

# Qat in Yemen Towards a Policy and Action Plan

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## Preface

*Qat is one of the most striking and important aspects of Yemen, but it has rarely been the subject of policy analysis or discussion. This study is an attempt to put the facts on the table and to discuss them objectively and pragmatically.*

*The study is very largely a compendium of knowledge based on the extensive literature on qat, which is listed in the bibliography. A particular debt is owed to two pioneering studies, by Weir and by Kennedy.*

*The origin of the study was in the work done jointly between the World Bank and the Ministry of Agriculture in 1998 as part of the preparation for the 1999 Agriculture Sector Strategy. That work has been completed by Peer Gatter working on health aspects and on recent developments regarding qat within Government and civil society. Some of the material on health was previously compiled by Peer Gatter for WHO. The study was summarized in early 2000 as part of the work on the Yemen Comprehensive Development Review. It has now been extensively revised with the intention of issuing it as a background paper for the proposed national conference on qat. For this purpose, a chapter has been added exploring possibilities for a policy and an action plan on qat.*

*The purpose of the paper is to provide a solid base of factual knowledge about qat, as a prelude to some suggestions about possible policy options. The study is a synthesis of information, and it attempts to be neutral and objective about a subject which is frequently discussed in terms of value judgements. Thus the study attempts to state the known facts and then to explore the technical, social and economic issues without taking a position on whether qat is "good" or "bad" for Yemen or Yemenis.*

*This attempt has raised two key points:*

*The first point is that we simply do not know much about some very key questions, including:*

- *how much does qat production affect the pace of groundwater overdraft, and would the overdraft really be different if qat did not exist*
- *how reliant are how many farmers on qat to live, and what would happen to the rural economy if qat did not exist*
- *how much do people really spend on qat, and what is its place in the overall economy*

*The study therefore recommends an agenda of further investigation of these issues.*

*The second point is that there is everywhere an ambivalence - should Yemen treat this as a drug and try to fight it, as Lebanon did hashish, or is it a crop and a social habit with certain positive and negative characteristics, akin to tobacco or wine, that nonetheless commands attention because it is such an important part of Yemeni economic and social life. Because everyone shares this ambivalence in varying proportions, there has been a tendency to avoid confronting qat issues, and as a result an ostrich approach has everywhere prevailed.*

*The authors of this study believe that objective analysis and practical advice are most appropriate; that Yemen needs to tackle the highly negative aspects of qat but that it is impractical to talk of eradicating it or even of reducing consumption significantly, except in the*

*long term. This approach would require support to developing a political consensus, and practical advice on mitigating the negative aspects. This is the approach adopted in the final chapter of the study.*

*The alternative approach is to be more proactive, and to try to support a constituency for radical action against qat in the country. The authors of this study believe that such an approach is not fully justified by the facts and could be of less practical use to the Yemeni government.*

## **Executive Summary**

### **A. INTRODUCTION**

**Origins of the Qat Plant.** The origin of qat is still today much disputed. Yemeni oral tradition and a number of early Arab sources suggest that the plant originated from the Ethiopian highlands and was introduced into Yemen around the thirteenth century A.D. However, recent botanical evidence supports a Yemeni origin of the qat plant. In any case, qat first emerges into Yemeni history at the same time as coffee at the end of the Rasulid era in Ta'iz (fourteenth century A.D.)

**The History of Qat Use.** Qat's original use in Yemen seems to have been as a "tea" amongst Sufis, Islamic mystics, who used it during religious ceremonies to intensify states of trance and to enhance mystical experiences. During the following centuries, the consumption of qat slowly spread to the upper classes. By the sixteenth century, its use was sufficiently prevalent to raise legal and religious concern and to merit scholarly treatments of whether it was licit or not. Qat came to the Zaydi highlands of Yemen from the southern uplands much later, but was common there by the eighteenth century.

### **B. QAT IN YEMENI LIFE**

**Consumption Levels.** There is a broad consensus that qat was frequently used only by the elite until quite recently. It was generally a luxury or occasional item in most areas. It is similarly agreed that the qat chewing habit has become almost universal in Yemen over the last thirty years. Qat chewing has become prevalent in all parts of Yemen, even in remote areas where the habit had previously been unknown, or where it was seen as shameful. In the mid-1980s, 80-85% of men and 50-60% of women of North Yemen were habitual chewers ("chewing more than once per week). After unity in 1990, the population of the southern governorates rapidly caught up. Essentially, within the last generation, qat has moved from occasional to everyday use.

**Factors Influencing the Recent Spread of Qat Use.** The big changes that led to a spread of qat consumption throughout Yemen, through all social strata and amongst both males and females seems to have been in the 1970s. The main factors for this growth of qat use are, first, the increase in wealth, particularly during the oil price boom when so many Yemenis worked abroad. Second, and linked, is the rapid change in the rural economy, as rapidly rising wage rates made subsistence agriculture uneconomic and provided the push for farmers to switch from subsistence farming to cash crop cultivation. Qat emerged as the most profitable cash crop, able to support the rapidly growing rural population at income levels previously undreamed of. This process was facilitated by the very special characteristics of the qat tree - drought tolerance, a flexible and not excessive labor requirement, relatively simple husbandry, a long harvest season, and exceptionally well-organized marketing. The arrival of the tubewell in the 1970s, together with the remitted capital to finance tubewell development, gave a powerful push to irrigated qat development. The development of the transport infrastructure made it easier to distribute qat. On the demand side, wage employment enabled Yemenis for the first time to have the cash in their pocket to buy qat regularly. Even social change played a role: women, too began enjoying qat on a larger scale.

**What Happens in a Qat Chewing Session.** Qat strongly influences and structures daily activity. Preparations for chewing begin well before the actual qat sessions and a fair amount of energy and thought are devoted to them. In order to carry out the lengthy preparation process, many businessmen and officials leave work early. By two or three o'clock most Yemenis are already comfortably seated in the special chewing room, the *mafraj*. Qat leaves are masticated and then stored in one cheek. Large amounts of sweetened water are drunk to make up for the dehydrating effect of qat and the juice of the leaves is thereby ingested. Tobacco smoking (mostly waterpipes) completes the ritual and is said to enhance the pleasure.

Such qat sessions (*majlis al-qat*) may well last up to five hours and are characterized by three phases. In the early phase, an extroverted atmosphere prevails. Then a climax is reached, often accompanied by a high level of mental concentration and group communion with a focus on a single topic. After this "hour of wisdom", participants gradually turn to low-voiced conversations and often want to be left alone to retreat into introverted reflections, before going to evening prayer and then returning home to their families.

The chewing sessions are not only for entertainment. There may be scholarly debates on legal or theological matters, the arrangement of marriages, or arbitration of disputes. Most of Yemen's business and politics also take place during qat chewing. Participation in chewing sessions as well as the choice of the right chewing companions can be a key to personal success.

**Sociology of Qat Sessions.** Amongst countries in which qat consumption is widely spread, only in Yemen has qat chewing developed into a social pastime. Qat parties are now the central social ritual of everyday life in Yemen. In the past, sessions could attract anyone, and in rural areas often the whole community may still gather. Urban sessions these days attract people with a much smaller range of social positions. In general, before the qat boom the majority of Yemenis socialized in a simple informal manner with a limited range of associates, whilst the rich had formal, lavish gatherings. Qat parties have replaced both.

**Qat and Women.** Yemeni women chew less than men. Today about 90% of men are chewers (habitual and occasional) compared to some 60% of Yemeni women. Chewing is not a family habit at all. Men and women always chew separately, but sharing is common. Many men bring qat home for themselves and their wives. There used to be some "shame" attached to women chewing, but nowadays, even for unmarried women, this has changed, especially in the towns, where qat chewing has become the fashion even for young people of both sexes. However, on the production side, and unlike most other agriculture products, qat is a man's crop.

**Qat and Income.** The cost of qat has been falling in terms of purchasing power. Thirty years ago, a bundle of qat cost the equivalent of the unskilled daily wage. In 1998, qat could be purchased for as little as a quarter of the unskilled wage.

The share of qat in the family budget is considerable. The 1992 Household Survey shows that in almost all the country, qat consumption ranked second only to animal products in household budgets. The same holds true for both rural and urban populations, and for all income levels except the very highest. According to the survey, qat occupies 5-10 percent of total household expenditure at each income level. A recent small scale survey suggests much greater importance of qat in family expenditures - as much as 28 percent of income.

Several facts are clear. First, qat consumption affects the family budget and limits financial resources for other basic needs and services, such as food, medication, clothing and schooling. Second, the effect is worse for the poor; "poor heavy users" spend more on qat than on food. Third, there are significant regional differences, as consumption is lower in non-qat growing areas in the southern parts of the Yemen. Finally, and despite the lack of data prior to



the 1970s, it is quite certain that the share qat occupies in the family budget has increased over the past decades.

**Yemeni Views of Qat.** From the earliest times in the southern uplands, qat had the "stamp of approval of the ruling class". It was at once noble and prestigious, and touched with religious associations. This was not, however, the case in the Zaidi highlands, where even today there is some resistance to the "tree of the devil" (*shajarat iblis*).

Although, qat has never been prohibited in Yemen on religious grounds (apart from a brief period in the sixteenth century), there has been a tradition, never strong but persistent, of official criticism of the qat habit. This attitude took political shape in the official campaign against qat mounted in 1972. However, the government fell within three months, and the experiment was abandoned.

The generalization and "institutionalization" of qat use is now an irreversible fact of Yemeni life. Qat is legal, and its use is nearly universal and ingrained in social habit. The plant has deeply influenced daily life, culture, politics, and even the architecture of Yemen. It today pervades the whole economic, social and psychological fabric of the country. Nowadays, everybody chews, whether gladly or reluctantly. In a survey, everybody admitted chewing but the answer to the question 'Do you want your children to chew qat?' was a resounding *no!*

**Foreign Views of Qat.** Early references to qat by westerners were not unfavorable. More recent foreign writers have produced "a tradition of mildly pompous condemnation". Official international attitudes are generally negative and the drug is banned in a number of countries.

### C. ECONOMIC ASPECTS OF QAT

**General Economic Importance.** Over the past three decades qat has become the major agricultural crop of Yemen, and certainly its most lucrative one, replacing sorghum and coffee in many areas. Qat secures profits up to ten times as high as achieved by cultivating other crops.

Estimates suggest that qat is grown on 100,000 hectares, including about 25 percent of groundwater irrigated land and using about 30% of the irrigation water. However, these figures are simply guesses, and need to be verified by proper study. The explosion in qat demand has increased the incentives to use water, and much qat is grown on mined groundwater, using up the nation's water capital.

Qat production has a huge impact on the rural economy. Employing large numbers (estimates run as high as half a million people, which is equivalent to almost 20 percent of Yemen's workforce), the qat sector has kept alive the agricultural economy, and kept the people tied socially and economically to their small rural communities, avoiding the problems of over-rapid urbanization.

Within the rural economy, studies show that up to 80% of qat revenues can remain in the local community; that qat producing areas buy in their food from surrounding areas, thus stimulating agriculture in those areas; that qat has helped to sustain the terrace system (reducing soil erosion and helping infiltration of rainwater); and that qat revenues may be used by communities to finance other rural development (e.g. opening roads, electrification).

**Production Data.** Despite qat's prominence in Yemen's economy there is a lack of reliable information at the macro level, and the official statistics are highly dubious. One thing is clear - that the production and consumption qat have grown explosively. The official figures are no more than orders of magnitude - but they serve to show that qat is a huge phenomenon.

**Qat in GDP.** Based on official statistics, it is possible to calculate a value for qat in the economy. The numbers, when calculated, are enormous - \$ 2 billion a year in retail value, equivalent to 30% of GDP; and farm gate value of \$640 million, equivalent to two thirds of the rest of agriculture put together (agriculture value added in 1995 was \$1,053 million). Skepticism should be exercised, as household budget data suggest that qat expenditures are in the range of 10-30% of incomes, which would suggest that 30% of GDP is an extreme (high) estimate.

**Profitability of Qat.** Where it can be grown, qat produces gross margins, returns to water and returns to family labor superior to returns on other crops in the same agroecological zone. Calculations for the Sana'a basin show the even higher profitability of the crop in the vicinity of the very rich market in the capital. There, net profits range from Rls. 400,000 to 1,800,000<sup>3</sup> per hectare (\$2,500-\$11,000). The words of a qat farmer of the Sana'a basin show what a high reputation this crop enjoys: "*Qat is like a safe. Whenever I want some money all I have to do is irrigate several times, spray some pesticide and within two weeks it is ready for harvest.* Several plastic bags of chewable qat leaves picked from a number of trees can be sold to cover a day's expenses for a typical rural household.

**Qat Taxation.** There is a consumption tax of 20% on qat sales, collected at the point where qat enters urban areas. The actual yield is vestigial compared to what is due and evasion is pervasive. Recent collection figures are under Rls 1 billion a year, against a theoretical assessment of Rls 60 billion (Rls 300 billion retail value at 20% tax rate). The Government adopted IMF recommendations from 1986 to improve collection performance but without success. Recently, penalties for failure to make declarations and pay the tax have been increased but evasion remains rampant.

**Economics of Water Use for Qat.** Qat gives by far the best financial return to water of any crop: 50-90 US cents/m<sup>3</sup> against a cost of water that rarely exceeds 10 US cents/m<sup>3</sup> (Rls 15/m<sup>3</sup>). Returns for grapes, the second most profitable crop in the Sana'a area, are in the range 30-50 US cents/m<sup>3</sup>. Qat is so profitable a crop that it can justify supplementary irrigation by tanker. This financial profitability does not take account of the effective subsidy of groundwater production (largely through the diesel pricing system) nor of the resource cost of mined groundwater. The inclusion of these two costs would certainly show a "negative" economic return for some marginal production, but in almost all cases qat would remain the most advantageous irrigated crop, where it can be grown. By contrast, where qat can be grown entirely on rainfall, it is an ideal crop from the economic and environmental perspective because of its high value and favorable watershed conservation characteristics.

**Elasticity of Demand.** Demand for qat as a whole is inelastic, but elastic for different grades. A person with increasing income would change to "better", more expensive qat, and a person with declining income would not stop or reduce the amount chewed, but would rather change to a less expensive, lower quality qat.

**Marketing Systems.** Yemen has a very well-developed marketing system for qat, which is dominated by small trading units. Qat marketing is distinguished by the need to get the product to the market fresh, since qat leaves are mostly chewed within 12 hours from harvesting. Hence, rapid speed of transport is indispensable. Because qat is highly perishable, and price fluctuations are large, purchases and sales are in small quantities in order to avoid losses. Qat does not therefore lend itself to market concentration or monopoly tendencies. In general, the following three main factors determine prices of qat: (1) location and reputation; (2) appearance; and (3) time of year and climate, as qat is more expensive during the winter months and during exceptionally cold and dry periods.

**Grades and Quality.** The mark of a "good" qat is that : (1) it is not too bitter; (2) it create a good quality of "high", called *kayf*; and (3) it has no after-effects, like spermatorrhea etc. Cheap grades have bad side effects, like the *sawti* qat that keeps the chewer awake all night.

**Trade.** Attempts in the past to open up imports of cheaper qat from Ethiopia were stopped after opposition from domestic producers. Today, small quantities of qat are exported to Europe and America by air largely to meet demand from Yemeni émigré communities. Another destination of Yemen's qat is Saudi Arabia, where qat is smuggled on a regular basis into the Asir and Najran regions. Profits are considerable.

#### D. Qat in Yemeni Agriculture

##### The Farming of Qat

**Agronomy.** Qat grows in two major forms: a slender white tree, or a small shrub, which is kept pruned down. All of the high quality "premium" qats come from the tree form. Qat is a hardy plant, long lived and drought resistant. Although an evergreen, it can go dormant under water stress.

**Husbandry.** Large scale qat plantations are not common due to land fragmentation and the strict agroecological location requirements associated with qat plantation. Qat is usually planted at the base of hills or on terraces with a slight slope. It performs best where the mean temperature is around 19°C. It is an altitude crop, rare below 1200m. It grows in areas of rainfall of 500 - 1000mm or under irrigation. The husbandry is not over-difficult, although farmers believe that the more work done in a plot (ploughing, dusting etc.) the better the harvest and the higher the profits. It can be intercropped until it comes into full bearing.

**Fertilization and Plant Protection.** Qat suffers from few pests but when farmers prepare the trees for harvest, chemical pesticides and hormones are usually applied. A plot may be sprayed with chemicals 3-5 times during the year. Some farmers even mix dangerous pesticide cocktails of up to 6 different products adding sugar and following the common belief of "the more the better". Agricultural extension programs do not provide qat farmers with any assistance on this (or on anything else to do with qat), and most farmers are not aware of the threat pesticides pose to human health. But even though most farmers apply chemicals, they try to deny it as much as possible, perhaps because they see the use of chemicals as "unnatural"

**Crop Characteristics.** Qat will grow on a wide variety of soils, even those that are only moderately fertile and are low in nitrogen. However, higher nitrogen availability produces a higher quality qat. Even though qat is quite hardy, it is sensitive to a combination of low temperature and humidity. For this reason, many farmers stop irrigating qat during the winter months to allow the plant to go dormant. Nevertheless, qat plots in areas protected from cold winds are watered and thus harvested during the winter and are highly profitable. In some areas, such as Wadi Dahr, qat can be induced to bud under irrigation anytime except the two coldest months of the year. This allows the harvest to be staggered, and under irrigation a crop can be brought on almost at will to catch suitable market opportunities.

**Harvest.** The branches with new growth are harvested, and it is a great art to try to get this "flush" of new growth at a time when prices are high. Farmers will invest in a tanker of water at the end of the dry season to produce this flush. Depending on the region, qat can be harvested between one and three times a year.

**Labor Requirement.** Qat in general is not a highly labor intensive crop, compared to grapes, cereals, vegetables or fruits. Moreover, since harvest time for qat can be delayed (within the summer months), labor demand is flexible.

##### Qat and Water

**Crop Water Requirements.** The actual water requirement of qat is quite low - 400-600 mm - but under Yemeni conditions this requires an application of between 700 mm and 1400 mm of water (both rainfall and irrigation) annually.

**Qat and Water Use.** In the 1970s, most qat was rainfed or irrigated by run-off water but much more qat is now pump irrigated. The uncontrolled spread of private agricultural wells has led to water mining in many areas - groundwater levels in the Sana'a area have declined at a rate of 3-6 m a year. Within the Sana'a basin, it is estimated that qat consumes at least one third of the yearly groundwater extraction for agriculture. This is more than the water consumption of the city of Sana'a. FAO estimated the total nation-wide yearly water consumption for qat cultivation to be 800 million m<sup>3</sup> (against renewable resources of 2,100 million m<sup>3</sup>). However, all these figures are all just guesses, and a reliable field survey is essential in order to assess the nature and extent of the problem. Farmers do use water conservation methods, but the incentives to conservation are slight whilst prices remain subsidized and groundwater is an "open access resource".

**Qat and the Environment.** In the 1970s and 1980s, traditional cereals terraces were being abandoned because of high labor costs and low grain prices. Qat was planted on some of those terraces, thereby saving them.

### **Qat and Farming Systems**

**Farmers' Perceptions of Qat.** In general, qat is appreciated by farmers as a crop with a very high market value, relatively low water requirements and low labor demand. Other factors for farmers' appreciation of qat are its tolerance of interplanting, its drought resistance, and its excellent marketing system. Qat cultivation needs little capital to start, and qat provides a decent income to many people. The relatively small variation in price over the year reduces farmers' risks, and the fact that - with a little water - it can be brought to harvest and market in most months of the year, makes it a ready source of cash. Also, farmers with some controlled water source can harvest as much or as little as they need to for budget purposes, and leave the rest for later. This appreciation is reflected in behavior. Villages growing qat have the lowest migration rates, the highest wages for workers, and the most village capital, as evidenced by road building equipment.

**Has Qat Displaced other Crops?** Qat has different requirements and characteristics from other crops and does not perfectly substitute for any crop. Some coffee, sorghum and grapes have been displaced, but most new qat plantations have been on land otherwise unused or abandoned. In some areas, qat has supplanted grapes, as farmers see qat as superior to grapes which are less hardy than qat and need more care.

**Qat Area.** The estimated area planted to qat in 1981 was 40,000-45,000 ha. By 1998, the area planted to qat was thought to have reached about 100,000 ha. New terraces, sometimes almost Cyclopean earth and stoneworks, are constructed, as qat's profitability persists and justifies the heavy investment involved.

### ***E. Impact of Qat on Health***

#### **General Health Conditions in Yemen**

Health indicators and national spending on health in Yemen are some of the lowest in the world. Major contributing factors to the alarming health situation include poverty, low participation in education especially among girls, high illiteracy, and limited access to potable water and proper sanitation. Malnutrition due to deficiencies of proteins and of fresh vegetables and to frequent parasite infections is prevalent. These conditions are exacerbated by the low level of medical knowledge among the people and a general lack of adequate medical facilities. The

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result is alarming, with maternal and infant mortality rates which are among the highest in the world, and with the highest fertility rate and at the same time lowest life expectancy for both males and females in the entire MENA region.

### **i. The Use of Qat in Traditional Medicine**

Qat has long played an important role in the traditional medicine of Yemen and East Africa. Qat leaves were traditionally consumed as tea or ingested by chewing to treat disorders. In addition, the adverse health effects of the qat chewing habit have been known for centuries and some traditional remedies developed. These "remedies" included a series of exercises designed to counteract the "cold" effect of qat - a special lunch, exercise before chewing etc. Such practices are not common today, but chewers will keep the windows tight shut for fear of the chill.

