentially wider application. Coca cola have special permission from the DEA to import dried coca leaf, primarily from Peru.⁷⁰ On their behalf, the Stepan Company in Maywood, imports coca leaf,⁷¹ removes the alkaloids, which it sells to Mallinckrodt Inc for medical purposes, and what remains it passes onto Coca Cola to produce F.E. Coco (a fluid extract of coca), a key flavouring agent for Coca Cola. Other companies with registrations legally to import coca leaf into the USA include Johnson Matthey, Inc, Pharmaceutical Materials; Penick Corporation; and the Research Triangle Institute. Coca is also legally imported into Europe for the production of drinks like Red Bull Cola, of the Rauch Trading AG (Austria), which is also flavoured with coca extract. These companies are extremely reticent about where their coca leaf comes from and a helpful start would be more openness and accountability from international companies already engaged in a legitimate trade in coca leaf.

Private investment in raw materials is only worthwhile if it makes business sense. A challenge will be to ensure that farmers / workers find it more beneficial to sell their produce legally than as contraband. The financial loss will need to be outweighed by the ability to live without fear of the drug barons and the police.

When companies are already investing in coca leaf in the Andes, as well as in many other natural resources, what changes to local institutions will be necessary to enable this model be expanded to the wider market? Without doubt any country planning to introduce regulations for the legal development of a coca leaf industry will need to ensure their governmental and judicial structures and systems are sufficiently robust to effect compliance.

Further research and analysis into the many and varied potential applications of the coca leaf is needed before drawing any final conclusions. We also acknowledge that any revival of interest in the coca leaf for medical,⁷² nutritional or commercial purposes must be supported by a thorough analysis of the policy implications of growing coca legally. While legal coca production, appropriately regulated,⁷³ has the potential to

⁷⁰ Adams M (2011): "To this day Coca Cola still imports coca leaves which are used to manufacture cocaine in the United States": Natural News June 09 2011 http://www.naturalnews.com/032658_Coca-Cola_cocaine.html (8/2013)

⁷¹ Gootenberg, P. *Andean Cocaine: The making of a global drug*, 2009, pg 198 - 205

⁷² Grinspoon, L and Bakalar, J.B, "Coca and cocaine as medicines: an historical review", *Journal of Ethnopharmacology* 1981 Mar-May; 3(2-3):149-59

⁷³ In the early 1900's, the Dutch colony of Java became the lead exporter of coca, shipping over 1m kg to Amsterdam, and overtaking the Peruvian export market. British and Japanese colonial powers also attempted to grow coca but never reached this scale of production.

supplant the illegal cocaine trade, there are still various foreseeable risks. There is a clear responsibility for international aid institutions to assist countries in the Andean region to enjoy the benefits of a legitimate coca leaf trade whilst at the same time managing the risks that will ensue.

Appendix: Coca in food and other products

Insecticide

Research suggests that the small quantities of cocaine in coca leaves can function as a natural insecticide, with the potential to target pests. The findings of a study conducted by the Neuropharmacology Research Laboratory in Massachusetts General Hospital⁷⁴ showed in 1993 that cocaine exerts insecticidal effects at concentrations which occur naturally in coca leaves.

Paper Products

Coca plant fibre has been known to be used to make boxes and pulp for newspapers and other paper products in local craft companies.⁷⁵ Unofficial sources claim Cartonbol,⁷⁶ a Bolivian cardboard company, is currently working with DIGCOIN to industrialise this process.

Gardening

Although currently not exploited in this way, the delicate flower of the coca plant is potentially useful for bouquet arrangements and flower beds.

Liqueur

Coca has been used to fabricate herbal liqueurs in Bolivia and Peru. Agwa de Bolivia (usually shortened to AGWA) is a herbal liqueur made with Bolivian coca leaves and 37 other natural herbs and botanicals including green tea, ginseng, and guarana, distilled and produced in Amsterdam by BABCO Europe Limited. The coca leaf content of the drink, like that in Coca-Cola, has the cocaine alkaloids removed during production, and does not contain the drug. Agwa de Bolivia has been approved for consumption by the European Union Narcotics commission.⁷⁷ To give an idea of the current price, a 70cl bottle of Agwa De Bolivia Coca Leaf Liqueur price ranges from £23.99⁷⁸ to £25.44⁷⁹.