### **ii. Pharmacology and Biochemistry of Qat**

The chemical nature of qat has been under analysis since the late 19<sup>th</sup> century. In the 1970s, the alkaloid cathinone (aminopropiophenone) was identified, a substance chemically resembling amphetamine and with similar stimulating effects, such as increased locomotor activity and higher oxygen consumption. Cathinone is potent with regard to stimulation of the central nervous system but is not stable and decomposes within two to three days. The concentration of cathinone was found highest in freshly harvested young qat leaves which explains consumers preference for this type of material. Another major component is tannin, which is responsible for various gastrointestinal disorders associated with the consumption of qat. There is some concern that the isolation of the stimulant cathinone could lead to abuse as it has for cocaine. However, due to the short lived nature of the active constituents of qat, they would lose their stimulating effects and decompose within a few days. With artificially produced cathinone this would not be any different.

### **b. Physical Health Effects of Qat**

Due to its complex constituents, qat has a wide range of physical effects on the human body. Most of them must be considered as negative. However, although research has been carried out on the physical health effects of qat, many vital questions remain unanswered, such as whether qat consumption affects life expectancy and mortality or if it causes cancer. In addition, even where effects are known, in most cases it is not clear how many users are affected.

**Gastrointestinal and Liver Effects.** Tannins contained in qat leaves are responsible for a variety of disorders of the digestive system, such as constipation, gastritis, and loss of appetite. The high rate of anorexia-like symptoms reported among qat chewers is explained by the appetite-suppressing characteristics of qat, which it has in common with other amphetamine-type stimulants. Frequent constipation resulting from qat chewing has been linked to hemorrhoids, from which 60 percent of qat chewers are reported to suffer. Tannic acid is also considered a possible contributing factor to the high level of liver cirrhosis observed in Yemen.

**Oral Effects.** Qat use is associated with inflammations of the mouth (stomatitis), which are especially observed among newly initiated chewers. The high concentration of tannin contained in qat is considered a contributing factor to the development of periodontal disease.

**Cardiovascular Effects.** One notable short term effect of qat ingestion on the cardiovascular system is an increase in heart rate. Whether qat ingestion has long term effects, and whether permanent damage is inflicted on the blood vessels and the heart is not yet known. Some studies report that migraine, cerebral hemorrhage, myocardial insufficiency, infarct, pulmonary edema, and tachycardia have been observed after the intake of qat, particularly in

older and predisposed individuals and that "hypertension in young persons ... is due to the chronic intake of khat [qat]...", but little quantitative data for these findings is provided.

**Urinary Tract Effects.** Urination and defecation are inhibited due to the use of qat. Female chewers have a higher prevalence of urinary problems. Twenty-two percent of heavily chewing females were diagnosed to suffer from urinary disorders.

### **Qat and Nutrition**

Qat chewing is an important determinant of malnutrition in Yemen since it competes directly with the purchase of food and it affects the appetite. Many households, especially poorer ones, spend more on qat than they can afford, to the detriment of the food budget. A recent study suggested that an average Yemeni family may spend 28 percent of its income on qat. Yemenis who do not have sufficient money to purchase both qat and food may choose to spend their money on qat, since it functions as a hunger depressant. Food intake was found to be reduced by 72 percent following the higher dose of cathinone.

The poor spend a much higher percentage of their wages on qat than the financially better off. The fact that families so readily spend money on qat does not indicate necessarily that they have money 'to waste', but that qat is a very important aspect of their life. Within the family there is a gender split in attitudes: women seem to be more aware that their dietary intake is insufficient. It is likely that both the nutritional situation of Yemeni families, as well as access to health services, would improve if qat were absent.

In addition, many families do not have the money for medical treatment or children's schooling, even though they make substantial outlays on qat. Poor medical access and poor schooling in turn affect morbidity and mortality.

**Maternal Health Effects.** Qat chewing is associated with decreased birth-weight. 30 percent of babies born to qat chewing women (occasional and regular users) are underweight (less than 2500 grams), as compared to 22 percent to non-chewers. It was also found that cathinone (norpseudoephedrine) is secreted in breast-milk and thus transferred to the breast-fed infant, which may be another reason for the high level of underweight babies in Yemen.

**Effects on Sexual Activity.** It is a common belief among Yemeni men that low quality qat can lead to loss of sexual desire, as well as loss of seminal liquid (spermatorrhea) and impotence. High quality qat on the other hand is said to enhance sexual desire and increase the length of performance, even though it is reported that ejaculation is sometimes painful due to a qat-induced constriction of vessels. Women experience more negative effects in sexual experience due to qat consumption than men.

**Effects on Male Reproductivity.** Significant decreases in testosterone secretion were observed due to the intake of crude qat extracts. Stress-like syndromes produced by cathinone were found to suppress gonadal function and decrease testosterone levels. The examination of testes showed degenerative changes in the interstitial tissue and a reduction in size of inner testicle cells. Experiments showed that prolonged cathinone treatments result in a significant reduction in the weight of testis, cauda epididymis and seminal vesicles. Cathinone also produced a decrease in sperm count, increased sperm mortality and an increased number of abnormal sperm. In addition the longer the period of use, the more serious are the effects on semen parameters and the more deleterious are the effects on sperm morphology and, in turn, male fertility.

### **Psychological Effects of Qat**

**Stimulating Effects.** A variety of stimulating effects of qat use have been reported. A considerable number of qat users perceive an increase in mental powers, a greater understanding of personal problems or life in general, and an increase in the flow of ideas. Qat is also said to stimulate imaginative powers and generate creativity. Users of qat for business sessions state that the positive atmosphere prevailing in these sessions is generated by the plant, facilitating mutual understanding and thus decision-making. However, all outcomes of qat sessions need to be reviewed the next day, as they are often unacceptable in the cold light of the morning after. Qat is also known to increase alertness and the ability to concentrate. Many high-school and university students claim that qat helps them to focus on their studies and will use the drug during exams. Besides giving rise to an optimistic and even euphoric state of mind, qat is said to engender contentment self-confidence and friendliness, which may be responsible for a greater ability to mediate arguments and even tribal feuds. Many Yemenis also point out that qat chewing elevates them into a spiritual mood in which they feel closer to God. They are able to stay up longer and consecrate time to prayers and religious reflections, an argument frequently brought into play when a religious restriction of the drug is discussed.

**Negative Psychological Effects.** Qat chewing also involves a wide range of negative and unwanted psychological effects. The most widespread of these negative effects is insomnia. Qat chewers reported sleeping an average of 6.6 hours per night, whereas non-chewers reported sleeping an average 7.8 hours. This insomnia feature of qat has also been associated with a rise in alcohol use in Yemen, as alcohol (and milk) apparently help chewers to sleep. Other negative effects include: greater nervousness, loss of ambition and frustration, sadness, a feeling of failure, helplessness, fear, and perceiving people as evil. Chronic use of the stimulant may result in psychopathic behavior and can lead to profound personality disorders. Women report higher levels of domestic violence after their husbands have chewed.

When chewing excessively, subjects may experience hallucinations. Qat chewers have reported feeling insects crawling on their body, experiencing non-occurring events, or having supernatural experiences. Over half of qat chewers frequently experience mild depression, such as hopelessness, feeling of having lost a battle, or worthlessness. Some chewers reported disjointed speech. Others reported distorted perception, confusion, loss of sense of time and place, and distortions of their short term memory. All these effects seem to be temporary. If the ingestion of qat is abandoned permanently, the symptoms do not reappear. So far no cases of permanent qat psychosis have been reported.

**The Gender Difference.** Males tend to be more vulnerable to qat and report both stimulating and negative experiences much more frequently than females. This gender difference can perhaps best be explained the fact that women in general chew much smaller amounts of qat.

**Does Qat Cause Dependence?** Some studies have found that qat consumption may induce moderate but persistent psychic dependence. The withdrawal symptoms after prolonged qat use seem to be limited, however, to lethargy, mild depression, slight trembling and recurrent bad dreams. Based on experiments which have shown that cathinone has the same mechanisms of action as amphetamine, and can thus be dependence-producing, the WHO has recommended that cathinone be placed under international control. Since then, it has been included in Schedule I of the UN Convention on Psychotropic Substances. This has led a number of western countries, including Canada, the USA and Germany, to put controls on import and production of qat.

### **Indirect Health Hazards of Qat**

There are a number of indirect effects of qat chewing. One is the chance of road accidents. Many Yemenis emphasize increased awareness, and qat is thus consumed by a

majority of taxi and truck drivers. However, qat-induced euphoria may well affect drivers' judgement. A second risk is from smoking. Increasing levels of qat-use are strongly associated with an increasing prevalence of respiratory problems, such as heightened respiration, shortness of breath, bronchitis, bronchial pneumonia, chronic bronchial asthma, respiratory vesicularis, and emphysema. Cases of bronchitis for example were found to be up to three times more frequent in heavy qat chewers than in non chewers. The reason is that people tend to smoke much more heavily during qat sessions than at other times. A third risk is tuberculosis from smoking the water-pipe (*mada'a*) or from the well-filled open spittoons into which chewers eject the chewed residues.

**Pesticides.** The biggest indirect risk from qat chewing is from pesticide residues. Pesticides can cause cancer, human mutations, congenital malformations, inhibition of body immunity and endocrine disturbances. There have also been reports of fatal pesticide poisoning in Yemen among qat farmers. Farmers use pesticides on a large scale in order to protect the plant from various pests, to ensure healthy foliage, larger leaves and a more attractive leaf coloring. Many farmers believe that these effects are enhanced with greater quantity of pesticides and they therefore mix several different products, often using substances restricted in other countries, such as DDT and Lindane. Qat may be chewed within a few days of pesticide use. The majority of qat consumers do not wash the leaves before chewing them, and are thus not only exposed to the residues within the plant, but also to pesticide traces on the surface of the leaves.

### **The Health Sector's Response to Qat**

The Ministry of Public Health has joined the recent campaign of President Saleh to reduce the consumption of qat in Yemen. The MOPH's approach is to restrict consumption in those facilities for which it has control and to develop awareness programs on qat. The Ministry's approach is to raise awareness on the basis of scientific knowledge on the negative effects of the stimulant. The Ministry also maintains a library with an extensive collection of qat literature.

## **F. TOWARDS A POLICY AND AN ACTION PLAN**

### **Official Attitudes towards Qat**

**Attitudes in Recent Years.** Government's attitude towards qat has been ambivalent. Some actions have suggested disapproval of qat. For example, there is an official ban on qat use in governmental offices, and farmers who grow qat are excluded from access to agricultural services. The high tax rate on qat also suggests official "disapproval", and in fact qat is the only agricultural crop that is taxed at all. On the other hand, there are numerous examples of official acceptance of qat: restrictions that applied in the former PDRY in the south were rapidly eliminated after Unity; there has rarely been any official pronouncement against qat, and there has been little attempt at an awareness program against it. In general, this ambivalence of Government approach reflects the ambivalence of Yemeni attitudes in general towards the drug. There is a pride in this distinctively Yemeni habit, tinged with a slight apprehension that it may not be the correct characteristic for a country that wishes to join the comity of modern nations.

**Recent Developments.** Since 1999, there appears to have been a current of change in Government and civil society. The leadership of the country made a surprise shift in 1999; the President announced that he was giving up qat and taking up computers and sport instead. He was followed by other political leaders; the governor of Ibb led a wide campaign against qat in his governorate. In the wake of this, Government introduced the five day week and longer working hours, police and soldiers were forbidden to chew on duty, and Yemenia stopped transporting qat. At the same time, several NGOs began awareness campaigns against qat. In July 1999, Government took the decision to hold a national conference on qat in 2000.



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## **Focussing the Issues - What is the Qat Problem?**

The fact that attitudes to qat are everywhere ambivalent is not surprising, as the drug has characteristics that make it popular both as an economic good and as a habit for a society in transition such as Yemen. On the other hand, the ill-effects on natural resources, the economy, human health and society are palpable.

As an *economic good*, qat has many favorable characteristics. Well adapted to Yemen's tough climatic conditions, it has beneficial impacts on the rural economy and ecology. It has helped preserve Yemen's rural way of life and the terrace system, and has stemmed rural urban migration. It has displaced other crops, but the substitution of higher value cash crops for lower value or subsistence crops is a normal part of the modernization of agriculture. However, qat production is an important cause of the very rapid mining of Yemen's groundwater.

As a *drug*, qat seems to be relatively mild in its effects. It is not currently considered a dangerous drug by the Yemeni government or the international community (if it were, this would build the case for a much more interventionist approach). Nonetheless, qat has to be seen as a factor in the appalling health and nutritional status of the Yemeni population, and the risk from pesticide poisoning is substantial.

As a *social phenomenon*, qat presents some advantages. Chewing is the leisure activity of choice for the entire population, and it contributes to social cohesion. It could be said that qat, as a distinctively Yemeni phenomenon, has helped Yemenis to survive the difficulties of an extraordinarily rapid modernization process with much of the traditional social and family structures and values intact and with comparatively little of the suffering of alienation experienced by other peoples. On the other hand, the effect of the qat habit on the family, particularly on women and children, underlines the risks to society that the excessive use of the drug brings.

The negative impacts are thus basically the natural resource mining and the impacts on health and the family. This pinpoints the measures that might be considered as Government moves towards a qat "policy".

## **Assessment of the Constituency for Change**

**Factors for Change.** Changing the qat habit would require a strong constituency for change. There appear now to be some signs of a positive Government attitude towards doing something. The major change in recent months has been the emergence of leadership on the issue. In parallel, an embryonic civil society movement against qat has emerged.

**Factors Constraining Change.** There are, however, a considerable number of factors that militate against change. First and foremost, qat is the object of general recognition and tolerance – and appreciation. Nowadays, Yemenis are satisfied with the qat habit – and modestly proud of its "Yemeni-ness" before foreigners. They see it as a social habit, not an addiction. It has become so widespread that it is inconceivable that it could be eradicated; most Yemenis do not really see it as a problem at all. Second, qat has become the mainstay of the rural economy, and reduction in qat activity would have serious effects on rural people. Politicians and rural people alike would oppose such a change. Third, there is no clear religious ruling against qat in Yemen. This is in contrast to Saudi Arabia and other Muslim countries, where qat has been declared haram by the religious establishment. Fourth, despite the recent moves against qat, there is little breadth to the political constituency for action on the drug. There is in fact the memory of the failure of past

attempts at control, which have reduced the credibility of anti-qat proposals. Thus, there are some factors favoring action on qat, but there is also a complex of constraints that will inevitably reduce the scale and momentum of any change.

### **Towards a National Action Program on Qat**

Plainly, there is a case for an action program on qat targeted at key problems such as water mining, health and family problems, and there is an embryonic constituency for such a program. However, it is also clear that the constraints are enormous. In particular, the option of regulation of qat is unlikely to work. Under these circumstances what are the options open to the nation?

### **Policy Development and National Consensus Building**

**National Conference and Official Policy.** First, Government and the nation at large need to move towards a consensus on qat. The medium of the national conference seems an appropriate way to handle this. The objective of the national conference is to develop ideas for an official policy towards the drug.

**Program of Further Study.** Second, until now a key constraint in dealing with qat is the lack of information on which to base decisions, and on which to found an action program. More information would help to pinpoint the impact of qat on groundwater overdraft and to document the health and social ill-effects that could make a difference to people's attitudes in an awareness campaign. The main areas for further work are on social impacts, the economy of qat, qat in agriculture, qat and health.

**Establish a Qat Forum.** There is a need for a forum for dialogue and study on qat and for a documentation center. This could be accomplished by the establishment of an independent "qat forum" - a think tank or policy research center located within the non-governmental sector and open to all interested parties, from Government to NGOs, donor organizations, researchers, and the general public.

**Education and Awareness Campaigns.** People need to be aware of the dangers of qat consumption. An education and awareness campaign could change hearts and minds as was done with smoking throughout the world over recent decades. The nation could therefore undertake a long-term education and public awareness campaign on qat driven by hard facts on the drug and its socio-economic and medical effects. Ideally, an NGO should take the lead, in co-ordination with public agencies. The campaign should use experience from successful awareness and public health campaigns carried out in other countries on similar issues, adapted to the Yemeni context.

### **Intervention Programs**

**Taxation.** Efforts could be made to develop a more efficient qat taxation. Revenues could be used to finance further research and action on qat.

**Trade Policy.** Given that Ethiopian qat is cheaper, Government could consider the advantages (in terms of groundwater conservation) of opening up qat imports.

**Agricultural Programs.** On the production side, a program with four components could be envisaged: (i) crop substitution, which could learn from the successful program in Saudi Arabia; (ii) research and extension, building on the recent establishment of a qat agricultural research center, and focussing on water saving techniques; (iii) action on pesticides; and (iv) information and policy analysis. A special fund could be set up to finance these actions.

**Health Programs.** Regarding the health aspects, a two-pronged strategy could be pursued, covering education and awareness (as discussed above), and additional research and study on particular areas of concern. Priority areas for research include the health effects of pesticides used in qat cultivation, and research on qat and women.

**Alternative Leisure Pursuits.** Consumers need to be presented with alternative leisure activities and to be given time to change their chewing habits. One Yemeni youth sums up the voices of qat consumers. "Without qat what would we do for entertainment?" Yemen could draw inspiration from the program under which Saudi Arabia addressed its qat problem in the Asir region in the early 1980s, when it identified alternative leisure opportunities as vital in the reduction of qat consumption and built a new leisure and educational infrastructure in the province.

### **The Short and the Long Term Outlook**

In the short run, the task of the government should be to limit the most obvious negative effects of qat production and consumption. Actions affecting water use, pesticide contamination and deterioration of family life are those to be addressed first.

Long term, the nation's development goals suggest that a reduction of qat use is desirable, and the necessary substitution and awareness programs should be put in place.

Long and short term strategies do not exclude each other and should be implemented simultaneously in order to effectively address the qat problem. Since qat touches most aspects of Yemeni life, government could form a partnership with civil society and the religious establishment to address this complex issue.



”This drug has had a profound effect on the history of Yemen... there is no individual Yemeni whose life is not affected in profound ways by qat....”

(J. Kennedy)

## 1. INTRODUCTION

### Origins of the Qat Plant

1.1 The origin of qat is still today much disputed. Yemeni oral tradition and a number of early Arab sources suggest that the plant originated from the Ethiopian highlands and was introduced into Yemen around the thirteenth century A.D.<sup>1</sup> It first came to notice at the same time as coffee at the end of the Rasulid era in Ta'iz in the reign of al-Malek al-Mu'ayyad Daud (early fourteenth century). The following story is told:

A Muslim of Abyssinia....went to Yemen and was presented to the king (al-Mu'ayad Da'ud), who accepted him as a friend. The Abyssinian entreated him to ask for a favor, and the king requested some leaves of the qat tree; he forthwith sent someone to Abyssinia who brought back a stalk. This was planted in Yemen and flourished. When the time came to harvest the leaves, the king asked the Abyssinian how the plant was used and he explained to him the effects it produced. On learning that it banished the desire to eat, to drink or to have sexual relations, the king al-Mu'ayyad said: 'And what other pleasures are there in this life except these? I will never eat it! Those three things are all I spend my wealth on; how could I use something which deprived me of just those pleasures I enjoy?'.<sup>2</sup>

1.2 Some Ethiopian sources, however, suggest the drug originated east of the Red Sea, in Yemen. A legend regarding the founding of the Ethiopian city of Harrar attributes a prominent role to the qat plant:

After ”discovering that the air of the new town had a depressing effect on the people and made them tired and very lazy, the council met to discuss the problem. They agreed that the holy... [qat tree] was the cure. A mission of merchants was dispatched to Yemen to fetch the chat [qat], and thus first chat is said to have come to Harrar and indeed to Ethiopia”.<sup>3</sup>

1.3 Also recent botanical evidence supports a Yemeni origin of the qat plant. The much greater abundance of plant varieties of qat found in Yemen than in Ethiopia suggests that the home of the plant is indeed Yemen, from where one or two varieties have at some point made their way across the Red Sea<sup>4</sup>.

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<sup>1</sup> E.g. an early tradition regarding the Arab saint Ibn Alwan living in the 13<sup>th</sup> century, for whom qat was a means to turn away from wine (*Schopen, A. (1977): Das Qat: Geschichte und Gebrauch des Genußmittels Catha edulis Forsk. in der Arabischen Republik Jemen. Wiesbaden, Franz Steiner Verlag, p. 47-49*). Another tradition claims that the saint Ibrahim Abu Zarbita, who became a heavy user of qat in Ethiopia, brought qat to Yemen in the 13<sup>th</sup> century (*Burton, R. (1856): Personal narrative of a pilgrimage to al Madinah and Meccah (Vol. 1). Dover, p. 75*).

<sup>2</sup> *Gaudefroy-Demombynes, 1927, p. 12. Translation of Masalik al-absar fi mamalik al-amsar by Ibn Fadl Allah al-'Umari. Paris, Geuthner (quoted in Weir, S. (1985): Qat in Yemen. Consumption and Social Change. British Museum Publications.*

<sup>3</sup> *Getahun, A. & A. Krikorian (1973): Chat: Coffee's rival from Harrar: Ethiopia. I. Botany, cultivation and use. Economic Botany, 27, p. 354 f.*

<sup>4</sup> *Revri (1983): Catha edulis Forsk. Geographical dispersal, botanical, ecological and agronomical aspects with special reference to Yemen Arab Republic. Göttingen, p. 4.*

1.4 Some even earlier writings dating from the eleventh and twelfth century that describe the qualities of the stimulant for the first time, claim Central Asia as its home, casting some doubt on an origin in the Red Sea area<sup>5</sup>:

Abu Raihan Muhammad ibn Ahmad al-Biruni (973-1051 A.D.) writes in his book on materia medica (*Kitab as-Saidana fi Tibb*) that "al-Qat is something being imported from Turkestan. It tastes sour and is artificially refined ... It is red, it discharges heat. It calms the gall bladder, refreshes the stomach and bowels."

1.5 Another mention of the same Central Asian origin is made by Nagib ad-Din as-Samarqandi (died 1222 A.D.) in his famous book on compound drugs (*Kitab al-Qarabadin*) where he describes the euphoric effects of qat and its ability to give relief from melancholia and depressive symptoms.

1.6 One scholar even holds Alexander the Great responsible for bringing qat to the region, identifying qat with the sacred laurel of Delphi, leaves of which Alexander was reputed to have sent to Ethiopia to cure an epidemic of melancholy.<sup>6</sup>

1.7 Unless more historical and botanical research is conducted, the origins of the shrub cannot be definitely ascertained. Today, however, qat can be found from Yemen to the highlands of Saudi Arabia (Asir region), and even further north in Israel, and in the west from Egypt and Ethiopia as far south as Mozambique and Madagascar (where it is known as *chat*, *miraa* or *marongi*). Trade and migrations have introduced the plant to the maghreb (Algeria and Morocco), and even to the United States, where it is grown in greenhouses.<sup>7</sup> In addition, due to modern air traffic, qat is no longer only used where it is grown. It is exported on a regular basis to a range of European countries, such as Italy, Great Britain and Finland<sup>8</sup>.

## The History of Qat Use

1.8 Qat's original use in Yemen seems to have been as a "tea" amongst Sufis, Islamic mystics, who used it during religious ceremonies to intensify states of trance and to enhance mystical experiences.<sup>9</sup> During the following centuries, the consumption of qat slowly spread to the upper classes. By the sixteenth century, its use was sufficiently prevalent to raise legal and religious concern and to merit scholarly treatments of whether it was licit or not. One of these was the "Authoritative Warning against the Use of Kafta and Qat" (*tahdir al-thiqat al-kafta wa al-qat*) by the sage Ibn Hagar al-Haythemi (died 1567 A.D.). Al-Haythemi reports that some found piety enhanced, happiness increased and energy sustained. In the end, al-Haythemi finds qat undesirable and advises against it, but he affirms that it cannot be classed with *hashish* and cannot be outlawed on grounds of religion and thus be declared *haram*<sup>10</sup>.

1.9 Qat came to the Zaydi highlands of Yemen from the southern uplands much later, but was common there by the eighteenth century. It was first recorded for science by the Danish

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<sup>5</sup> Quoted by Kennedy, J. (1987): The Flower of Paradise. The Institutionalized Use of the Drug Qat in North Yemen. D. Reidel Publishing Company, Dordrecht (p. 60).

<sup>6</sup> Reference to be added by C. Ward.

<sup>7</sup> Giannini et al. (1986): Khat: Another drug of abuse. *J. of Psychoactive Drugs*, p. 157.

<sup>8</sup> E.g. Tacke, U. H. Malinen & H. Pitkanen (1992): Kati - Uusi Huume Suomessa [Khat - a new drug in Finland]. *Duodecim* 108/16: 1390-1394 (in Finnish).

<sup>9</sup> Schopen 1977, p. 52.

<sup>10</sup> Kennedy 1987, p. 68.

disciple of Linnaeus, Per Forsskal, who was a member of Niebuhr's pioneering expedition and who died in Yemen in 1763.<sup>11</sup>

1.10 By the nineteenth century, Yemen's coastal cities with their unfavorable climate for qat cultivation were regularly supplied from the highlands with the stimulant. In 1889 it was reported that "the sole city of Aden receives each year more than 1000 camel-loads [of qat]".<sup>12</sup> By the turn of the century this figure had already doubled,<sup>13</sup> and by 1917 "2500 camel-loads of khat which reach Aden in the course of a year" were counted<sup>14</sup>.

1.11 Since the 1920's travelers have basically called the qat habit "universal" in Yemen. Even though some authors believe that until North Yemen's civil war (1962-1970), the use of qat was a pastime restricted to the upper classes<sup>15</sup>, there are many reports that already in the early twentieth century qat was consumed by all social strata, even in non-qat growing areas, such as Aden.<sup>16</sup> It remained, however, an expensive and occasional habit for most until the 1970s when the consumption of qat exploded. By the mid-1970s it is thought that about three quarters of the population were frequent consumers and regular consumption was common for the first time among both sexes and in all sections and classes of the urban and rural population throughout the country.<sup>17</sup>

1.12 However, despite an abundance of studies conducted on the qat phenomenon since the late nineteenth century, estimates of qat consumption prior to the emergence of the two Yemeni republics in the 1960s are very vague. Comparisons with the present situation are therefore rather limited.

## Qat and Coffee

1.13 The history of qat is strangely tied up with the history of coffee. Both stimulants were consumed in Yemen from about the same time in the fourteenth century onwards.<sup>18</sup>

1.14 This might suggest some purposive linkage. *Wenner* (1991) maintains that both drugs were the outcome of a sufi search for elixirs.<sup>19</sup> In the middle ages, sufis looked for elixirs that would facilitate visions of the godhead. It is reported that Shaykh al-Shadhili (died 1442 A.D.) a famous Yemeni mystic, the reputed founder of Mocha and patron saint of coffee, brought both coffee and qat to Mocha. As a result, al-Shadhili is called *abu zahrayn*, "father of the two flowers". Coffee was for long known as *shadhiliyya*.<sup>20</sup>

1.15 From this early beginning, however, the paths diverged as during the fifteenth century, coffee drinking spread to other parts of the Middle East, becoming popular in Istanbul in the reign of Suleiman I (1520-1566).<sup>21</sup> Coffee came to Europe at the end of the sixteenth century and

<sup>11</sup> *Weir* 1985, p. 27.

<sup>12</sup> *Deflers* 1889, p. 12 (quoted from *Krikorian, A.* (1983): Khat and its use: An historical perspective. In: Shahandeh B. *et al.* (eds.): The health and socioeconomic aspects of khat use, p. 22).

<sup>13</sup> *Zwemmer, S.* (1900): Arabia: The cradle of Islam. New York: Flemming. H. Revell Co., p. 62.

<sup>14</sup> *Moser, Ch.* (1917): The Flower of Paradise. : The Part which Khat Plays in the Life of the Yemen Arab. *National Geographic Magazine*, 32/1917, p. 175/179.

<sup>15</sup> E.g. *al-Barraduni, A.* (1972): Al-Qat. *Al-Yaman al-Jadid*. 3<sup>rd</sup> issue (in Arabic), p. 4.

<sup>16</sup> *Bury, W.* (1915): Arabia Infelix: Or the Turks in Yemen. London: MacMillian Co., p. 152; and *Moser* 1917, p. 174.

<sup>17</sup> *Weir* 1985, p. 87

<sup>18</sup> *Weir* 1985, p. 76.

<sup>19</sup> *Wenner* (1991): Yemen Arab Republic (Full reference to be added by C. Ward)

<sup>20</sup> *Kennedy* 1987, p. 65 and *Wenner* 1991, p. 67.

<sup>21</sup> *Kennedy* 1987, p. 66.

by the end of the seventeenth century the Dutch had broken the Yemeni monopoly by taking the plant to their colonies. Since then, both production and consumption of coffee have been global. Qat, by contrast, has remained a quite local phenomenon, and only in Yemen does it play such a huge role in economic and social life.

1.16 Even the debate about whether the drug was licit or not finds parallels between coffee and qat. There was long a debate in the Muslim world as to whether coffee was *haram* or *halal*. The Ottoman government was apparently frightened by talk in coffee houses,<sup>22</sup> rather as some external observers today find the leisurely social process of qat chewing an unsettling phenomenon.

## 2. QAT IN YEMENI LIFE

### Consumption Levels

2.1 Despite a lack of quantitative data on the development of qat consumption in Yemen, there is a broad consensus among Yemeni consumer and researchers as well as foreign observers that qat was frequently used only by the elite until quite recently. It was generally a luxury or occasional item in most areas.<sup>23</sup>

2.2 The same consensus is that the qat chewing habit has soared to previously unknown levels over the second half of the twentieth century. Qat chewing has become prevalent in all parts of Yemen, even in remote areas where the habit had previously been unknown, or where it was seen as shameful (see below).

2.3 Comparing the scarce data available on qat intake is difficult due to different classifications of chewing. In the literature on qat, chewing is often classified as "occasional", "habitual", "light", or "heavy" without the terms being defined. Despite these obstacles, a comparison between the figures of *Mancioli* and *Parrinello* (1967) obtained between 1955 and 1967 and the estimates of *Kennedy* (1987) dating from the mid 1980s begins to reveal a picture.

2.4 *Mancioli* and *Parrinello* (1967) found that, of the patients they saw in the Taiz hospital where they worked, 90% of the males over the age of 12 chewed qat, but only 60% were "habitual" chewers. For women, the figures were 59% users, with 35% habitual users.<sup>24</sup> In the mid-1980s *Kennedy* (1967) categorizes 80 to 85% of men and 50 to 60% of women of North Yemen as habitual chewers ("chewing more than once per week").<sup>25</sup>

2.5 This shows a rapid rise in the number of habitual qat users. Over the last thirty years qat has thus moved from "leisure" to everyday use.

2.6 Other figures obtained in a 1984 study carried out in the delivery units of hospitals throughout North Yemen are somewhat lower than *Kennedy's* on the extent of qat-chewing among Yemeni women. Of 1141 young mothers questioned in the study, 59% admitted chewing

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<sup>22</sup> *Kennedy* 1987, p. 66.

<sup>23</sup> *Weir* 1985, p. 83.

<sup>24</sup> *Mancioli* and *Parrinello* (1967): Il qat (*Catha edulis*). *La Clinica Terapeutica* 43/2: 103-172. In their nearly 12 years serving in the hospital of Taiz, the two Italian doctors gathered data of qat use from 27,410 patients (15,051 male and 12,359 females).

<sup>25</sup> *Kennedy* points out that "occasional chewers" can not really be called "users", because they only chew at special occasions such as weddings, funerals or holidays (*Kennedy* 1987, p. 77-78).



qat, 38% on a regular basis.<sup>26</sup> The reason for the somewhat lower figures may be due to the study's inevitable exclusion of older women beyond child bearing age, and to the fact that both common sense and medical science would discourage pregnant women from chewing the drug. Also, due to an absence of hospitals in many rural areas it seems certain that city-dwelling women were over-represented in the 1984 study. The study does acknowledge that qat use was found to be more abundant among older women and women from rural areas, than among younger women and those living in towns.<sup>27</sup>

### Factors Influencing the Recent Spread of Qat Use

2.7 The big changes that led to a spread of qat consumption throughout Yemen, through all social strata and both males and females seem to have been in the 1970s. The main factors for this growth of qat use are discussed in the following paragraphs.

(a) **Increase in Wealth.** In the 1970s and 1980s Yemeni workers experienced a steady rise of income; per capita incomes went up from \$62 in 1964 to \$528 in 1982. This increase in incomes was largely a result of the oil price boom of the early 1970s. Although Yemen did not at the time produce oil itself, some 1.2 million Yemenis (about 10 percent of the country's population) migrated to the oil rich Arab neighbor states of Saudi Arabia, Kuwait and the United Arab Emirates with their booming economies. Working in the rapidly expanding construction sector, many Yemenis achieved relative prosperity, and they transferred significant shares of their earnings back home. In 1980, foreign remittances constituted 40 percent of the GNP of North Yemen and 44 percent of South Yemen (\$ 1 billion annually<sup>28</sup>). By the late 1970s virtually every Yemeni family had a relative abroad and thus experienced considerable financial blessings. This resulted in a marked rise in the standard of living and an amelioration of rural poverty<sup>29</sup>. The inflow of foreign exchange fuelled public and private consumption in Yemen, multiplying foreign imports and stimulating consumer demand in the local economy. The chewing of qat, previously an expensive and prestigious pastime, became affordable for large parts of the population. The economic independence and leisure of those who returned from working overseas was the individual reflection of this change in the nation's wealth, and those returning quickly became regular qat chewers.<sup>30</sup>

(b) **Changing Terms of Trade.** The counterpart of the increase in wealth was that subsistence agriculture and the growing of low value cereals became uneconomic in many areas as wage rates went up. Qat cultivation was an excellent alternative in areas where it could be grown, as the return to labor was many times higher. The inflow of resources from overseas stimulated the switch as higher incomes led to higher demand for qat, and the abundance of capital allowed farmers to invest in the switch to cash crops.

Thus many communities have switched from subsistence farming to qat cultivation, supporting a bigger population at higher income levels. Old men will recall a time when qat farming was seen as a luxury and even as a waste of vital resources. In those days,

<sup>26</sup> Eriksson, Ghani & Kristiansson (1991): Khat-chewing during Pregnancy-effect on the off-spring and some characteristics of the chewers. *East African Medical J.* 68/2, p. 107.

<sup>27</sup> Eriksson et al. 1991, p. 109.

<sup>28</sup> Okruhlik, G. & P. Conge (1997): National Autonomy, Labor Migration and Political Crisis: Yemen and Saudi Arabia. *Middle East J.* 51/4: 554-565 (p. 556); and Addelton, J. (1991): The Impact of the Gulf War on Migration and Remittances in Asia and the Middle East. *International Migration* 29/4, p. 511.

<sup>29</sup> Richards, A. & J. Waterbury (1996): A Political Economy of the Middle East, 2nd ed. Boulder, CO, Westview Press, p. 386.

<sup>30</sup> Weir 1985, p. 87.

qat planters did not enjoy much prestige. This has changed completely nowadays, and many qat farmers are respected and prosperous, and belong to the economic elite.

- (c) **Crop Qualities of Qat.** The characteristics of the qat tree made it the crop of choice for many farmers who were switching from subsistence to cash crop farming. Qat is more drought tolerant than other crops, it needs less labor input, it has an easy and cheap way of reproduction (root and stem cuttings, suckers), and it can be harvested in many months of the year. This greatly increases the profitability of production for farmers.
- (d) **Development of Tubewell Irrigation.** The tubewell and tubewell irrigation were introduced into Yemen in the 1970s. The ease with which controlled irrigation could be developed from groundwater once the technology and capital for tubewells were available facilitated the spread of qat. Many new areas came into production, particularly in the more arid plateau region of the central highlands, where qat had previously been rarer, but where tubewells now provided the water.
- (e) **Development of the Transport Infrastructure.** Qat has to be chewed fresh, usually within 24 hours of harvest.<sup>31</sup> Prior to the development of a modern infrastructure, the lack of reliable roads and air transport permitted only scant and infrequent qat supply to many non-qat growing regions. Qat was transported over distances - for example, from the Taiziyyah to Aden by camel caravan - but the high cost and infrequent supply inevitably limited consumption. The rapid development of the transport network over the last three decades has allowed qat to be transported from farm to market more readily, even to remote areas where qat chewing was previously unknown, such as the north-eastern desert province of Marib.<sup>32</sup>
- (f) **Changing Structure of Yemeni Life.** The qat boom was also at a time when a new phenomenon appeared for most Yemenis - wage employment. Wage employment assured more economic security and provided a steady flow of cash, rather than intermittent proceeds of farming.<sup>33</sup> This enabled Yemenis for the first time to have the cash in their pocket to buy qat regularly.

Women, too began enjoying qat on a larger scale. They had more leisure, being somewhat released from chores by machines. With the gradual opening up of Yemen to the outside world, it also became socially more acceptable for women to chew.

## What Happens in a Qat Chewing Session

2.8 Qat strongly influences and structures daily activity. Preparations for chewing begin well before the actual qat sessions and a fair amount of energy and thought are devoted to them. It is believed that the quality of the qat<sup>34</sup> has effects on the amount of pleasure (*keif*) derived from chewing, so buying qat is an important and time consuming ritual. Choosing qat and bargaining for it is a daily challenge to manhood. The preparation of the body for chewing is also a serious

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<sup>31</sup> Since the active ingredients of qat are shortlived, the leaves lose their stimulating abilities within two days of harvesting.

<sup>32</sup> Due to two factors qat-chewing was previously not practised in Marib. The hot and arid climate and the low altitude made cultivation impossible. The instability of the active components of the plant, that loses its stimulant qualities within two days after harvesting, prevented export to this remote region.

<sup>33</sup> Weir 1985, p. 90.

<sup>34</sup> The Yemenis devote much time to picking the right bundle of twigs with as many young and tender leaves as possible. True connoisseurs of qat know that quality is also determined by season, area of origin (sort), age of leaves, part of the plant where the twigs are taken from, the color of the leaves, and last but not least, the nature and frequency of water supply of the qat fields (rainfed qat is preferred over irrigated).

matter. Traditionally, the body was dehydrated by excessive exercise or perspiration in the damp heat of a Turkish bath, which was said to intensify the stimulating effects of qat. Today, however, a large hot and greasy meal is generally taken instead. This is believed to limit the unwanted gastrointestinal side-effects of qat, such as digestive problems or constipation (see below)<sup>35</sup>. Also the choice of place preoccupies the qat chewer, since poor company can easily ruin a whole afternoon.

2.9 In order to carry out this lengthy preparation process, many businesses close at around 1 p.m. only to open again for a short time in the evening hours. Until recently, also government offices would close at 1 p.m. and resume work only the following morning (see below). By two or three o'clock most Yemenis are already comfortably seated in the *mafraj*,<sup>36</sup> a room built and designed for the sole purpose of accommodating the chewing sessions. There are few dwellings in Yemen that lack this accessory. Located traditionally on the top floor, it overlooks with its tall windows the city or village and is meant to stimulate in itself an atmosphere of relaxation and contemplation.

2.10 Qat leaves are masticated and then stored in one cheek. After several hours of chewing, this can result in a considerable ball of mashed leaves. This mash is, however, never swallowed, as occasionally observed in Eastern Africa<sup>37</sup>. In Arabic the verb *khazzana* (to store)<sup>38</sup> is therefore attributed to this popular pastime. Large amounts of sweetened water are drunk to make up for the dehydrating effect of qat and the juice of the leaves is thereby ingested. Tobacco smoking (mostly waterpipe) completes the ritual and is said to enhance the pleasure.

2.11 Such qat sessions (*majlis al-qat*) may well last up to five hours and are characterized by three phases. In the early phase, often marked by laughter, and by loud and vivid conversations, an extroverted atmosphere prevails. Jokes are told, news and gossip are passed on. After two hours a climax is reached, often accompanied by a high level of mental concentration and group communion with a focus on a single topic ("a psychic group process"<sup>39</sup>). However, after this "hour of wisdom" (*sa'a Sulaimaniyya*) the sound level falls rapidly and participants gradually turn to low-voiced conversations and often want to be left alone to retreat into introverted reflections, whether of a positive or a negative tone. These circumstances are not only stimulated by the effects of qat, but also by a general fatigue following the often euphoric discussions. Kennedy (1987), however, points out that this state cannot be legitimately called "depression" as some authors would have it. "... the chewer does not feel less stimulated; there is rather a turning inward of racing ideas and plans that may be too rapid to be shared".<sup>40</sup>

2.12 The chewing sessions, however, do not only provide a social framework for entertainment. Besides scholarly debates on legal or theological matters, the arrangement of marriages, or arbitration of disputes, most of Yemen's business and politics also take place during qat chewing. The participation in chewing sessions as well as the choice of the right chewing companions can therefore be a key to personal success.

<sup>35</sup> 95% of Yemenis taking part in Kennedy's survey said they eat large meals before qat sessions to nullify at least some part of these effects (see Kennedy 1987, p. 81 f.).

<sup>36</sup> The word *mafraj* derives from the verb *faraja*, meaning "to dispel grief or anxiety" and so to mean "place of relaxation or relief".

<sup>37</sup> See Kennedy 1987, p. 88.

<sup>38</sup> The french word *magasin* (shop, store) and *magazine* (a publication "storing" information) derive from the same Arabic root. The Arabic *makhzan* is simply a store room.

<sup>39</sup> Kennedy 1987, p. 90; and Schopen 1978.

<sup>40</sup> Kennedy 1987, p. 92.

## Sociology of Qat Sessions

2.13 Qat sessions are relatively open and informal, and so political information and often also high government officials become accessible to virtually everyone<sup>41</sup>. This open quality seems to have diminished over time. In the past, sessions could attract anyone, and in rural areas often the whole community may still gather. Urban sessions these days attract people with a much smaller range of social positions. "As money has been displacing the criterion of descent as a measure of status, and as education has increased, the tendency to gather with peers in qat sessions has increased... people tend to choose the less stressful and more convivial company of those similar to themselves in status and interests."<sup>42</sup> The choice of seat in the *mafraj* is, however, still determined by the status of each individual within the group and the best positions are occupied by the host, his closest friends and any older person or more important guests. Their seats "face the windows, and later, as the sun is setting [they] are in the best positions to contemplate the beauty of the changing landscape outside"<sup>43</sup>.

2.14 Qat seems to have changed the ways in which Yemenis spend their leisure time. *Weir* (1985) traces this process of change in the old pleasures of Yemeni rural life, especially dancing.<sup>44</sup> People used to dance in the afternoons - now they go to qat parties.<sup>45</sup>

2.15 In general, before the qat boom, the majority of Yemenis socialized in a simple informal manner with a limited range of associates, whilst the rich had formal, lavish gatherings. Qat parties have replaced both.

2.16 Amongst countries in which qat consumption is widely spread, such as Somalia, Djibouti, Ethiopia and Kenya, only in Yemen has qat chewing developed into a social pastime; in East Africa it is more of a solitary activity. This social quality is reproduced amongst chewers of Yemeni descent in migrant communities abroad, such as in Great Britain, Italy, or Germany, where qat sessions have become a means of supporting cultural identity<sup>46</sup>.

2.17 A phenomenon as strange and as pervasive as the social qat gatherings unique to Yemen, plainly demands a sociological and anthropological explanation. The role of the qat party in Yemeni life has been variously analyzed as: an emblem of social interaction; a group communion; a manifestation of commitment and conformity; a display of reciprocity; an opportunity for conspicuous consumption; and a venue for social competition (with the poor excluded, the middle income able to participate, but to a lesser extent than the rich).<sup>47</sup> *Weir* (1985) summarizes: qat parties are the central social ritual of everyday life in Yemen and they are the stage on which much social change is played out. Money is driving this social change - specifically the admission of the new rich to the social elite - and qat parties, made possible by new money, help that social change to happen. People go to qat parties under "the push of personal ambition and the pull of social pressure"<sup>48</sup>.