⁷⁴Nathanson J, Hunnicutt E, Kantham L, and Scavone C, "Cocaine as a naturally occurring insecticide", Proc. Natl. Acad. Sci. USA Vol. 90, pp. 9645-9648, October 1993

⁷⁵"El Papel de la Coca 2012/ The Coca Paper in Process 2012" on the Mama Coca Website, www.mamacoca.org

⁷⁶ Cartonbol website: www.cartonbol.com.bo/

⁷⁷"Agwa de Bolivia" entry on Wikipedia website: [http://en.wikipedia.org/wiki/Agwa_de_Bolivia_\(liqueur\)#Legality](http://en.wikipedia.org/wiki/Agwa_de_Bolivia_(liqueur)#Legality)

⁷⁸<http://www.backstreet-merch.com/stores/Agwa/> [viewed on 27.03.13]

⁷⁹www.thedrinkshop.com [viewed on 27.03.13]

Biscuits, Pasta and Granola Bars⁸⁰

Coca biscuits and noodles enable a modern form of coca, using the coca leaf as a source of energy. They are advertised as helping with altitude sickness, reducing headaches and regulating blood pressure; maintaining high energy levels for extreme tiredness; and reducing appetite and anxiety. A pack of coca noodles can be purchased for \$8.90 and a bag of coca and yoghurt biscuits for \$6.90.⁸¹

Flavouring

More globally, Red Bull Cola is flavoured with coca leaf plant extracts and the decocainized extract of coca leaf provides the flavouring for Coca-Cola. A Stepan Company in Maywood, New Jersey has a license legally to import coca leaves for this purpose as well as for manufacturing pure cocaine for medical use.⁸²

Jam

Coca jam is promoted for flavouring bread, biscuits, ice cream and exotic desserts. It is green and with the scent and flavour of coca leaves and currently targets an elite niche of the market.⁸³ A glass jar containing 260g of this product can be purchased for \$14.90.⁸⁴

Toffee Sweets⁸⁵

Similar to small caramel toffees, these sweets are sold to help with altitude sickness as well as being energizing and nutritious.⁸⁶ A plastic or foil bag with 425 grams can be bought for \$24.90.⁸⁷

Coca Honey Bars

Energy bars can be made from coca flour, 100% natural honey from Oxapampa and cinnamon powder. These are advertised as providing long term energy without causing insomnia, due to its complex carbohydrates and fibre components. It is also

⁸⁰ Coca Indigena website: http://cocaindigena.org/index.php?option=com_content&task=view&id=13&Itemid=15

⁸¹ The Coca Shop http://www.cocashop.com/product_info.php?products_id=73 [cited 27.03.13]

⁸² Other companies with registrations to legally import coca leaf into the USA include Johnson Matthey, Inc, Pharmaceutical Materials; Mallinckrodt Inc; Penick Corporation; and the Research Triangle Institute.

⁸³ Productos Alimentarios Misky Sac. Source: www.adonde.com/directorio-web/productosmisky-com-17062/

⁸⁴ The Coca Shop http://www.cocashop.com/product_info.php?products_id=53&osCsid=286d2db42f0f11d580c86b6ce368f2e0 [cited on 27.03.13]

⁸⁵ Productos Alimentarios Misky Sac. Source: www.adonde.com/directorio-web/productosmisky-com-17062/

⁸⁶ Coca Shop website:

http://www.cocashop.com/product_info.php?products_id=70&osCsid=040cfe4c6870163915747cc71bbce05a

⁸⁷ Coca Shop website:

http://www.cocashop.com/product_info.php?products_id=75&osCsid=286d2db42f0f11d580c86b6ce368f2e0 [cited on 27.03.13]

said to reduce appetite without causing malnutrition as it is a rich source of vitamins and minerals. A pack of 30 x 10g bars cost 24.80 euro.⁸⁸

Coca Ointment and Coca Cream⁸⁹

Known for its anti-rheumatic agents which alleviate muscle ache, articulation and lumbar pain, coca based ointment is sold as treatment for muscle spasms and swellings. A plastic jar with 30g of cream of coca leaves cost \$14.00.⁹⁰

Coca Oil

Coca oil is for external use, as massage and bath oil due to its distinct aroma. It is advertised as a regenerative antioxidant, and is described as moisturising and reducing muscle and bone pain. It can also be used as a make-up remover, a hair mask and for baby massage.⁹¹

Cosmetics

Coca leaf is used in the production of a range of cosmetics including beauty serums, toothpaste, shampoo and soap. Handmade natural soap is created with olive oil, palm oil, coconut oil, distilled water and coca leaf. A bar of 80g of this handmade soap in Cuzco costs \$18.90.⁹²

⁸⁸ Inkanatural website: <http://www.inkanatural.com/es/arti.asp?ref=hojas-coca#5> [cited 27.03.13]

⁸⁹ Coca Indigena website: http://cocaindigena.org/index.php?option=com_content&task=view&id=11&Itemid=13

⁹⁰ Coca Shop website:

http://www.cocashop.com/product_info.php?products_id=61&osCsid=286d2db42f0f11d580c86b6ce368f2e0 [cited on 27.03.13]

⁹¹ Coca Indigena website: http://cocaindigena.org/index.php?option=com_content&task=view&id=41&Itemid=43

⁹² Coca Shop website: http://www.cocashop.com/product_info.php?products_id=62&osCsid=286d2db42f0f11d580c86b6ce368f2e0 [cited on 27.03.13]