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<sup>41</sup> *Kennedy* 1987, p. 91.

<sup>42</sup> *Kennedy* 1987, p. 85.

<sup>43</sup> *Kennedy* 1987, p. 86. The host must not necessarily sit in the best position, which is often given to a special guest of high rank or a visitor from out of town (*ibid.*).

<sup>44</sup> Yemen knows two forms of dancing, the formal ritual dance (*bara'a*), which is "obligatory", and dancing for pleasure (*li'ba*), which is up to the individual and would present a chance to form bonds of friendship etc.

<sup>45</sup> *Weir* 1985, p. 143.

<sup>46</sup> *Griffith et al.* (1997): A transcultural pattern of drug use: qat (*khat*) in the UK. *British J. of Psychiatry* 170, p. 283.

<sup>47</sup> *Weir* 1985, p. 150.

<sup>48</sup> *Weir* 1985, p. 144.

## Qat and Women

2.18 Qat chewing among Yemeni women is found to be somewhat less than among men. *Mancioli & Parrinello* (1967)<sup>49</sup> and *Kennedy* (1987)<sup>50</sup> mention up to 90% of men as chewers (habitual and occasional) compared to up to some 60% of Yemeni women. Chewing is not a family habit at all. Men and women always chew separately, but sharing is common. Many men bring qat home for themselves and their wives.

2.19 The earliest mention of qat chewing among women was made in 1900. *Zwemmer* observed that qat is "used by every mother's son as well as by the mothers themselves"<sup>51</sup>. Despite not being reported prior to this date, it is likely that women always chewed the stimulant, although on a smaller scale than men. The absence of information on women's chewing might be attributed to the fact that all visitors to Yemen reporting on this habit in the past centuries have been men, with little, if any access to the veiled women's world that characterizes Yemen until today.

2.20 Among the tribes of the Zaydi dominated northern highlands around Sa'ada qat chewing was until very recently regarded as shameful ('*aib*) for both sexes<sup>52</sup>. Qat consumption has gradually become accepted for men in the region over the past two decades, but it is still regarded as undesirable for women even today.

2.21 In most parts of Yemen chewing was traditionally regarded as shameful for unmarried women. This has changed especially in the towns, where qat chewing has become the fashion for young people of both sexes.

2.22 Unlike many other agriculture products, qat is a man's crop. All the work on production and on selling is done by the man, with the local exception of *Jebel Sabr* near *Taiz*, where women have taken on qat marketing.<sup>53</sup> It is also men who buy the qat in the market. Only the *akhdam* community, tracing its roots back to Eastern Africa, is an exception. Here the family is headed by women who buy qat for the whole family or give their husbands an allowance to buy qat for themselves.<sup>54</sup>

## Qat and Income

The share of qat in the family budget is still not clear but is evidently considerable. In most areas of Yemen, qat consumption affects the family budget and limits financial resources for other basic needs and services, such as food, medication, clothing and schooling. A 1972 study on the old city of *Sana'a* suggested that by that time 10 percent of income was spent on qat. At that time, 1kg of meat cost about the same as a *robta* (bundle) of qat. In *Kennedy's* 1987 survey "poor heavy users" spent more on qat than on food.<sup>55</sup>

2.23 The cost of qat has been falling in terms of purchasing power. In 1970, a bundle of qat cost the equivalent of the daily unskilled wage, but by 1980, the cost was equivalent to only half the unskilled wage.<sup>56</sup> In 1998, qat could be purchased for Yemeni Rials (RIs.) 100-400 (low

<sup>49</sup> *Mancioli & Parrinello* (1967): Il qat (*Catha edulis*). *La Clinica Terapeutica* 43/2: 103-172.

<sup>50</sup> *Kennedy* 1987, p. 78.

<sup>51</sup> *Zwemmer, S.* (1900): Arabia: The Cradle of Islam. New York, Fleming, p. 62.

<sup>52</sup> *Kennedy* 1987, p. 76

<sup>53</sup> *Mundy, M.* (19.....) ....., p. 78 (Full reference will be added by C. Ward).

<sup>54</sup> *Lenaers & Gatter* (1999): Qat and its Impacts on Nutritional Balance and Family Life in Yemen. With a Special Reference to Low Income Segments of Society. Report of the World Bank Resident Mission, Yemen.

<sup>55</sup> *Kennedy* 1987, p. 167.

<sup>56</sup> *Weir* 1985, p. 89.

grade, depending on season) against unskilled wages of Rls. 400-800 a day; thus qat could by then be purchased for as little as a quarter of the unskilled wage. Despite this rise in purchasing power, there is hardly any Yemeni family that has savings at its disposal. As soon as money enters the household it is spent. Qat must be seen as one of the reasons for this.

2.24 The 1992 Household Survey shows that in almost all except the desert governorates, qat consumption ranked second only to animal products (meat, eggs, dairy, fish) in household budgets. The same holds true for both rural and urban populations, and for all income level except the very highest. Qat occupies 5-10 percent of total household expenditure at each income level (tables 2-4).

**Table 1: Qat in the 1992 Household Budget Survey: Average Monthly Expenditure per Capita for each Expenditure Category**  
(in Yemeni rials, 1992 values)

Expenditure level	wheat	flour	bread	rice	other cereals	pulses	vegetab. & fruits	Animal production	sugar	<b>Qat</b>	education	health
0-499	14	11	11	13	10	8	41	67	16	<b>23</b>	4	5
500-999	22	22	18	29	23	17	82	145	34	<b>69</b>	11	14
1000-1499	39	37	20	45	31	25	121	237	58	<b>123</b>	19	26
1500-1999	53	44	23	62	46	37	164	335	83	<b>183</b>	25	39
2000-2999	76	58	26	83	56	51	215	456	120	<b>263</b>	34	53
3000-3999	105	72	38	102	104	66	286	615	184	<b>364</b>	45	82
4000-4999	111	95	37	147	129	75	377	767	232	<b>440</b>	46	116
5000-5999	151	116	42	200	149	97	400	897	287	<b>579</b>	94	114
6000-6999	143	96	48	172	212	89	535	972	271	<b>715</b>	76	225
7000-7999	225	104	35	215	325	130	564	1143	417	<b>783</b>	92	140
8000-8999	128	130	46	216	306	301	508	1324	371	<b>815</b>	75	522
9000-9999	172	131	85	194	214	98	691	1332	228	<b>630</b>	107	871
10000+	450	234	85	428	496	219	1208	2351	743	<b>1074</b>	202	1780

**Table 2: Qat in the 1992 Household Budget Survey: Average Monthly Expenditure per Capita for Rural and Urban Areas**  
(in Yemeni rials, 1992 values)

Expenditure level	wheat	flour	bread	rice	other cereals	pulses	vegetab. & fruits	Animal production	sugar	<b>qat</b>	education	health
Urban	43	40	33	72	38	42	205	405	99	<b>228</b>	32	74
Rural	108	68	6	67	112	41	148	324	117	<b>174</b>	22	66

**Table 3: Qat in the 1992 Household Budget Survey: Average Monthly Expenditure per Capita by Governorate**

(in Yemeni rials, 1992 values)

Expenditure level	wheat	flour	bread	rice	other cereals	pulses	vegetab. & fruits	Animal production	sugar	qat	education	health
Ibb	72	47	6	43	60	54	108	256	94	<b>165</b>	17	42
Abyan	34	67	15	78	36	20	213	371	102	<b>142</b>	19	24
Sana'a city	44	40	35	43	31	52	224	453	107	<b>305</b>	44	132
Al-Baida	39	43	18	39	29	53	157	396	89	<b>220</b>	21	21
Taiz	92	45	27	62	93	48	150	338	108	<b>217</b>	38	110
Al-Jawf	264	105	1	146	38	66	218	568	108	<b>140</b>	4	30
Hajjah	54	180	9	54	219	41	220	452	113	<b>230</b>	25	112
Al-Hodeida	10	31	32	57	59	21	171	262	76	<b>212</b>	32	67
Hadramaut	71	24	15	184	33	19	162	421	108	<b>24</b>	15	23
Dhamar	110	56	2	32	47	34	116	260	104	<b>216</b>	12	40
Shabwah	152	72	5	104	46	25	123	502	234	<b>143</b>	18	39
Sa'ada	198	57	25	77	87	52	317	582	130	<b>297</b>	42	46
Sana'a gvte	108	38	1	34	96	54	119	262	74	<b>139</b>	29	24
Aden	8	27	49	88	21	32	265	450	82	<b>206</b>	18	30
Lahj	78	101	18	119	74	73	191	532	184	<b>291</b>	25	104
Mareb	354	117	12	180	159	84	320	934	386	<b>508</b>	50	159
Al-Mahwit	117	87	7	37	67	48	135	200	109	<b>191</b>	23	23
Al-Mahrah	76	121	16	239	152	74	324	565	179	<b>63</b>	67	50

Source: Household Budget Survey 1992

2.25 Despite the lack of data prior to the 1970s it is quite certain that the share qat occupies in the family budget has increased over the past decades. Nonetheless anecdotal evidence suggests that even in the early twentieth century in some areas of Yemen the share of qat already enjoyed quite a prominent role in family expenditure: *Bury* states on the eve of World War I that qat "permeates every class that can afford it, and many that cannot, for sometimes a man will starve himself and his family to get it".<sup>57</sup> *Moser* (1917), formerly American Consul to Aden, reports in 1917 that "a coolie who earns 30 cents per day spends 10 cents of it for the support of his family and the rest for khat".<sup>58</sup>

2.26 A recent small scale survey suggests that the 1992 Household Budget Survey greatly understates the importance of qat in family expenditures. In this survey, results show an average family spending as much as 28 percent of its income on qat.<sup>59</sup> Regional and rural-urban differences were found, but figures never dropped below 23 percent. In some areas, such as the coastal plain of the Tihama, the share spent on qat was even as high as 33 percent of financial resources available to a family each month. The share was lower in qat producing areas such as Mahwit (see table 1) since market prices are lower and many families, even if they are not qat farmers, plant some qat on their land for home consumption.

2.27 The survey results also showed that consumption is lower in non-qat growing areas in the southern parts of the Yemen. The reason for lower consumption in the southern governorates is partly due to distance from the growing regions, and consequent higher prices. There is also a difference of attitude as the qat habit has not yet become so deeply rooted there. Until unification

<sup>57</sup> *Bury* 1915, p. 152 quoted in *Kennedy* 1987, p. 75.

<sup>58</sup> *Moser* 1917, p. 174.

<sup>59</sup> *Lenaers & Gatter* 1999.

in 1990, qat consumption in PDRY was limited by law to weekends. Thus the share spent on qat in Aden is 23 percent of household expenditures (still a considerable amount).

**Table 4: Household Expenditure in Four Areas of Yemen (in Rls.) and Expenditure Share of Qat (in Percent) in 1999<sup>60</sup>**

	Aden	Sana'a	Mahwit	Tihama	Average
Food	5000	5500	4000	4500	4750
<b>Qat</b>	<b>3000</b>	<b>4000</b>	<b>2500</b>	<b>3500</b>	<b>3250</b>
Cigarettes	1000	1000	1000	1000	1000
Medication	800	700	600	1200	825
Electricity & Water	2500	2500	1000	-	1500
Others (schooling, clothing, etc.)	500	450	250	300	375
Total	12800	14150	9350	10500	11700
<b>Qat Expend. (%)</b>	<b>23.4</b>	<b>28.3</b>	<b>26.7</b>	<b>33.3</b>	<b>27.8</b>

### Qat and Wealth

2.28 Qat is an item of conspicuous consumption. As *Weir* (1985) says, "people pay not as little as they can but as much as they can afford". Modern Yemen is described as a culture where cost information is the main way of 'placing' someone socially. The result of this "pecuniary consciousness", as *Weir* (1985) calls it, is that "the greater your cash resources, the greater your potential for being effective and powerful".<sup>61</sup> "The poor are never capable of operating in the systems of power and influence controlled by the rich... because they do not have the money to buy influence, nor the influence to be paid money".<sup>62</sup> On this view, qat quality and quantity is a way of ranking in a fast-changing society.

2.29 Certainly, qat consumption is a useful indicator of disposable income. People may inspect the new arrival at the qat party and appraise the virtue and cost of his qat. By extension, qat consumption is a means of judging and reporting on character. The man of whom it is said "he doesn't chew" is unsociable. The man who buys qat beyond his means is a spendthrift, and not a good family man. *Weir* (1985) calls this aspect of qat "a metaphor for excess behavior".<sup>63</sup>

### Yemeni Views of Qat

2.30 The generalization and "institutionalization" of qat use is a probably irreversible fact of Yemeni life. Qat is legal, and its use is nearly universal, and surrounded by custom and etiquette.

<sup>60</sup> Based on *Lenaers & Gatter* 1999 (the table lists the expenditures per household as reported by women in four areas of Yemen. The figures, *Lenaers & Gatter* write, must be approached with some caution since 20 % of the women, who were the target population of this study, did not know how much money was spent and earned. The majority of the remaining 80 % were not responsible for the household budget and were therefore less likely to know about income and expenditure).

<sup>61</sup> *Weir* 1985, p. 99.

<sup>62</sup> *Messick* quoted in *Weir* 1985, p. 165/6.

<sup>63</sup> *Weir* 1985, p. 164.



The plant has deeply influenced daily life, culture, politics, and even the architecture of Yemen. It today pervades the whole economic, social and psychological fabric of the country.<sup>64</sup>

2.31 Qat has never been prohibited in Yemen on religious grounds apart from a brief period in the sixteenth century. There is however, a constant concern with the "ritually polluting aspects of spermatorrhea" (see also the chapter on Qat and Health).<sup>65</sup>

2.32 From the earliest times in the southern uplands, qat had the "stamp of approval of the ruling class". It was at once noble and prestigious, and touched with religious associations.<sup>66</sup> This was not, however, the case in the Zaidi highlands, where even today there is some resistance to the "tree of the devil" (*shajarat iblis*).

2.33 There has been a tradition, never strong but persistent, of official criticism of the qat habit. Under the British, articles critical of qat appeared in Adeni periodicals, from the late 1930s.<sup>67</sup> The Imam Yahya had eulogized qat in a famous poem, so for a brief period during the revolutionary struggle in the north, qat became a focus of opposition. For example, the activist Zubayri wrote "the devil takes the shape of the qat tree".<sup>68</sup> *Said al-Attar* (author of *Le sous-développement de Yemen*), calculated that 2 million hours per day were "wasted" on the drug. In 1961, *al-Mahi* wrote:

"The loss of hours incurred by qat in the working life of the nation is a matter of grave import. It constitutes a serious handicap in any process of economic development of agricultural or industrial type where the development process depends on the index of productivity".<sup>69</sup>

2.34 This attitude took political shape in the campaign against qat mounted in 1972 by Mohsen al-Aini, Prime Minister under the modernizing President al-Hamdi. Al-Aini banned use of qat in public buildings, prohibited *qat* on *waqf* land, and initiated a propaganda campaign - radios, newspaper, poems, skits. Journals like *al-Yaman al-Jadid* devoted a whole issue to qat, arguing that it was bad for the health. Attention was galvanized by this campaign. Producer attitudes were defensive, often hostile. One extreme can be summed up by what one Wadi Dahr farmer was reported by *Obermeyer* in 1973 as saying: "People need qat...if anyone, even the Prime Minister, tries to take even one tree of mine, I will kill him. I am willing to die under one tree!".<sup>70</sup> Al-Aini left office within three months, and the experiment was abandoned.

2.35 Nowadays, Yemenis are generally satisfied with the qat habit - and modestly proud of its "Yemeni-ness" before foreigners. For them the most important features are the sociability and intercommunication of qat. They see it as a social habit, not an addiction.<sup>71</sup> There is nonetheless a certain ambivalence, even a little shame, in popular attitudes. *Kennedy* (1987) saw a spread of negative feelings from the media. But in general the habit is now seen as quite banal. Everybody does it, whether gladly or reluctantly. However, in answer to a survey question put by *Kennedy's* team 'Do you want your children to chew qat', the answer was a resounding *no!*<sup>72</sup>

<sup>64</sup> *Kennedy* 1987, p. 79 and 100.

<sup>65</sup> *Weir* 1985, p. 65.

<sup>66</sup> *Weir* 1985, p. 79.

<sup>67</sup> *Kennedy* 1987, p. 20.

<sup>68</sup> *Weir* 1985, p. 66.

<sup>69</sup> *El-Mahi* (1961): A preliminary study on khat - together with the institutional history of coffee as a beverage in relation to khat. World Health Organization, Regional Office for the Eastern Mediterranean, WHO document EM/RC 11/10 MS., p. 16.

<sup>70</sup> *Kennedy* 1987, p. 233.

<sup>71</sup> *Weir* 1985, p. 68.

<sup>72</sup> *Kennedy* 1987, p. 238.

## Foreign Views of Qat

2.36 Early references to qat by westerners were not unfavorable (e.g. *Niebuhr* 1776, *Botta* 1837).<sup>73</sup>

2.37 *Doreen Ingrams* was more censorious : "[qat] sessions inspired a great deal of talk but no action and I saw no possibility of Yemen developing into a prosperous modern country so long as qat was allowed to exhaust the people's talents and sap their vitality".<sup>74</sup>

2.38 *Dresch* sums up these later less relaxed views: "Foreign writers have produced a tradition of mildly pompous condemnation (of qat)", *Dresch* advances his own view that the *muqeel*, the "conversational gathering" around qat, is "thoroughly civilized".<sup>75</sup>

2.39 Official international attitudes are generally negative. For example, in 1980, the United Nations Division of Narcotic Drugs in Vienna published a special issue of the Bulletin on Narcotics devoted to qat. With regard to social and economic effects of qat use, the report concluded that:

"The literature on social and economic effects of qat use suggests that it contributes to family instability because of the economic drain on family resources and the absence of the father from participation in family life. Work productivity is said to be reduced as a result of absenteeism, tardiness and depressed mood of qat chewers. Finally, there may be a serious economic balance-of-payments problem in those countries where qat imports account for the loss of a sizeable portion of the national income".<sup>76</sup>

## 3. III. ECONOMIC ASPECTS OF QAT

### General Economic Importance

3.1 Over the past three decades qat has become the major agricultural crop of Yemen, and certainly its most lucrative one, replacing sorghum and coffee in many areas. Qat secures profits up to ten times as high as those achieved by cultivating other crops.<sup>77</sup>

3.2 Estimates suggest that the cultivation of qat uses 100,000 hectares, including about 25 percent of the groundwater irrigated land<sup>78</sup> and using about 30% of the irrigation water.<sup>79</sup> However, these figures are simply guesses and need to be verified by proper study. The explosion in qat demand, has increased the incentives to use water, and much qat is grown on mined groundwater, using up the nation's water capital. Qat's profitability can even justify irrigation by tankered water (at a cost of over US\$1/m<sup>3</sup>). The profitability of qat is increased by the government's general promotion of irrigated agriculture and by the import ban on qat.

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<sup>73</sup> See *Weir* 1985, p. 54-55.

<sup>74</sup> *D. Ingrams* Quoted in *Weir* 1985, p. 58.

<sup>75</sup> *Dresch, P.* (19..): ... p. 20. Full source will be added by C. Ward.

<sup>76</sup> *United Nations* (1980): Bulletin on Narcotics: Special Issue Devoted to *Catha edulis* (Khat). *Bulletin on Narcotics* 32/3, p. 91.

<sup>77</sup> *Deutschlandradio* Sept. 12, 1998, 13:30 h. "Qat" a report by Heiko Hümen.

<sup>78</sup> Agricultural Statistics Pamphlet 1998, General Department of Agricultural Statistics and Documentations, Ministry of Agriculture and Irrigation, Republic of Yemen, p. 14. Irrigated land accounts for about 24% of Yemens cultivated agricultural land (UNDCP 1995, Development and Cooperation: Yemen, p. 16).

<sup>79</sup> *Deutschlandradio* Sept. 12, 1998, 13:30 h. "Qat" a report by Heiko Hümen.

3.3 Qat production can be said to be responsible for a number of positive developments in Yemen. While it can have harmful social and health impacts, for the farmer it can also represent the same motor of the rural economy that another mild stimulant, coffee, represented in the seventeenth century. Employing large numbers (estimates run as high as half a million people, which is equivalent to almost 20 percent of Yemen's workforce)<sup>80</sup> the qat sector has kept alive the agricultural economy, has limited rural to urban migration, and kept the people tied socially and economically to their small rural communities.<sup>81</sup> Qat thus contributes to keeping the rural economy alive, and to avoiding the problems of over-rapid urbanization.

3.4 These positive macro level effects are confirmed by the findings of some micro level research<sup>82</sup> conducted in a rainfed area. Findings indicate that up to 80% of qat revenues can remain in the local community; that qat production and trading units are usually small (i.e. no "qat barons"); that qat does not usually displace coffee, but rather the low value grain crops; that qat producing areas can buy in their food from surrounding areas, thus stimulating agriculture in areas that can produce grain and fruit but not qat; that qat has helped to sustain the terrace system with beneficial effects on watershed management (reducing soil erosion and helping infiltration of rainwater); and that qat revenues may be used by communities to finance other rural development (e.g. opening roads, electrification)...

3.5 Despite much research there is still an urgent need to better document qat, before problems associated with it can be properly identified. This is especially true for the role of qat in Yemen's economy and for its importance in the rural production areas.

## Production Volumes

3.6 Despite qat's prominence in Yemen's economy there is a total lack of reliable information at the macro level, and the official statistics are highly dubious. The production statistics (see Table 5) would show that **all** cash crops have expanded their area and increased their production. But it is the cultivation of qat that has grown explosively. Probably these figures are no more than orders of magnitude - but they serve to show that qat is a huge phenomenon.

**Table 5: Production of Grapes, Coffee and Qat during 1970-1995<sup>83</sup>**

Crop/Year	1970	1975	1980	1985	1988	1989	1990	1991	1992	1993	1994	1995
Grapes (000'ton)	n.a.	n.a.	56	81	133	135	142	139	145	144	146	151
Coffee (000'ton)	5	4	5	5	6	7	7	5	8	9	8	9
Qat (mil. Bundle)	35	145	352	387	440	484	516	536	556	570	583	596

## Qat in GDP

<sup>80</sup> *Economist Intelligence Unit* (1995): Oman and Yemen 1996-96, p. 57.

<sup>81</sup> *Weir* 1985, pp. 83-108.

<sup>82</sup> *Weir* 1985, pp. 83-108.

<sup>83</sup> Source: Agricultural Statistics Office. The *rubta* (bundle) weight varied from one place to another depending on the type of Qat. For example, the weight of one bundle of al-Udee or al-Dalee types is in the range of 25-100 grams, while the weight of one bundle of al-Sahbani or al-Muktari types is in the range of 250-750 grams.

3.7 Using the official production statistics, it is possible to estimate the value of qat production and its share in GDP. In fact the numbers do more or less match up with reported yields and hectarages (see calculations 1 and 2 below). And the numbers, when calculated, are enormous - \$ 2 billion a year in retail value, equivalent to 30% of GDP; and farm gate value of \$ 640 million, equivalent to two thirds of the rest of agriculture put together (agriculture value added in 1995 was \$1,053 million)

**Calculation 1: qat value assuming 596 million bundles in 1995 (MAI data)**

- 5 million users twice a week = 10 million bundles a week
- 10 million x 52 weeks = 520 million bundles a year (roughly matches 596 million bundles (see table 5))
- 520 million bundles at \$4 per bundle = \$2 billion a year retail value of qat

**Calculation 2: qat value assuming 89,000ha of qat grown in 1995 (MAI data)**

- 89,000ha (see Table 9 below) at 7,200 bundles/ha = 640 million bundles (roughly matches 520/596 million bundles)
- 640 million bundles at Rials 100 per bundle = \$640 million a year farm gate value of qat

3.8 However, skepticism should be exercised, as household budget data (see section on ‘Qat and Income’ above) suggest that qat expenditures are in the range of 10-30% of incomes, which would suggest that 30% of GDP is an extreme (high) estimate. The EIU did estimate qat as 25% of GDP some years ago (Table 6), but the source is not clear.

Agriculture (excluding Qat)	16 %
Qat	25 %
Industry	18 %
Services	41 %

### **Profitability of Qat**

3.9 The profit margins of qat are good, since production costs and taxes usually amount to no more than 30-50% of sales proceeds. The crop budgets prepared as part of the agriculture strategy exercise by the Ministry of Agriculture and Irrigation in 1998 reflect this profitability<sup>85</sup> Under varying husbandry systems, gross margins are reported at between Yemeni Rials (Rls.) 400,000 (\$3,100) and Rls. 600,000 (\$4,700) per hectare. Returns to water are estimated at Rls. 30-40/m<sup>3</sup>, and returns to family labor at Rls. 2,300-2,500/day. These figures are all superior to returns on other crops in the same agroecological zone.

<sup>84</sup> *Economist Intelligence Unit* (1995): Oman and Yemen 1996-96. See p. 57 for qat figures.

<sup>85</sup> Yemen: Agriculture Strategy Note, World Bank September 1999

3.10 Calculations for the Sana'a basin show the even higher profitability of the crop in the vicinity of the very rich market in the capital. It was found that an average of 90 percent of the sales as net profits was typical for the Sana'a area. On this basis, net profits range from Rls. 400,000 to 1,800,000<sup>3</sup> per hectare (\$2,500-11,000).<sup>86</sup>

3.11 The words of a qat farmer of the Sana'a basin show what a high prestige this crop enjoys: "Qat is like a safe. Whenever I want some money all I have to do is irrigate several times, spray some pesticide and within two weeks it is ready for harvest."<sup>87</sup> Several plastic bags of chewable qat leaves (gadal) picked from a number of trees can be sold to cover a day's expenses for a typical rural household.

### **Political Economy - Who Benefits**

3.12 In such a wealthy system, it is clear that qat creates fortunes, and with it vested interests.<sup>88</sup> These are, however, not really documented. It could be guessed that qat farmers, qat traders and the officials connected with qat taxation have a strong interest in preserving the current laissez-faire, and that any business worth such a large share of GDP will have excellent connections within the establishment. There is also no information on how qat money is linked to the flourishing arms trade in Yemen and, thus, to the problems of security in many parts of the country.

3.13 Anecdotal evidence of vested interest behavior can be gathered from incidents like the frustration of the plan by Prime Minister al-Aini in the 1970s to allow qat imports. This was countered by some tribal leaders with the threat to shoot down planes carrying qat to Yemen. In fact, there was highly effective opposition to the whole range of initiatives of Prime Minister al-Aini to restrict qat consumption and production in the 1970s, which may have contributed to his fall.

### **Qat Taxation<sup>89</sup>**

3.14 There is a consumption tax of 20% on qat sales, collected at the point where qat enters urban areas. The actual yield is vestigial compared to what is due and evasion is pervasive. Recent collection figures are under Rls 1 billion a year, against a theoretical assessment of Rls 60 billion (Rls 300 billion retail value at 20% tax rate). See Annex 8 for more details.

3.15 In 1986 an IMF mission reviewed the problems associated with taxing qat and made a number of recommendations for controlling distribution and marketing in order to collect the excise taxes due. The main problems confronting an efficient taxation of qat stem from the fact that qat must be sold within two days of being cut. Because of the widespread cultivation and distribution, taxpayers must be taxed on the way to markets and on a daily basis. Taxes not assessed on the spot are lost for the state.

3.16 The principal control measures recommended by the 1986 IMF mission included:

- formalizing and strengthening the roadside system of checkpoints;
- strengthening internal management controls by rotating collectors from one checkpoint to another;

<sup>86</sup> *Al-Hamdi, M.* (1998): Qat: Technical, Economic and Social Issues. Paper for the World Bank, (February 1988).

<sup>87</sup> *al-Hamdi, M.* 1998.

<sup>88</sup> *Kennedy* 1987, p. 54.

<sup>89</sup> This section is in part adapted from a note by Prof. Mohamed Al-Eryani, University of Sana'a.

- establishing permanent checkpoints;
- seizure of vehicles transporting qat on which the tax has not been paid;
- increasing the number of collectors; and
- implementing a financial incentive arrangement for collectors.

3.17 The Government adopted all of these recommendations but rather than improving the situation, the volume of daily sales has steadily risen with no proportional increase in revenue. A recent addition to the control measures has been the establishment, on an experimental basis, of a distribution center outside Sana'a. Assessment and payment procedures have been streamlined. Penalties for failure to make declarations and pay the tax have been increased to 35 percent for the first infraction and 70 percent for the second plus the tax owing. Despite the penalties being severe, evasion runs rampant.

3.18 Most recently, Government has reverted to the age-old expedient of tax farming. Since about 1998 private collectors are collecting the tax on qat entering the city of Ta'iz.

3.19 There are many obstacles to increasing the government's revenue from qat taxation. The most significant are:

- low salaries of tax collectors (average Rls. 3,000 per month in 1995) and lack of incentives. Article 21 of the Tax Law which gives the collectors 10 percent of the revenue increases is not applied;
- lack of data on cultivated areas which makes it difficult to make good estimates of revenues; and
- lack of governance and big "moral hazard".

3.20 There is no quick solution to the dilemma of taxing qat. Consumption of the product is widespread, and there is no social stigma associated with its use. Qat is not illegal, profits from the product are enormous, transportation of the product is simple; large quantities can be transported in cars and small trucks, and transportation routes to consumer centers are in excellent condition and are difficult to control due to their number.

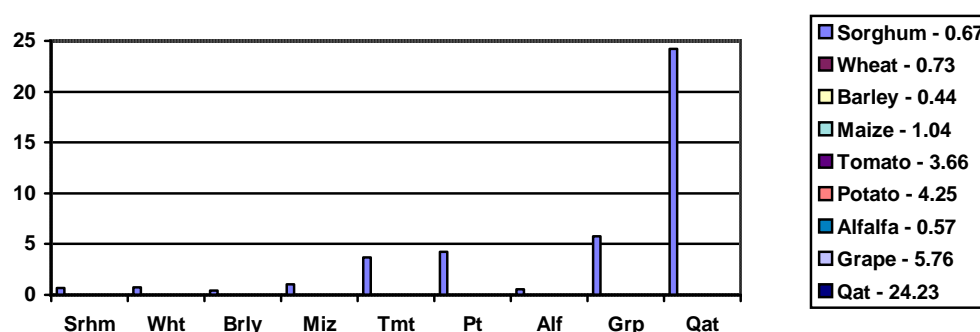
3.21 The Government, therefore, faces a problem which does not lend itself to an immediate solution. Control is possible but the degree and the cost are matters which must be decided. Officials argue that if more effective controls are to be implemented there must be a large increase in the number of inspectors, they must be better trained and must have transport. Support from the police and/or military would be needed. It is also a possibility that if the tax rate were lowered from 20 percent to 10 percent of the sale price, it may encourage a better level of compliance and thus increase revenue.

### **Economics of Water Use for Qat**

3.22 Calculations done by the High Water Council in 1990 show qat as giving by far the best return to water of any crop in the Sana'a Basin (Figure 1). As a high value crop, qat can justify the use of relatively expensive pumped groundwater. Figure 1 shows the income generating value of water use for cash crops (qat and grapes) and cereals in the Sana'a area in 1990. Based on field data collected in 1997 the return on groundwater use for qat irrigation was calculated to be at between 50 and 90 US cents/m<sup>3</sup> against a cost of water that rarely exceeds Rls 15/m<sup>3</sup>.

Returns for grapes, the second most profitable crop in the Sana'a area, were in the range 30-50 US cents/m<sup>3</sup>.<sup>90</sup>

**Figure 1: Returns of Different Crops to Water in 1990 (Rls./m<sup>3</sup>) as calculated by the High Water Council**



3.23 Qat is so profitable a crop that it can justify supplementary irrigation by tanker - typically a week or so before harvest in a dry period when prices are very high (\$1 per m<sup>3</sup> of water and up). In some areas of Yemen water is being trucked 20 kilometers to the qat fields.<sup>91</sup>

3.24 The impact of this profitability on Yemen's dwindling groundwater resources is discussed below (Chapter IV). Rainfed systems have very different economic and environmental characteristics. In rainfed areas, qat is an ideal crop because of its high value and favorable environmental characteristics.

### Supply and Demand

3.25 In the past both production and consumption of qat suffered from constraints which today have been greatly reduced. On the production side, qat could only be cultivated in areas with access to reliable irrigation water sources like permanent springs or in areas of high rainfall. On the consumption side, demand for qat was constrained by low incomes. Rising incomes, coupled with improved transport and relatively cheap access to a reliable water source (groundwater) triggered the explosion in qat cultivation.

3.26 Despite the increase in overall volumes of production and consumption, qat supply and demand is usually quite a local affair. This is largely because of the deterioration of the crop if transported over time and distance. For example, Sana'a is largely supplied by the immediately surrounding districts - Bani Hushaish, Bani al-Harith and Hamdan. The rapid growth of the city (annual growth rate of 8%) stoked demand over the last twenty years and led farmers in areas around the city to expand qat cultivation. Nevertheless, sometimes qat is also brought from far away areas like Sa'ada in the north and Dhamar in the south.

3.27 Although production is restricted in many areas to the summer months, different climatic conditions in the different regions of the country generate sufficient overall supply throughout the

<sup>90</sup> Al-Hamdi 1998.

<sup>91</sup> Dresch quoted in Weir 1985, p. 87.

year. Relatively lower qat prices and better quality during the summer indicate an over supply, while higher prices and lower quality during the winter reflect supply shortages.

3.28 Some authors believe that demand for qat as a whole is inelastic, but that quality classifications are quite income elastic. In other words, a person with increasing income would change to "better", more expensive qat, and a person with declining income would not stop or reduce the amount chewed, but would rather change to a less expensive, lower quality qat.

## Marketing Systems

3.29 Qat marketing is distinguished by the need to get the product to the market fresh, since qat leaves are mostly chewed within 12 hours from harvesting. Hence, rapid speed of transport is indispensable. Qat sellers usually keep pruned branches covered with wet cloth or store them in hollow banana stalks to ensure freshness up to the last minute. Qat stored to the next day usually drops in price drastically.

3.30 There did exist a prejudice against market trading in the past, at least amongst the *qabili* in the tribal areas in the north and north east of the country. Qat was then sold only by tradesmen - the *ahl as-suq*. But now *qaba'il*, the tribes, will happily market their crop directly.<sup>92</sup> However, some farmers still do not wish to market their own qat, and in some cases picking is left to the low status *akhdam*.

3.31 As the market for qat grew, men specialized as brokers (*muqawatun*).<sup>93</sup> However, qat marketing has retained a remarkably open structure, with many small-scale participants and little apparent monopoly tendency. Qat markets in Yemen have reached a high level of maturity in balancing the supply with the varying demand. For example, the market seems to adjust easily to meet the higher demand on Thursdays and holidays. In a recent study in Sana'a and Dhamar provinces four main marketing channels were found.<sup>94</sup>

- (a) **Selling directly to consumers:** this procedure is popular in rural areas, where consumers buy their needs directly from producer farms, especially in areas close to urban concentrations such as western and northern parts of Sana'a.
- (b) **Selling at rural markets:** in almost every village or town there is a local qat market, where producers bring their produce and sell it to consumers or to traders.
- (c) **Selling to *muqawatun*, who usually have transport:** The *muqawatun* will visit qat farms to make deals with producers. Then they bring laborers to harvest the crop and sell it either directly to consumers or to retailers in urban and rural areas.
- (d) **Selling to *muqawatun* through a middleman called *museleh* or *mefaud*:** The *museleh* does not own the product i.e. he does not bear any risk. He gets a commission of about 10 percent of the total value for doing this function.

3.32 On the whole, whether the qat is sold by farmers or professional dealers, trading units are small, because qat is highly perishable, and price fluctuations are large. The strategy of most qat traders is to buy and sell in small quantities in order to avoid losses. Qat does not therefore lend itself to market concentration or monopoly tendencies. Nonetheless, there are some "big" qat merchants - e.g. in Wadi Mawr, where the "big" merchants buy qat in the mountains and transfer

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<sup>92</sup> Tutwiler, R. & S. Carapico (1981): Yemeni Agriculture and Economic Change. American Institute for Yemeni Studies, Sana'a, Yemen. Development Series, No. 1, p. 91.

<sup>93</sup> Mundy, M. (19.....): ..., p. 81(Full source will be added by C. Ward).

<sup>94</sup> Jabarin & Juneid 1996.



it daily in fleets of trucks to Hodeida.<sup>95</sup> Mark-ups of traders are of the order of 50 to 100 percent above farm gate prices.<sup>96</sup>

3.33 Nominal prices of qat have increased steadily during the last decades. A bundle of qat in 1975 was worth 6 Rls. The same bundle was selling for 50 Rls. in 1980, and increased to about 200-350 Rls. in 1995. However, in terms of purchasing power, prices are considerably lower (about a quarter) of what they were thirty years ago (see above). In general, the following three main factors determine prices of qat:

- (a) **Location and reputation:** some types of qat are expensive because they are cultivated in a certain area e.g. qat from Dula, near Sana'a, is always expensive. Qat cultivated in other areas is low priced since it is known to induce some side effects e.g. lack of sleep, headaches, nightmares, etc.
- (b) **Appearance:** for example bright, small-leafed, long branches are usually more expensive than other types.
- (c) **Time of year and climate:** qat in general is more expensive during the winter months and during exceptionally cold and dry periods.

### Grades and Quality

3.34 "White" (really green) or "blue" (really grey) qats are better than red ones. In Sana'a, the quality or expensive qat comes from Wadi Dahr or Dula. Among the expensive qat is the *baladi* which can be easily distinguished by its long branches (up to 1 m). The middling quality is from Bani Hushaysh or Haraz. The cheap *sawti* qat that keeps the chewer awake all night may be poor origin qat, e.g. from a rainfed area of 'strong' qat, or it may be overaged qat or stems harvested from the lower part of the tree. This inferior qat can also produce confusion or hallucinations (see section below on 'Negative Psychological Effects').<sup>97</sup>

3.35 The mark of a "good" qat is that : (i) it is not too bitter; (ii) it creates *kayf*; and (iii) it has no after-effects, like spermatorrhea etc. (see below, Chapter V).

### Trade

3.36 After the air route was set up across the Red Sea in 1949, large quantities of qat were imported from Ethiopia to Aden.<sup>98</sup> Under the Imamate, Yemen supplied Aden by camel caravan. After the establishment of the Yemeni republics in the 1960s, the Yemen Arab Republic exported to the Peoples Democratic Republic of Yemen until the trade was banned in 1971.<sup>99</sup>

3.37 During the premiership of Al Aini in the early 1970s, an attempt to "open" up the Yemeni qat market to cheaper imports from Ethiopia was made but was apparently frustrated when armed bands prevented the first plane from landing and tribal leaders threatened to shoot down planes carrying qat to Yemen.

3.38 Today, small quantities of qat are exported to Europe and America by air largely to meet demand from Yemeni émigré communities. Qat is, for example, available daily in London in

<sup>95</sup> Weir 1985, p. 33.

<sup>96</sup> Al-Hamdi 1998.

<sup>97</sup> Kennedy 1987, p. 80 and 119

<sup>98</sup> Weir 1985, p. 28

<sup>99</sup> Kennedy 1987, p. 133.

Church Street Market, and in Kilburn. Another destination of Yemen's qat is Saudi Arabia. Despite having been outlawed there in the early 1980s by a religious decree (*fatwa*), still today a considerable number of Saudi nationals and Yemeni guest workers consume the stimulant there. Sa'ada qat merchants report that qat is smuggled on a regular basis by donkey caravans from the Sa'ada and al-Khamra' areas across the border into the Asir and Najran regions. Profits are considerable. There are even reports that consignments smuggled in four wheel drive vehicles have been abandoned when challenged by border guards; the vehicles have been abandoned too without apparently denting the profitability of the trade.

## 4. QAT IN YEMENI AGRICULTURE

### A. The Farming of Qat

#### Agronomy

4.1 In botany, there are two species of qat: *edulis* and *spinosa*. *Spinosa* does occur in the wild in Yemen, but is not used. Of the *edulis* species, which is the qat consumed in Yemen, there are four cultivars, commonly called white, red, black and blue.<sup>100</sup>

4.2 *Edulis* grows in two major forms. In mountainous areas, its form is generally a slender white tree between 2-4 meters in height. In areas of frost, it takes the form of a small shrub, which is kept pruned down. Thus in the mountainous Ibb governorate, qat reaches an average height of only 70 cm. All of the high quality "premium" qats come from the tree form.

4.3 Qat is a hardy plant and drought resistant. Although an evergreen, it can go dormant under water stress (see also annex 6).<sup>101</sup> It is long lived - farmers in Wadi Dahr show trees said to be 80 years old; in Mabian, the Hajja Governorate, trees can be found allegedly 120 years of age. Qat does not seem to suffer mineral deficiency, as its extensive root system can tap up the minerals.<sup>102</sup>

#### Husbandry

4.4 Large scale qat plantations are not common due to land fragmentation and the strict agroecological location requirements associated with qat plantation. Qat is not usually planted in plains, but mostly found at the base of hills or on terraces. An exception is the area east of Dhamar where large size plantations are found on the high plateau.

4.5 Qat is an adaptable crop that does not take up much space, but as with any crop there are strict limitations on growing conditions. It is best cultivated at 1500 - 2400m. Where the mean average temperature is below 17°C, growth is inhibited. The plant performs best where the mean is around 19°C. *Al-Hamdi* (1998) describes qat in the Sana'a basin:

"Qat is usually irrigated from March to October. On average 12 irrigations are applied to each plot, and the average irrigation interval is 20 days. Within a plot, water is applied between the qat rows, which are generally a meter apart. Rows are usually divided into sections where the higher sections are watered first. Within a plot, water is either applied to one row and

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<sup>100</sup> Kennedy 1987, p. 177.

<sup>101</sup> Tutwiler & Carapico 1981, p. 164.

<sup>102</sup> Kennedy 1987, p. 138.

through the use of channels is diverted from one to another, or sometimes plastic tubes are used for the same purpose.”<sup>103</sup>

4.6 Qat cultivation extends in a rough quadrilateral from Jabal Fayfah in Asir (today Saudi Arabia) to Hajirya, south of Taiz, to Jabal Jihaf and al-Baydha in the east. It is an altitude crop, rare below 1200m. It grows in areas of rainfall of 500 - 1000 mm or under irrigation. In lower rainfall areas, moisture may be enhanced by mists, clouds or dew.<sup>104</sup>

4.7 The easiest way of propagation is by root cuttings and suckers. Farmers establishing new plantations will buy young plants from good stock grown on by other farmers.

4.8 Qat is usually cultivated on terraces with a slight slope. The soil is ploughed and leveled. Holes of 50 cm in depth are used to plant the cuttings. Cuttings of 40-50 cm are transplanted to the holes either in spring or summer at the onset of the rainfall season. Qat plants are set between one and one and a half meters apart. The qat field needs three to four hoeings each year for weed control and aeration. A 1997 survey, however, showed that some farmers rather apply an extra irrigation or two instead of working the soil.<sup>105</sup> The main idea behind working up the soil is to enhance the water holding capacity, and in the current situation where water is not a major cost factor in qat production, extra water application is not of a major concern to the farmer. In general, the survey found that it is widely believed among farmers that the more work done in a plot (ploughing, dusting, etc.) the better the harvest and the higher the profits.<sup>106</sup>

4.9 Qat may be pruned low either against frost or to prevent wind damage. It can be intercropped (especially with maize), particularly in the first three years, until it comes into full bearing. In some areas, qat trees are said to produce better when planted among fruit, castor bean and camel thorn trees.<sup>107</sup>

## Fertilization and Plant Protection

4.10 Qat suffers from few pests - the main plant protection problem is a discoloring fungus. Against this, farmers throw a clay dust that may contain some sulphur.<sup>108</sup> This dust may be brought from up to 40 kilometers away. It is an all-purpose treatment - fertilizer and pesticide. Each year the trees may be dusted three to four times. *Al-Hamdi* (1998) reports up to 15 dustings on some plots.<sup>109</sup>

4.11 Dusting is still a widespread practice; it is thought that the dust layer on the leaves works as a barrier protecting the leaves from pests. Nevertheless, during the rainy season the clay dust is washed away and at times when farmers prepare the trees for harvest, chemical pesticides and hormones are usually applied. A plot may be sprayed with chemical pesticides 3-5 times during the year.

4.12 Even though most farmers apply chemical fertilizers, pesticides and hormones to qat, they try to deny it as much as possible, perhaps because they see the use of chemicals as "unnatural"<sup>110</sup>. On the other hand, they are usually open and proud to indicate the use of the clay

<sup>103</sup> *Al-Hamdi* 1998.

<sup>104</sup> See for example *Weir* 1985, p. 30.

<sup>105</sup> *Al-Hamdi* 1998.

<sup>106</sup> *Al-Hamdi* 1998.

<sup>107</sup> *Tutwiler & Carapico* 1981, p. 150.

<sup>108</sup> *Kennedy* 1987, p. 140.

<sup>109</sup> *Mundy, M.* (19.): , p. 75, (Full source will be added by C. Ward).

<sup>110</sup> According to *al-Hamdi* 1998.

dust and, to a lesser extent, manure. In almost all of the qat producing areas of the Sana'a basin, both chemical fertilizers and pesticides are widely used.

4.13 Fertilizer application varies from one farmer to another. The most popular fertilizer used is imported urea from Saudi Arabia. On average, farmers use about 100 kg of fertilizer per hectare. Some farmers also use manure, especially in the first year of plantation.

4.14 There are many types of pesticides on the market and farmers usually find out the suitable brand and dosages on a trial and error basis. Some farmers were even found to mix dangerous pesticide cocktails of up to 6 different products adding sugar and following the common belief of "the more the better".<sup>111</sup> Agricultural extension programs do not provide qat farmers with any assistance on this (or on anything else to do with qat). Most farmers are not aware of the threat pesticides pose to human health. Rarely are any precautions taken when handling these chemicals. "Spread (diluted) pesticide solutions usually come in contact with the applying person and anyone close to him".<sup>112</sup> Women wash the clothes exposed to pesticides during spraying, and emptied pesticide containers are used for storing or transporting water in the household and in mosques. Sometimes they are even used as cooking pots.<sup>113</sup>

### Crop Characteristics

4.15 Qat does not like long periods of humidity, and such conditions produce fungi. It will grow on a wide variety of soils, even those that are only moderately fertile and are low in nitrogen. However, higher nitrogen availability produces a higher quality qat.<sup>114</sup>

4.16 Even though qat can be considered a durable crop (growing under various climatic conditions), it seems that it is most sensitive to cold weather. Qat is not sensitive to low temperatures as such, but rather to the combination of low temperature and humidity. This phenomenon (known locally in the Sana'a Basin as *tharieb*) occurs mostly in the early mornings, and when it happens during the winter it results in catastrophic consequences. When *tharieb* takes place, trees dry up and change in color to dark brown (burned) and have to be cut off. A major disaster occurred in the districts of Bani Hushaish and Bani al-Harith of the Sana'a area in the mid 1980s where many fields were damaged. It is for this reason that farmers in the Sana'a area stop irrigating qat during the winter months to allow the plant to go dormant. Nevertheless, qat plots in areas protected from cold winds are watered and thus harvested during the winter and are highly profitable.

4.17 Swanson reviewed three villages in Ibb Governorate with superficially similar conditions to find out why a lot of qat was grown in one place, and little in another. He found that village A had plentiful rainfall but suffered from frost, so little qat was grown. Village B was also frosty and, in addition, dryer, so qat was grown only in irrigated fields where the soils were poor and therefore other crops would not grow. Village C was dryer still, but free of frost *and* the village had access to water from tubewells - in Village C, qat was abundant.<sup>115</sup>

4.18 In some areas, such as Wadi Dahr, qat can be induced to bud under irrigation anytime except the two coldest months of the year.<sup>116</sup> This allows the harvest to be staggered, and under

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<sup>111</sup> Thabet, A.R (1999): Natural pesticides as new alternatives to replace the conventional hazardous pesticides in the Republic of Yemen (in print: *Alexandria Science Exchange*).

<sup>112</sup> Al-Hamdi 1998.

<sup>113</sup> Results of a research trip to the Kuchlan and Hajja areas, July 1999 (P. Gatter).

<sup>114</sup> Kennedy 1987, p. 135.

<sup>115</sup> Swanson, ... (Source to be added by C. Ward).

<sup>116</sup> Mundy, M. (19.....):....., p. 74 (Source to be added by C. Ward).

irrigation a crop can be brought on almost at will to catch suitable market opportunities. The converse of this is that qat is a crop that can withstand thirst. In principle there is no distinctive irrigation season; farmers may choose to leave their qat dormant and then irrigate when they want to prepare the trees for harvest.

## Harvest

4.19 The branches with new growth are harvested, and it is a great art to try to get this "flush" of new growth at a time when prices are high. Farmers will invest in a tanker of water at the end of the dry season to produce this flush - and then pray it does not rain as this would bring on everyone else's qat too.

4.20 Depending on the region, qat can be harvested between one and three times a year. In the Sana'a basin, two harvests per year is the maximum with one major harvest called *gaftah* where branches 40-100 cm long are cut, and another minor harvest called *gathlah* where shorter branches 30-50 cm are pruned. A new trend to pick the small chewable leaves called *gadal* (sold in small plastic bags for Rls. 100-400 per bag) is a widespread practice nowadays.

4.21 If the shoots are not harvested in summer, the winter harvest is more plentiful and the plant produces small white flowers. On Jebel Sabr, farmers are reported to harvest each qat tree alternate years.<sup>117</sup>

4.22 In the early 1980s qat irrigated by springs in Wadi Dahr, was reported to produce a staggered harvest from June to October. The trees in the wadi are sizeable, and the harvest required youths to climb the trees to pick the tender tips.<sup>118</sup>

## Labor Requirement

4.23 Qat in general is not a highly labor intensive crop. Compared to grapes for example, it was observed that qat required much less labor. In field research in the Sana'a basin by *al-Hamdi* (1998) in 1997, farmers indicated that they do not consider qat a labor intensive crop compared to cereals, vegetables or fruits. Moreover, since harvest time for qat can be delayed (within the summer months), labor demand is flexible. Nevertheless, qat cultivation employs many outside laborers (even from other regions). Many qat farmers only supervise and do not work in the fields themselves. In the Sana'a area some farmers employ laborers from as far away as Raymah. These laborers live on the farms and are paid a monthly salary (6,000-10,000 Rls. in addition to food and qat).<sup>119</sup>

4.24 Field research in the Sana'a area indicated that labor costs average around 20% of total qat production costs.<sup>120</sup> To illustrate the type and amount of required labor work on a qat farm, in the area of al-Rawdah, north of Sana'a, a qat plot was dusted 12 times, ploughed three times, spread with pesticides three times, applied with fertilizer once, and irrigated 11 times. A break down of the costs of qat production is given in table 7.

<sup>117</sup> Kennedy 1987, p. 144.

<sup>118</sup> Tutwiler & Carapico 1981, p. 148.

<sup>119</sup> Al-Hamdi 1998.

<sup>120</sup> Total production costs are: (1) operation and maintenance of the well; (2) labour; and (3) other costs (pesticides, clay and fertilizers).

**Table 7: Crop Budgets and DRC Requirements of Qat: Estimated Annual Cost of Production and Income for One Hectare of Qat Under Well Irrigation (in Yemeni Rial)<sup>121</sup>**

Item	First year	Years 2-3	Years 4-8
Total Gross Output (Rls.)	0	48000	320000
Land Preparation (Rls.)	18400	0	0
Seedlings (Rls.)	13020	0	0
Irrigation cost (Rls.)	30000	25000	25000
Fertilizers (Rls.)		0	10850
Manure (Rls.)	3200	0	2500
Protection (Rls.)	0	2734	4340
Manual Labor (Rls.)	15240	3810	19050
<b>Net Returns (Rls.)</b>	<b>-79860</b>	<b>16456</b>	<b>258260</b>

## B. QAT AND WATER

### Crop Water Requirements

4.25 As in most aspects of qat, the crop water requirement is not very clear. The High Water Council (HWC 1992) calculated yearly crop water requirements for qat to be around 12,000 m<sup>3</sup> per ha in the Sana'a area. On this basis, a qat plot needs to receive water up to a depth of 1.2 m from rainfall and irrigation combined. Using the Penman method, the actual water requirement of qat assuming good efficiency has been calculated as 600 mm, although the plant can tolerate as little as 400 mm. The most recent calculations suggest a gross requirement of 700-1380 mm, presumably depending on local conditions (see table 10).

4.26 Field measurements carried out by *al-Hamdi* (1998) showed that water application to qat plots in the area of al-Rawdah, north of Sana'a city, actually do average a depth of 1.3 m per year (in addition to rainfall of about 250 mm/year). Using 12 as the average yearly number of irrigations, *al-Hamdi* calculated that farmers apply water on average to a depth of about 11 cm per irrigation.

**Table 8: Main Environmental and Crop Requirements of Qat<sup>122</sup>**

Characteristic	Optimum	Range
length of growing period (days)	120-210	-
rainfall (mm)	500-700	400-1000
mean annual temperature (°C)	19-20	17-25
humidity	MM	VL - HH
killing temperature (°C)	can withstand incidental short periods of night frost, but leaves may be damaged	
drought sensitivity	drought tolerant	
drainage	WE	MW - WE

<sup>121</sup> Source: *Jabarin & Juneid* 1996.

<sup>122</sup> Source: Crop Requirement Table by Wen Ting-Tiang, AREA/FAO 1998 (see also annex 6).

Depth	DD	SS - VD
Texture	M	M - H
pH (H <sub>2</sub> O)	7.0 - 7.4	6.3 - 8.7
ECe (dS/m)	< 2	-
Altitude	1200 - 2200	1000 - 2600
Average rooting depth (m)	min. 0.5 m, taproot of 3 m or more	
Water requirements (under irrigation)	700 - 1000 mm; 1380 mm <sup>YB</sup>	
Average farmer's yield	5600 bundles <sup>YB</sup>	

## Qat and Water Use

4.27 In the 1970s, most qat was rainfed or irrigated by run-off water but much more qat is now pump irrigated.<sup>123</sup> In Wadi Dahr, several different patterns were reported in the early 1980s: at that time in the *wadi*, 10 percent of qat was rainfed, 25 percent irrigated as a pure stand, and 40 percent irrigated with intercropping.<sup>124</sup>

4.28 Most of the cultivated qat within the Sana'a basin area is now irrigated with groundwater where more than 4000 private wells are used mainly to supply water for cash crops (qat, grapes and vegetables).<sup>125</sup> The uncontrolled spread of private agricultural wells has led groundwater levels in the Sana'a area to decline at a rate of 3-6 m a year. Within the Sana'a basin, one estimate is that qat consumes around 40% (= 80Mm<sup>3</sup>) of the yearly groundwater extraction for agriculture. This is considerably more than the water consumption of the city of Sana'a. Other estimates are, however, much lower. Many wells in and around Yemen's capital are today as deep as 370 meters.

4.29 The FAO 1993 annual report estimated the total nation-wide yearly water consumption for qat cultivation to be 800 Mm<sup>3</sup> to produce a total harvest of 25,000 tons.<sup>126</sup> Again, these figures seem very high. It is clear that most figures are just guesses, and a reliable field survey is essential in order to assess the nature and extent of the problem.

4.30 Even though groundwater extraction is highly "subsidized", many qat farmers in the Sana'a area use pipes and plastic tubes to convey groundwater from the wells to the various plots. In many cases, groundwater is pumped from a well to a small reservoir located at a higher elevation than the plots. When the reservoir is full, water is let out through a system of distribution networks that conveys water to each plot. It is common to find several kilometers of connected pipes used to convey groundwater to fields, especially in areas where well yields are low. The extensive use of pipes in the Sana'a area is to minimize conveyance losses associated with the use of earthen channels.

<sup>123</sup> Weir 1985, p. 32.

<sup>124</sup> Tutwiler & Carapico 1981, p. 52.

<sup>125</sup> The SAWAS project in the National Water and Sewerage Authority (NWSA) inventoried 3600 wells north of Sana'a. Al-Hamdi (1998) reckoned that the total number of drilled wells in the Sana'a basin area exceeds 7000 wells.

<sup>126</sup> Like most figures regarding qat this is a guess, especially since qat harvest is not measured by weight.

## **Qat and the Environment**

4.31 In the 1970s and 1980s, traditional cereals terraces were being abandoned because of high labor costs and low grain prices. Qat was planted on some of those terraces, thereby saving them.

## **C. QAT AND FARMING SYSTEMS**

### **Farmers' Perceptions of Qat**

4.32 In general, qat is appreciated by farmers as a crop with a very high market value, relatively low water requirements and low labor demand. Other factors for farmers' appreciation of qat are its tolerance of interplanting, its drought resistance, and its excellent marketing system.<sup>127</sup> Qat cultivation needs little capital to start, and provides a decent income to many people. The relatively small variation in price over the year reduces farmers' risks, and the fact that - with a little water - it can be brought to harvest and market in most months of the year, makes it a ready source of cash. Also, farmers with some controlled water source can harvest as much or as little as they need to for budget purposes, and leave the rest for later.

4.33 This appreciation is reflected in behavior. A study of 25 villages in Hajja and Hudeida Governorates in 1980 showed that villages growing qat had the lowest migration rates, the highest wages for workers, and the most village capital, as evidenced by road building equipment.<sup>128</sup>

4.34 Disadvantages of qat are relatively few. In Razeh, for example, only fear of theft and insecurity of land tenure were reported as risk factors.<sup>129</sup>

### **Has Qat Displaced other Crops?**

4.35 Qat has different requirements and characteristics from other crops and does not perfectly substitute for any crop. Some coffee has been displaced, but qat can be a less demanding alternative, as coffee needs more shade, more water and more labor.<sup>130</sup> In addition, coffee does not grow well above 1700 m and does not bear water stress well.<sup>131</sup>

4.36 Qat *has* replaced coffee in Haraz, but this is due to the fact that coffee trees died in a drought, and that many Ismailis have emigrated, reducing labor availability.<sup>132</sup>

4.37 Where irrigation is available, some cereals have certainly been replaced by qat, but qat's water requirement is at least 600 mm, so it cannot replace the great majority of cereal crops grown on terraces which have less effective rainfall available to them than that.<sup>133</sup>

4.38 In some areas, qat has supplanted grapes and this process is continuing in the Sana'a basin today, as was reported for the Bani Hasheish area in 1996.<sup>134</sup> For many farmers, qat is

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<sup>127</sup> Tutwiler & Carapico 1981, p. 148.

<sup>128</sup> (Source to be added by C. Ward)

<sup>129</sup> Weir 1985, p. 36.

<sup>130</sup> Kennedy 1987, p. 160.

<sup>131</sup> Weir 1985, p. 36.

<sup>132</sup> Gerholm, T. (1977): Market, Mosque and Mafraj. Stockholm University Press, p. 54.

<sup>133</sup> Kennedy 1987, p. 162.

<sup>134</sup> Jabarin & Juneid 1996.



superior to grapes because grapes are less hardy than qat, and vines need more care - up to 15 "dustings", for example.<sup>135</sup>

4.39 In general, qat becomes highly profitable only when it has access to a reliable water source. Therefore, it can be concluded that qat may have replaced coffee and cereals only in areas where a reliable irrigation water source is available.

4.40 Many farmers also tend to specialize on qat, and thus depend heavily on the financial returns of these monocultures. A 1977 survey found that, of 56 farms growing qat, 32 grew nothing else.<sup>136</sup>

### Qat Area

4.41 The estimated area planted to qat in 1981 was 40,000-45,000 ha. At that time, *Weir* reported that qat was spreading on already farmed terraces, as the major alternative crops - summer sorghum and coffee - were not so profitable. Qat was returning five times the profits of coffee, twenty times the profit of sorghum.<sup>137</sup>

4.42 *Kopp* and *Revri* (1983) estimated qat area in the mid-1980s at 60,000-85,000 ha (2-4 percent of growing area, against 1.6 percent for coffee and 1.6 percent for cotton).<sup>138</sup> In some areas qat is more prevalent: In the Sana'a basin, at least 5 percent of the area is planted to qat. In Wadi Dahr, home of the "champagne qat", more than 80 percent of the area is planted to qat.<sup>139</sup>

4.43 By 1998, the area planted to qat was thought to have reached about 100,000 ha. New terraces, sometimes almost Cyclopean earth and stoneworks, are constructed, as qat's profitability persists and justifies the heavy investment involved.

4.44 Official statistics are, however, notoriously unreliable (table 9), and one FAO expert estimates that the total area planted to qat is more likely to be 160,000 ha.<sup>140</sup>

**Table 9: Cultivated Area of Grapes, Coffee and Qat 1970-1998 (000'ha)<sup>141</sup>**

Crop/Year	1970	1975	1980	1985	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Grapes	10	10	12	13	15	14	17	18	19	19	21	21	21	21	22
Coffee	7	8	8	17	20	22	25	23	24	25	25	27	29	31	32
Qat	8	35	45	56	64	72	77	80	83	85	87	89	91	93	99

<sup>135</sup> *Kennedy* 1987, p. 163.

<sup>136</sup> (Source to be added by C. Ward)

<sup>137</sup> *Weir* 1985, p. 34.

<sup>138</sup> *Kopp*... (Source to be added by C. Ward), *Revri* 1983.

<sup>139</sup> *Kennedy* 1987, p. 134.

<sup>140</sup> Personal communications, Wen Ting-Tiang (FAO/AREA).

<sup>141</sup> Source: Statistical Year Books (various years) (CSO), Agricultural Statistics (various years) (General Dept. of Agricultural Statistics and Documentation, MAI), and unpublished data.

## 5. V. IMPACT OF QAT ON HEALTH<sup>142</sup>

5.1 Qat influences Yemen and Yemeni society in many ways; one of them is the impact of the plant on the health of its consumers. Despite much research, there is still a need to determine what effect the widespread consumption of this natural stimulant has on health in Yemen. What follows is a review of recent literature on the health impacts of qat.

5.2 This chapter begins with an overview of health conditions in Yemen, which is followed by sections on the use of qat in traditional medicine, on the plant's pharmacology and on its biochemistry. The chapter then passes to a synopsis of the effects of qat consumption on health, among them the plant's effects on the gastrointestinal, cardiovascular and urinary systems. The chapter continues with the impact of qat on nutritional status, its role in maternal health, and its influence on sexual activity and reproductivity. A section on psychological effects of qat ends with a discussion of whether the plant should be regarded as a dependency inducing substance. Finally, indirect health hazards of qat, such as its association with smoking and the qat consumer's exposure to tuberculosis and pesticides, are described. The chapter concludes with an account of how the Ministry of Public Health is responding to the qat phenomenon.

### A. GENERAL HEALTH CONDITIONS IN YEMEN

5.3 Economic stagnation and limited social development have severely hampered progress in Yemen's health sector. Currently public spending on health is only about 1.6 percent of GDP and 4.8 percent of total government expenditure. Private expenditures for health, at 4.7 percent of GDP, are somewhat higher, yet they are among the lowest in the Middle East and North Africa (MENA) region. Health indicators in Yemen are some of the lowest in the world. In light of the country's difficult economic situation, improving them is a daunting task. Major contributing factors to the alarming health situation include poverty, low participation in education especially among girls, high illiteracy, as well as limited access to potable water and proper sanitation.<sup>143</sup> In Yemen's fast growing cities, there is a general lack of adequate sanitation systems. Wells and cisterns on which many rural areas rely due to the absence of a municipal water supply are often contaminated with schistosoma and other parasites. Malnutrition due to deficiencies of proteins and of fresh vegetables and to frequent parasite infections is no doubt exacerbated by the anorectic effects of qat consumption. These conditions are exacerbated by the low level of medical knowledge among the people and a general lack of adequate medical facilities. The result is alarming, with maternal and infant mortality rates which are among the highest in the world,<sup>144</sup> and with the highest fertility rate and at the same time lowest life expectancy for both males and females in the entire MENA region (table 12).

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<sup>142</sup> This chapter is based on a 1998 study by the author: *Gatter, P. (1998): The Impact of Qat on Health and Opportunities for WHO Engagement. WHO, Geneva, Department of Substance Abuse, 37 pages.*

<sup>143</sup> *World Bank (1999): Republic of Yemen: Health Sector Strategy Note.*

<sup>144</sup> *World Bank (1999): Republic of Yemen: Health Sector Strategy Note.*

**Table 10: Middle East and North Africa Health and Demographic Indicators (1995-2010)**

Country	Infant Mortality Rate <sup>a</sup>	Maternal Mortality Rate <sup>b</sup>	Life Expectancy At Birth, 1995		Population Growth Rate		Total Fertility Rate
	1995	1990-95	Males	Females	1995	1995-2010	1995
<b>Yemen</b>	<b>101</b>	<b>1471</b>	<b>53</b>	<b>54</b>	<b>3.2</b>	<b>3.3</b>	<b>7.4</b>
Egypt	57	174	64	66	2.3	1.9	3.5
Morocco	56	372	64	68	1.7	1.6	3.5
Syria	30	179	66	70	3.0	2.7	4.9
Iran	26	35	68	71	2.7	1.5	3.3
Jordan	31	132	68	72	4.3	2.4	4.8
Algeria	34	140	68	71	2.2	1.7	3.6
Tunisia	40	139	68	70	1.8	1.5	3.0
West Bank and Gaza	29	..	70	74	5.6	3.9	6.4
Lebanon	32	300	67	71	1.9	1.3	2.9
Oman	18	190	68	73	5.5	3.8	7.1
Saudi Arabia	21	18	69	71	3.8	3.3	6.3
UA Emirates	16	30	73	76	5.0	2.2	3.6
Iraq	111	310	59	62	2.1	3.0	5.5
<b>MENA</b>	<b>43</b>	<b>268</b>	<b>66</b>	<b>69</b>	<b>2.4</b>	<b>1.8</b>	<b>3.5</b>
<b>Reg. Average</b>							

Source: World Bank estimates, 1997.

Notes: a) Rate per 1,000 live births,  
b) Rate per 100,000 live births.

## B. THE USE OF QAT IN TRADITIONAL MEDICINE

5.4 Qat has long played an important role in the traditional medicine of Yemen and East Africa. Prior to the import of modern medicine, qat leaves consumed as tea or ingested by chewing were widely used to treat disorders such as bronchial asthma,<sup>145</sup> headaches, colds, minor body pains, arthritis fevers, hypertension, and depression.<sup>146</sup> Even today qat is used to treat diabetes.

5.5 Despite its widespread use as a medicinal plant, the adverse health effects of qat have been known for centuries. As early as the 17<sup>th</sup> century, the Islamic scholar aš-Sheikh Muhammed

<sup>145</sup> Baasher, T. (1980): The Use of Khat: A Stimulant with Regional Distribution. In: Edwards, G. & A. Arif (Eds.): Drug Problems in the Sociocultural Context. A Basis for Policies and Programme Planning. World Health Organisation, Geneva. Public Health Papers No. 73, p. 90.

<sup>146</sup> Kennedy et al. 1983, p. 785.

as-Salem noted that the children of parents using qat "look small and sickly"<sup>147</sup>, drawing the connection between qat consumption and low birth weight.

5.6 Instead of abandoning its use after such discoveries, Yemeni researchers instead searched for remedies to combat qat's side effects. For example, it was found that a tea made from the quince fruit (*safarjal*) could, when ingested after chewing qat, limit or reverse unwanted side-effects and "give the body back what qat took from it".<sup>148</sup>

5.7 Other remedies were rooted in the traditional perception of the body being precarious balanced between the four humors of ancient Greek medicine.<sup>149</sup> Each humor has two inherent qualities drawn from the twin categories: *wet/dry* and *hot/cold*. Thus the four humors have the following qualities:

blood	wet/hot
phlegm	wet/cold
yellow bile	dry/hot
black bile	dry/cold

5.8 Qat acts on the black bile, and its character is thus dry and cold. Because qat is dry, the qat chewer drinks a lot. Because it is cold, the prudent chewer will first, before a chew, make himself hot by a special lunch. In the past, many chewers used to take exercise before chewing in order to get hot. Imam Yahya (r. 1904-1948) is said to have run up Jebel Nuqum, the tall mountain above the old city of Sana'a.<sup>150</sup> Such practices are not common today, but chewers will keep the windows tight shut for fear of the chill.<sup>151</sup>

### C. PHARMACOLOGY AND BIOCHEMISTRY OF QAT

5.9 The chemical nature of qat has been under analysis since the late 19<sup>th</sup> century. It was not until 1930 that the alkaloid cathine (norpseudoephedrine) was identified and thought to explain qat's stimulating effects.<sup>152</sup> Later studies, however, revealed that the amount of cathine contained in a portion of qat was insufficient to account for the symptoms observed.<sup>153</sup>

5.10 In the 1970s, the alkaloid cathinone (aminopropiophenone) was identified.<sup>154</sup> Not only did this new substance chemically resemble amphetamine, but also had similar stimulating effects, such as increased locomotor activity and higher oxygen consumption.

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<sup>147</sup> Quoted in Ghani *et al.* (1987): The influence of Khat-chewing on birth-weight in full-term infants. *Social Science and Medicine* 24/7, p. 625 with a reference to Shahandeh *et al.* (eds.) (1983): The health and socio-economic aspects of khat use. Proceedings of an International Conference on Khat, Antananarivo, 17-21 January 1983. Lausanne, International Council on Alcohol and Addictions.

<sup>148</sup> Schopen, A. (1983): Traditionelle Heilmittel in Jemen. Wiesbaden, Franz Steiner Verlag, p. 81.

<sup>149</sup> Weir 1985, p. 43.

<sup>150</sup> Kennedy 1987, p. 81.

<sup>151</sup> Weir 1985, p. 43.

<sup>152</sup> Wolfes, O. (1930): Über das Vorkommen von d-nor-iso-Ephedrin in *Catha edulis*. *Archiv der Pharmazie*, 268 or 308 (?): 81-83; and Brücke, F. (1941): Über die zentral erregende Wirkung des Alkaloides Cathin. *Archiv für experimentelle Pathologie und Pharmakologie*, 198: 100-106.

<sup>153</sup> Kalix 1987, p. 49

<sup>154</sup> United Nations (1975): Studies on the chemical composition of khat (III): Investigations on the phenylalkylamine fraction (MNAR/11/1975); see also Schorno, X. & E. Steinegger (1979): The phenalalkylamines of *Catha edulis* Forsk: The absolute configuration of cathinone. United Nations Document (MNAR/3/1979).

5.11 Although cathinone is more potent with regard to stimulation of the central nervous system than cathine, it is less stable and decomposes within two to three days. The concentration of cathinone was found highest in freshly harvested young qat leaves which explains consumers preference for this type of material.<sup>155</sup>

5.12 A number of other constituents of qat have been defined over the past two decades, but it is unlikely that any of these compounds, except for the tannin, plays a role in the plant's effects. Tannin is responsible for various gastrointestinal disorders associated with the consumption of qat (see below).<sup>156</sup>

5.13 There is some concern that the isolation of the stimulant cathinone could lead to abuse as it has for cocaine. It is not known that this has occurred, although there are reports of the use of "qat pills" amongst Israelis of Yemeni origin. However, due to the short lived nature of the active constituents of qat, they would lose their stimulating effects and decompose within a few days. With artificially produced cathinone this would not be any different. The question of whether cheaper industrially produced cathinone could help to reduce spending on qat and the wasting of precious water resources must therefore be answered with *no* (for the dependence producing "alternative" Methcathinone see annex 7).<sup>157</sup>

#### D. PHYSICAL HEALTH EFFECTS OF QAT

5.14 Due to its complex constituents, the plant-derived stimulant qat has a wide range of physical effects on the human body. Most of them must be considered as negative, however, some have positive aspects. Qat for example seems to clean the teeth and its use may contribute to the low incidence of diabetes in Yemen. In addition, qat has a high Vitamin C content.

5.15 Over the past years a lot of research has been carried out on the physical health effects of qat. Many vital questions, however, such as whether qat consumption affects life expectancy and mortality or if it causes cancer, remain open. One of the shortcomings of medical research on qat is that it is in most cases unknown how many users of the stimulant are affected by the disorders its consumption may cause.

In the following account the current state of research is summarized.

##### Gastrointestinal Effects

5.16 Tannins contained in qat leaves are responsible for a variety of disorders of the digestive system, such as constipation, gastritis, and loss of appetite. The high rate of anorexia-like symptoms reported among qat chewers is explained by the appetite-suppressing characteristics of qat, which it has in common with other amphetamine-type stimulants. In the past the anorectic effects of qat have often been described as a form of *anorexia*; they are, however, short-lived.

<sup>155</sup> Giannini, A. et al. (1986): Khat: another drug of abuse? *J. Psychoactive Drugs*. (Apr.-Jun.) 18/2, p. 156.

<sup>156</sup> The tannin content of Qat that varies considerably from one variety of Qat to another is associated with environmental differences. High nitrogen in the soil produces a higher drug content. A high calcium content results in lower tannin. The high quality qats of Dula and Wadi Dahr come from the high plains, where soil and water conditions are propitious (see Kennedy 1987, p. 187).

<sup>157</sup> Methcathinone, a derivative of cathinone, that has more or less the same effects as cathinone, is, however, much more stable and longlived due to its modified structure. Considerable abuse of this substance has been reported from Europe and the United States (see annex 6).

Frequent constipation resulting from qat chewing has been linked to hemorrhoids, from which 60 percent of qat chewers are reported to suffer.<sup>158</sup>

Additionally, an increase in the probability of developing esophageal and other digestive tracts cancers have been suggested.<sup>159</sup>

## Liver Disorders

5.17 The tannic acid contained in qat leaves is also considered a possible contributing factor to the high level of liver cirrhosis observed in Yemen. Various endemic diseases such as schistosomiasis and hepatitis are, however, held responsible for the majority of liver-disorders.<sup>160</sup> Among habitual qat chewers, both male and female, a slightly higher incidence of liver disorders (cholecystitis, hepatic insufficiency) has been found.<sup>161</sup>

## Oral Effects

5.18 Qat use is associated with inflammations of the mouth (stomatitis), which are especially observed among newly initiated chewers.<sup>162</sup> The high concentration of tannin contained in qat is considered a contributing factor to the development of periodontal disease.<sup>163</sup> Dryness of the mouth which might last up to two days, is a widespread phenomenon among qat chewers, which could explain the large quantities of water consumed during and after qat chewing.<sup>164</sup> The observation of white lesions in 50 percent of qat chewers has raised speculation that qat chewing could be a likely oral leukoplakia risk factor.<sup>165</sup> Research on the association between the use of qat and oral leukoplakia did not, however, produce any statistically significant results.<sup>166</sup>

## Cardiovascular Effects

5.19 Short term effects of qat ingestion on the cardiovascular system were detected when monitoring EKG changes over three hours of chewing when an increase in heart rate was observed.<sup>167</sup>

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<sup>158</sup> Personal communications: President of the Yemeni Cancer Society Dr. Ahmed al-Hadrani, Medical Faculty, University of Sana'a (P. Gatter).

<sup>159</sup> LeBras, M. & Y. Frétilière (1965): Les aspects médicaux de la consommation habituelle du cath. *Médecine Tropicale* 25: 720-732; Morton, J. (1980): Search for carcinogenic principles. *Recent Advances in Phytochemistry* 14: 53-73. See also *Al-Thoura* Newspaper, 29 April 1999, Qat: The Pros and Cons (Investigative Journalism by the Saba News Agency of Yemen)[in Arabic].

<sup>160</sup> See *al-Ghdaian* (1983): Khat in the Shari'ah. In: Shahandeh et al., p. 238.

<sup>161</sup> *Kennedy et al.* 1983, p. 791.

<sup>162</sup> *al-Ghdaian* (1983): Khat in the Shari'ah. In: Shahandeh et al., p. 238.

<sup>163</sup> *Halbach, H.* (1972): Medical aspects of the chewing of khat leaves. *Bulletin of the World Health Organization* 47/1: 21-29; *Luqman & Danowski* (1976): The Use of Khat (*Catha edulis*) in Yemen. Social and medical observations. *Annals of Internal Medicine* 85/2: 246-249; *Kalix, P.* (1987): Khat: scientific knowledge and policy issues. *Br. J. Addict.* (Jan.) 82/1, p. 48.

<sup>164</sup> *Kalix, P.* 1987, p. 48. See also *Halbach* 1972.

<sup>165</sup> *Hill & Gibson* (1987): The oral and dental effects of q'at chewing. *Oral Surgery, Oral Medicine, and Oral Pathology* 63/4: 433-436.

<sup>166</sup> *Macigo et al.* 1995, p. 271 f.

<sup>167</sup> The average heart rate increased a total of about 10 beats/min. during the first 90-100 min. of a session, and then gradually tapered off to their previous level over another 90-100 min., even though some Qat was still being chewed during this latter period (see *Kennedy et al.* (1980): Qat Use in Northern Yemen and the Problem of Addiction: A Study in Medical Anthropology. *Cult. Med. Psychiat.* 4, 311-344 (60 Yemeni males participated in this study)).

5.20 Whether qat ingestion has long term effects, and whether permanent damage is inflicted on the blood vessels and the heart is not yet known. Some studies report that migraine, cerebral hemorrhage, myocardial insufficiency, infarct, pulmonary edema, and tachycardia have been observed after the intake of qat, particularly in older and predisposed individuals<sup>168</sup> and that "hypertension in young persons ... is due to the chronic intake of khat [qat]...",<sup>169</sup> but little quantitative data for these findings is provided. Such adverse cardiovascular effects are mainly attributed to the sympathomimetic activity of the qat alkaloids.

### Urinary Tract Effects

5.21 Urination and defecation are inhibited due to the use of qat. The reason for urinary retention in males is the hypotonicity of the smooth muscle of the bladder.<sup>170</sup> Female chewers have a higher prevalence of urinary problems. Twenty-two percent of heavily chewing females were diagnosed to suffer from urinary disorders, whereas only 8 percent of non-chewing females suffered from such problems. In males the difference between chewers and non-chewers was not as apparent (17% and 16% respectively). The reason for this gender difference may be due to the fact that females generally have poorer diets and are thus more vulnerable to poor sanitary conditions.<sup>171</sup>

### Qat and Nutrition

5.22 Malnutrition and a poor daily diet are generally associated with poverty, although poverty is not always the main reason for malnutrition. In Yemen, qat chewing is another important determinant since it competes directly with the purchase of food and it affects the appetite. A recent study by *Lenaers & Gatter* (1999) suggested that an average Yemeni family may spend 28 percent of its income on qat (see chapter 'Qat and Income').<sup>172</sup> Although this share is higher than found in larger surveys, it is an observable fact that many households, especially poorer ones, spend more on qat than they can afford, to the detriment of the food budget. Yemenis who do not have sufficient money to purchase qat and food, may choose to spend their money on qat, since it functions as a hunger depressant. The poor spend a much higher percentage of their wages on qat than the financially better off. As a result, they and their families often have too little food and family health status is affected<sup>173</sup>.

5.23 The fact that families so readily spend money on qat does not indicate necessarily that they have money 'to waste', but that qat is a very important aspect of their life. Within the family there is a gender split in attitudes: in the *Lenaers and Gatter* (1999) study, women seem to be more aware that their dietary intake is insufficient - when asked how they would spend an additional 5000 Rls., 89 percent indicated that they would spend the entire amount on food. The remaining 11 percent of the respondents would either use this sum for clothes, medication or for

<sup>168</sup> *Gendron et al.* (1977): Accidents cardiovasculaire aguis déclenchés par le khat. *Médecine Tropicale* 37: 69-73; *al-Ghdaian* (1983): Khat in the Shari'ah. In: Shahandeh et al., p. 238. See also *Kalix, P.* 1987, p. 50; and *Luqman, W. & T. Danowski* (1976): The Use of Khat (*Catha edulis*) in Yemen. Social and medical observations. *Annals of Internal Medicine* 85/2: 246-249.

<sup>169</sup> *Luqman & Danowski* 1976, pp 246-249.

<sup>170</sup> *Giannini, A. et al.* (1986): Khat: another drug of abuse? *J. Psychoactive Drugs* (Apr.-Jun.) 18/2: 155-158; see also *Nasher, A. et al.* (1995): Khat chewing and bladder neck dysfunction. A randomised controlled trial of alpha 1-adrenergic blockade. *Brit. J. of Urology* 75/5: 597-598.

<sup>171</sup> *Kennedy et al.* 1983, p. 788 and 790.

<sup>172</sup> *Lenaers & Gatter* 1999.

<sup>173</sup> *Lenaers & Gatter* 1999.

qat.<sup>174</sup> It is therefore likely that both the nutritional situation of Yemeni families, as well as access to health services would ameliorate if qat were absent.

5.24 The *Lenaers & Gatter* (1999) study also found that 69 percent of women interviewed were unable to raise sufficient money to pay for medical treatment or adequate medication in case of sickness. In some extreme cases family members of the respondents had died because they did not have access to medical treatment due to a lack of financial resources. In other cases, women were forced to sell their dowry-gold in order to pay for treatment or medication.<sup>175</sup>

5.25 The share of qat in the expenditures of the poor also affects the education of the next generation, as there are insufficient resources for clothing and schooling. Table 1 shows that the average share spent on these in Yemen is below 3.2 percent of the family budget.<sup>176</sup> Low education in return affects morbidity and mortality.

### Maternal Health Effects

5.26 Qat chewing is associated with decreased birth-weight. Thirty percent of babies born to qat chewing women (occasional and regular users) are underweight (less than 2500 grams), as compared to 22 percent to non-chewers.<sup>177</sup> It was also found that cathinone (norpseudoephedrine) is secreted into breast-milk and thus transferred to the breast fed infant, which may be another reason for the high level of underweight babies in Yemen.<sup>178</sup>

5.27 Concomitant diseases in new mothers were significantly more common among qat chewers (8 percent) than among non-chewers (3 percent).<sup>179</sup> Unspecified pregnancy complications were reported in 4 percent of non-chewing women and 6 percent of habitual qat consumers.<sup>180</sup>

5.28 Studies involving birth-giving women revealed that the regular female qat-chewer is older than 24 years (the median age of all observed mothers), of higher parity (an average of 4 children compared to 3 in non-chewers) and has more surviving children (attributed to a better financial status of chewers compared to non-chewers). Differences in levels of education between the chewing and non-chewing women could not be determined.<sup>181</sup>

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<sup>174</sup> *Lenaers & Gatter* 1999.

<sup>175</sup> *Lenaers & Gatter* 1999.

<sup>176</sup> Although government schools do not charge fees, schooling is not without costs. Parents have to pay a registration fee at the beginning of the year and fees for exams. They must pay also for books, pens, and a school uniform, which means an average of 100 YR per child per month (*Lenaers & Gatter* 1999).

<sup>177</sup> *Eriksson et al.* 1991, p. 108.

<sup>178</sup> *Kristianson et al.* (1987): Use of Khat in lactating women: a pilot study on breast-milk secretion. *J. of Ethnopharmacology* 21/1: 85-90. Studies on pregnant guinea-pigs have revealed that cathinone reduces myoendometrial blood flow (*Eriksson et al.* 1991, p. 109 f.), increases the placental vascular resistance and reduces placental blood flow in growth-retarded fetuses (*Jansson et al.* (1987): Effect of the khat alkaloid (+)norpseudoephedrine on uteroplacental blood flow in the guinea pig. *Pharmacology* 34/2-3: 89-95). It was also found that in Qat-fed guinea-pigs maternal food intake was reduced and maternal weight gain was lower than in control groups (*Jansson et al.* (1988): Effect of khat on maternal food intake, maternal weight gain and fetal growth in the late-pregnant guinea pig. *J. of Ethnopharmacology* (May-Jun.) 23/1: 11-17). It seems reasonable to assume that several of these mechanisms might be responsible for the fetal effects described in humans above.

<sup>179</sup> *Eriksson et al.* 1991, p. 108.

<sup>180</sup> Influence of Qat-chewing on congenital malformations, still-births and early neonatal mortality could not be determined (*Eriksson et al.* 1991, p. 108).

<sup>181</sup> *Eriksson et al.* 1991, p. 109.



## Effects on Sexual Activity

5.29 It is common belief among Yemeni men that low quality qat can lead to loss of sexual desire, as well as loss of seminal liquid (spermatorrhea) and impotence.<sup>182</sup> A temporary form of impotence has been associated with qat. When limiting the consumption of qat, or abandoning chewing for a period of time, this disorder is reported to be overcome.<sup>183</sup> Other studies have found that chronic use of qat may lead to impotence.<sup>184</sup>

5.30 High quality qat on the other hand is said to enhance sexual desire and increase the length of performance. Even though it is reported that ejaculation is sometimes painful due to a qat-induced constriction of vessels, it is said to be often more pleasurable than usual.<sup>185</sup>

5.31 Further research is needed on the effects of the drug on sexual activity and performance. Especially for women there is a great lack of information. From the little that is known in this respect, it can only be said that in general women experience more negative effects in sexual experience due to qat consumption than men. A study found that only about 4 percent of Yemeni women reported positive effects, while about 10 percent reported negative effects. For male respondents the figures were quite different - 36 percent claimed positive effects while nearly 21 percent had negative sexual experiences.<sup>186</sup>

## Effects on Male Reproductivity

5.32 Research on the effects of qat consumption on male reproductivity, semen parameters and sperm ultrastructure showed that qat consumption has more impact than generally believed.

5.33 Significant decreases in testosterone secretion were observed due to the intake of crude qat extracts.<sup>187</sup> Cathinone has also been shown to inhibit secretion of the hypophysis.<sup>188</sup> Stress-like syndromes produced by cathinone were found to suppress gonadal function and decrease testosterone levels.<sup>189</sup> The examination of testes showed degenerative changes in the interstitial tissue and a reduction in size of inner testicle cells.<sup>190</sup> Experiments with animals showed that prolonged cathinone treatments result in a significant reduction in the weight of testis, cauda epididymis and seminal vesicles.<sup>191</sup> Cathinone also produced a decrease in sperm count, increased sperm mortality and increased number of abnormal sperms. Research showed that heavy qat consumption lowers semen parameters in all users, and may alter the morphogenesis of every part of the spermatozoon, producing ~65 percent deformed spermatozoa. In addition the longer the

<sup>182</sup> *al-Ghdaian* (1983): Khat in the Shari'ah. In: Shahandeh et al., S. 238; and *Kennedy* 1987, S. 119.

<sup>183</sup> E.g. *Kennedy* 1987, p. 129 and 124.

<sup>184</sup> *Margetts, E.* (1967): Miraa and myrrh in East Africa - Clinical notes about *Catha edulis*. *Economic Botany*, 21: 358-362, and *Kalix* 1987, p. 48.

<sup>185</sup> Personal communications and *Kennedy* 1987, p. 129.

<sup>186</sup> *Kennedy* 1987, p. 130.

<sup>187</sup> Decreases in plasma testosterone and dihydrotestosterone (*Parmar, N. & M. Tariq* (1984): Studies on endocrine disturbances induced by chronic khat (*Catha edulis* Forssk.) administration in albino rats. 6<sup>th</sup> Eur. Sym. on Animals, Plant and Microbial Toxins. Basel, August 27-31).

<sup>188</sup> An inhibition of the release of several anterior pituitary hormones was found (*Wagner, G. et al.* (1982): Neurochemical similarities between d,l-cathinone and d-amphetamine. *Drug and Alcohol Dependence* (Aug.) 9/4: 279-284).

<sup>189</sup> By a massive release of catecholamines.

<sup>190</sup> The histopathological showed degenerative changes in the interstitial tissue and atrophy of Leydig's and Sertoli cells (*Kalix, P.* (1986): The release effects of the isomers of the alkaloid cathinone at central and peripheral catecholamine storage sites. *Neuropharmacology* 25, 499).

<sup>191</sup> *Islam et al.* (1990): An evaluation of the male reproductive toxicity of cathinone. *Toxicology* 60/3: 223-234.

period of use, the more serious are the effects on semen parameters and the more deleterious are the effects on sperm morphology and, in turn, male fertility.<sup>192</sup>

5.34 These findings support earlier reports showing impairment of male sexuality<sup>193</sup> and loss of libido in qat chewers<sup>194</sup> as well as inhibition of spermatogenesis and decreased semen output.<sup>195</sup>

5.35 The mechanism of cathinone induced male sexual dysfunction is not clear. Besides decreases in testosterone levels, food intake was found to be reduced by 72 percent following the higher dose of cathinone. Partial or total starvation is known to affect the male reproductivity system and produce atrophy of testes and epididymis.<sup>196</sup>

5.36 There are no data available on the effects of qat on female reproductivity. Research is needed in this area

### **Qat and Parasites**

5.37 Medical research conducted in Yemen in the 1980s showed a slightly higher prevalence of parasites among qat chewers (particularly among women), than among non-chewers. Parasites were detected in 30 percent of female light chewers and in 23 percent of heavy chewers. For female non chewers the figure was only 16 percent.<sup>197</sup> This might be attributed to the fact that qat is an orally ingested drug. Many parasites found in Yemen usually enter the body orally through food and drink. The intake of qat, especially when washed with contaminated water, might thus act as a vehicle facilitating colonization by these organisms.<sup>198</sup>

## **E. PSYCHOLOGICAL EFFECTS OF QAT**

5.38 Some of the psychological effects of qat chewing, viewed as desirable by the user, have been mentioned above. Along with a variety of negative side-effects these characteristics deserve further attention.

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<sup>192</sup> *El-Shoura et al.* (1995): Deleterious effects of khat addiction on semen parameters and sperm ultrastructure. *Hum. Reprod.* 10/9: 2295-2300.

<sup>193</sup> World Health Organisation Expert Committee on Addiction-Producing Drugs (1964): Khat. Technical Report Ser. 273, 10.

<sup>194</sup> *Krikorian, A.* (1983): Khat and its use: An historical perspective. In: Shahandeh B. et al. (eds.): The health and socioeconomic aspects of khat use. pp. 7-71.

<sup>195</sup> *Hammouda, E.* (1978): Effects of dietary khat extract on the testes of the white leghorn, *Gallus domesticus*. *Bulletin of the Fac. Sci King Abdul Aziz University* 2, 17.

<sup>196</sup> *Islam et al.* 1990, p. 232.

<sup>197</sup> Parasite colonisation for male non- and heavy chewers showed with 19 and 20 percent respectively no significant difference. *Kennedy et al.* (1983): A Medical evaluation of the Use of Qat in Yemen. *Social Science and Medicine* 17/12, pp. 788, 790.

<sup>198</sup> *Kennedy et al.* 1983, pp. 788, 790.

### Stimulating Effects

5.39 A variety of stimulating effects of qat use have been reported. Figures in brackets represent the percentage of qat users experiencing these effects, figures before the comma represent males, and figures after the comma females.<sup>199</sup>

5.40 A considerable number of qat users perceive an increase in mental powers. They report a greater understanding of personal problems or life in general (50 percent, 17 percent), as well as an increase in the flow of ideas (68 percent, 22 percent). Qat is also said to stimulate imaginative powers and generate creativity. However, it has been reported that the results of qat-induced creativity need careful investigation the day following a qat session, when the effects of the drug have worn off. Some qat users will then discover that they had overestimated their abilities or simply produced a wild array of confused ideas.

5.41 Providing a framework for business and politics, qat sessions are also the setting in which many important decisions and transactions are made. Users of qat state that the positive atmosphere prevailing in these sessions is generated by the plant, facilitating mutual understanding and thus decision-making. The same as for qat-induced creativity is, however, also true for decisions taken during qat sessions. If not too late, the decisions are carefully reviewed the next day and a toned down version may be issued.

5.42 Qat is also known to increase alertness (65 percent, 19 percent). Qat is thus chewed by many drivers, particularly professionals, such as taxi and truck drivers. To a lesser extent qat also increases the ability to concentrate (20 percent, 19 percent). Many high-school and university students claim that qat helps them to focus on their studies and will use the drug during exams. The fact that qat is said to create or increase the desire to work (59 percent, 41 percent) may also play a role in influencing students' qat consumption.

5.43 Besides giving rise to an optimistic and even euphoric state of mind, qat is said to engender contentment (68 percent, 67 percent), self-confidence (62 percent, 33 percent) and friendliness (58 percent, 27 percent), which may be responsible for a greater ability to mediate arguments and even tribal feuds. Many Yemenis also point out that qat chewing elevates them into a spiritual mood in which they feel closer to God (63 percent, 62 percent). They are able to stay up longer and consecrate time to prayers and religious reflections, an argument frequently brought into play when a religious restriction of the drug is discussed.

### Negative Psychological Effects

5.44 Qat chewing also involves a wide range of negative and unwanted psychological effects that do, however, not keep Yemenis from consuming the stimulant. These unwanted side effects are generally attributed to qat of inferior quality or to excessive chewing.

5.45 The most widespread of these negative effects, experienced by 58 percent of qat chewers, is insomnia. Qat chewers reported sleeping an average of 6.6 hours per night, whereas non-chewers reported sleeping an average 7.8 hours. This insomnia feature of qat has also been associated with a rise in alcohol use in Yemen, because it is believed that alcohol consumption (as well as that of milk) after chewing will eliminate the insomnia effects of the stimulant.<sup>200</sup>

<sup>199</sup> The figures are taken from a study conducted by *Kennedy*. Since exact figures are not always given, the data can only be approximate (see *Kennedy* 1987, pp. 108-131).

<sup>200</sup> *Kennedy* 1987, pp. 128-129.

5.46 Other negative effects include: greater nervousness which has been experienced by 35 percent of male, and 12 percent of female chewers, loss of ambition or frustration (12 percent, 6 percent), sadness (44 percent, 16 percent), the feeling of failure (13 percent, 4 percent), helplessness (10 percent, 9 percent), fear (8 percent, 7 percent), and perceiving people as evil (10 percent, 6 percent).<sup>201</sup>

5.47 Chronic use of the stimulant may result in psychopathic behavior and can lead to profound personality disorders.<sup>202</sup> Even though aggressiveness can rarely be witnessed during qat sessions, women report higher levels of domestic violence after their husbands have chewed. A recent study by *Lenaers & Gatter* (1999) on the effects of qat on family life noted the following:

[Husbands] come home *kayyif* which means that their state of mind is very different from their non-chewing family members. In most cases the men do not want to speak after qat consumption and prefer to be left alone. 8 percent of women of the focus groups stated that their husbands sometimes get so nervous after chewing qat that they start shouting when approached and beat their children who ask for the attention of their fathers... [The interviewed] mentioned at least 6 examples of divorce due to qat. This is either because some men had beaten their wives or because the latter were heavy chewers asking their husbands for too much qat.<sup>203</sup>

5.48 When chewing excessively in addition to the above mentioned effects, hallucinations can be experienced. Qat chewers have reported feeling insects crawling on their body (22 percent, 18 percent), experienced non-occurring events (19 percent, 3 percent), or have had supernatural experiences. Some report believing themselves in another place (18 percent, 9 percent) and others misperceive threats (12 percent, 7 percent). Over half of the qat chewers frequently experience mild depression, such as hopelessness, feeling of having lost a battle, or worthlessness (50 percent, 56 percent). Some chewers reported disjointed speech. The mind being faster than the tongue "words tumble out in a manic jumble".<sup>204</sup> Others reported distorted perception (9 percent, 8 percent) and some chewers experience states of confusion, lose sense of time and place, or face distortions of their short term memory.<sup>205</sup>

5.49 All the above described effects associated with qat use seem, however, to be temporary and disappear gradually within several hours. If the ingestion of qat is abandoned permanently they do not reappear. So far no cases of permanent qat psychosis have been reported.<sup>206</sup>

## The Gender Difference

5.50 In both the stimulating and the negative effects of qat chewing, a gender difference is observed. Males tend to be more vulnerable to these effects and report both stimulating and negative experiences much more frequently than females. Only in the case of contentment, the feeling of concentration, and distorted perception do the figures for males and females match. For depression caused by qat ingestion the numbers for females are even slightly higher than for men.

5.51 This gender difference can perhaps best be explained the fact that women in general chew much smaller amounts of qat than do men and are thus exposed to smaller quantities of the drugs

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<sup>201</sup> *Kennedy* 1987, pp. 124-127.

<sup>202</sup> *Kalix, P.* (1987): Khat: Scientific Knowledge and Policy Issues. *British Journal of Addiction* 82/1, p. 50.

<sup>203</sup> *Lenaers & Gatter* 1999.

<sup>204</sup> *Kennedy* 1987, p. 112 and 124-129.

<sup>205</sup> *Kennedy* 1987, p. 121.

<sup>206</sup> *Yousef, G., Z. Huq & T. Lambert* (1995): Khat chewing as a cause of psychosis. *British J. of Hospital Medicine* (Oct. 4-17) 54/7: 322-326; and *Alem, A. & T. Shibre* (1997): Khat induced psychosis and its medico-legal implication: a case report. *Ethiopian Medical J.* (Apr.), 35/2: 137-141.

active components cathin and cathinone. This is supported by the findings of *Lenaers & Gatter* (1999) who write that

”If women [here of the Akhdam community] buy qat for themselves, they spend 50 to 100 YR per qat session for 3 or 4 women... In case the men buy the leaves the amount of money spent per person ranges from 50 to 400 YR, depending on their financial situation and the importance they attach to qat”.<sup>207</sup>

## Does Qat Cause Dependence?

5.52 Some studies have found that qat consumption may induce moderate but persistent psychic dependence.<sup>208</sup> The withdrawal symptoms after prolonged qat use seem to be limited, however, to lethargy, mild depression, slight trembling and recurrent bad dreams.<sup>209</sup> In contrast to the effects of amphetamine, those of qat seem not to be susceptible to the development of tolerance, which is probably due to the physical limits on the amount that can be chewed rather than an inherent property of the drug.<sup>210</sup>

5.53 Based on animal experiments<sup>211</sup> which have shown that cathinone has the same mechanisms of action as amphetamine, and can thus be dependence-producing, the WHO has recommended that cathinone be placed under international control.<sup>212</sup> Since then, it has been included in Schedule I of the UN Convention on Psychotropic Substances. This has led a number of western countries, such as Canada, the USA, and Germany, to put controls on import and production of qat.

5.54 A frequently heard argument that qat is not dependence producing is that the customary pattern of chewing a bundle of leaves over a 4-5 hour period places ”natural limits on the amount of the drug that can be ingested”<sup>213</sup> and consequently also limits the quantity of cathinone absorbed. Recent developments in Great Britain, however, change this picture. *Brown et al.* (1995) reported that, ”along with other drugs of abuse” qat has lately been found at ‘Rave’ dance events. Here the stimulant is consumed as a juice, which is either produced by alcohol extraction of the active ingredients or by blending the leaves with water and lemon and filtering the resulting mixture.<sup>214</sup> This way of consumption exposes the body to much larger quantities of cathinone. Taken the above findings into account it is very probable that dependence is produced. There is, however more research needed to verify this assumption.

<sup>207</sup> *Lenaers & Gatter* 1999.

<sup>208</sup> *Eddy et al.* (1965): Drug dependence: Its significance and characteristics. *Bulletin of the World Health Organisation*, 32: 721-733.

<sup>209</sup> *Kennedy et al.* 1980; *Halbach* 1972.

<sup>210</sup> *Kalix* 1987, p. 48.

<sup>211</sup> Behavioural studies have shown that the response of rats, trained to distinguish between a placebo and amphetamine, was not modified when amphetamine was replaced by cathinone (see *Rosecrans, J. et al.* (1979): Discriminative stimulus and neurochemical mechanisms of cathinone: A preliminary study. In: Harris, L. (ed.): Problems of drug dependence, Washington, D.C., *National Institute on Drug Abuse (NIDA) Research Monograph 27*). Self administration experiments with monkeys showed that the reinforcing efficacy of cathinone was equal to that of cocaine (see *Woolverton, W. & C. Johanson* (1984): Preference in rhesus monkeys given a choice between cocaine and cathinone. *J of the Experimental Analysis of Behavior* 41, 35-43). In such experiments monkeys make frequent injections of cathinone for a period of several days. They will eventually stop due to exhaustion, but will resume again after having recovered - a pattern of drug intake characteristic of amphetamine dependence (see *Oinuma, N. et al.* (1981): Dependence Potential of Cathinone. *Japanese J. of Pharmacology* 31, p. 279; and *Kalix* 1987, p. 49).

<sup>212</sup> *World Health Organisation Expert Committee on Drug Dependence* (1985): Twenty Second Report. WHO, Geneva.

<sup>213</sup> *Kennedy et al.* 1983, p. 784.

<sup>214</sup> *Brown, E., D. Jarvie & D. Simpson* (1995): Use of drugs at 'raves'. *Scottish Medical J.* (Dec.) 40/6: 168-171.

5.55 In the 1956 WHO typology of ‘drug dependence’, there are two major types of dependence isolated: physical dependence and psychic dependence. The typology classes all drugs in seven categories, qat making up an own category:

- morphine
- barbiturate – alcohol
- cocaine
- cannabis
- amphetamines
- qat*
- hallucinogenic substances.

## F. INDIRECT HEALTH HAZARDS OF QAT

5.56 In addition to the above discussed direct health hazards, qat chewers are exposed to a variety of indirect dangers to their well being. Little research has been conducted on these issues, however, they are crucial to understand the full extent of the implications of chewing.

5.57 One of the problems faced by a vast number of chewers and their families is malnutrition. This is (see above) a result of both the anorectic effects of qat and the financial burden of qat in the family budget, reducing the resources for food. Malnutrition in turn increases the susceptibility to infectious diseases. This section deals with the other indirect effects of the qat habit.

### Alcohol and Soft Drinks

5.58 An indirect threat to health which is associated with chewing is the consumption of alcohol, which is said to have risen considerably in recent years. Alcohol as well as sedatives are used to overcome insomnia caused by qat use. The consumption of soft drinks, commonly used to ingest the bitter qat leaves is said to be harmful for the teeth due to their high sugar content.<sup>215</sup> However, no research has so far been conducted on either of the above issues.

### Accidents

5.59 To what extent qat use contributes to accidents at the workplace or traffic accidents is a subject of debate. Many Yemenis emphasize increased awareness, and qat is thus consumed by a majority of taxi and truck drivers. Opponents of the plant, however, point out that many drivers are preoccupied with ingesting qat and do not give adequate attention to driving. In addition, qat-induced euphoria may well affect drivers' judgement.

### Smoking

5.60 A study that looked at respiratory disorders in Yemen found that increasing levels of qat-use were strongly associated with an increasing prevalence of respiratory problems, such as heightened respiration, shortness of breath, bronchitis, bronchial pneumonia, chronic bronchial asthma, respiratory vesicularis, and emphysema. Cases of bronchitis for example were found to

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<sup>215</sup> Personal communications: Dr. Souad al-Hibshi, Faculty of Dentistry (University of Sana’a, Yemen).

be up to three times more frequent in heavy qat chewers than in non chewers.<sup>216</sup> This can be attributed not so much to the effects of qat itself, but to smoking during qat sessions, since people tend to smoke much more heavily during qat sessions than at other times. Passive smoking, even for infants present at female chewing sessions, is a further contributing factor for these disorders. The Yemeni Cancer Society identified passive smoking during qat sessions as one of the major contributing factors to cancer in Yemen.<sup>217</sup>

## Tuberculosis

5.61 Smoking the water-pipe (*mada'a*) in qat sessions is one of the reasons for the high level of tuberculosis in Yemen. The common mouthpiece is passed from participant to participant, as are also cups containing water or soft drinks. Ejecting the chewed residues of leaves into the open spittoons, an accessory of each gathering room (*mafraj*), is a further source of tuberculosis infection.

## Pesticides

5.62 The unscientific use of pesticides is one of the great dangers threatening man and environment in Yemen. Several studies have demonstrated that pesticides can cause cancer, human mutations, congenital malformations, inhibition of body immunity and endocrine disturbances. There have also been reports on fatal pesticide poisoning in Yemen among qat farmers.

5.63 Due to the economic importance of qat as a cash crop, producers use pesticides on a large scale in order to protect the plant from various pests, to ensure healthy foliage, larger leaves and a more attractive leaf coloring. Many farmers believe that these effects are enhanced with greater quantity of pesticides and they therefore mix several different products, often using substances restricted in other countries, such as DDT and Lindane.<sup>218</sup> There is little awareness in Yemen of the danger of these products to health. Pesticide spraying is also done with little consideration for the protection of the applicant. Women washing the pesticide-stained clothes of their husbands and children playing with empty pesticide cans are heavily exposed to these toxic substances. Moreover, most qat farmers do not respect the safety period for pesticide application and qat may be chewed within a few days of pesticide use. The majority of qat consumers do not wash the leaves before chewing them, and are thus not only exposed to the residues within the plant, but also to pesticide traces on the surface of the leaves.

5.64 Currently research is underway on less harmful natural pesticides to replace the highly toxic products still in use in Yemen.<sup>219</sup>

<sup>216</sup> Kennedy et al. 1983, pp. 789, 791.

<sup>217</sup> Yemeni Cancer Society (1996): At-Tadkhin (2<sup>nd</sup> edition 1997).

<sup>218</sup> Thabet, A.R. (1993): Interaction between the extract of a natural plant [Qat] and the toxicology of some insecticides. Ph.D. thesis, University of Alexandria.

<sup>219</sup> Thabet, A.R. (1999): Natural pesticides as new alternatives to replace the conventional hazardous pesticides in Republic of Yemen; and Thabet, A.R.. (1998): Effect of carbaryl insecticide, Khat *Catha edulis* (Forsk.) and their combination on male and female mice. *Alexandria Science Exchange*, Vol. 19/1, pp. 187-195.

## **G. THE HEALTH SECTOR'S RESPONSE TO QAT**

5.65 The present Minister of Public Health Abdul Wali Nasher has joined the recent campaign of President Saleh to reduce the consumption of qat in Yemen. The MOPH's approach is to restrict consumption in those facilities for which it has control (as of 1997, Qat chewing is prohibited in MOPH administrative buildings and in public hospitals) and to provide the public with information on the harmful effects of qat on health.

5.66 In its *Wide Sector Approach on Health Education*, which includes TV spots on AIDS and malaria, the ministry plans to include awareness programs on qat. In addition, the director of the Health Education Department is currently negotiating with the *Afif Cultural Foundation* and the *Society for Combating Qat Disadvantages* to develop TV spots on qat. The Ministry's approach is to raise awareness on the basis of scientific knowledge on the negative effects of the stimulant. The Ministry also maintains a library with an extensive collection of qat literature.

## **6. TOWARDS A POLICY AND AN ACTION PLAN**

### **OFFICIAL ATTITUDES TOWARDS QAT**

#### **Attitudes in Recent Years**

6.1 Government's attitude towards qat is ambivalent. On one hand, past government policy toward qat seems to have been somewhat negative. For example, there is an official ban on qat use in governmental offices. Farmers who grow qat are, according to public policy, excluded from access to agricultural services, including research (until recently), extension, public credit and irrigation improvement projects. Certainly, qat farmers are excluded from donor-financed agricultural projects e.g. subsidized pipes from the Land and Water Conservation Project (even though qat is one of the main land and water users). In addition, the high tax rate on qat suggest official "disapproval", and in fact qat is the only agricultural crop that is taxed at all.

6.2 On the other hand, there are numerous examples of official recognition or acceptance of qat. For example, restrictions on the use of qat that had been effectively applied in the former PDRY in the south were rapidly eliminated after Unity in 1990 and qat use has grown very rapidly there. Many official governmental and parliamentary evening meetings and sessions are conducted during qat sessions. There has rarely been any official pronouncement against qat, and there has been no attempt at an awareness program against it. As recently as 1998, the President of the Republic praised qat in a television interview (*al-Jazira*, April 1998).

6.3 In general, this ambivalence of Government approach reflects the ambivalence of Yemeni's attitudes in general towards the drug. There is a pride in this distinctively Yemeni habit, tinged with a slight apprehension that it may not be the correct characteristic for a country that wishes to join the comity of modern nations.



## Recent Developments

6.4 Since 1999, there appears to have been a current of change in Government and civil society. A number of examples will illustrate this. First and most striking, the leadership of the country made a surprise shift in 1999; the President announced that he was giving up qat and taking up computers and sport instead. He was followed by other political leaders; the governor of Ibb led a wide campaign against qat in his governorate and established an NGO to combat it and provide alternative leisure activities. In the wake of this, Government introduced the five day week (instead of six) and longer working hours (8 am to 3 p.m. instead of 8 am to 2 p.m.), a move that had long been advocated as a way of fighting qat. Police and soldiers were forbidden to chew on duty (560 soldiers were subsequently arrested for qat chewing in late 1999). Some qat markets were moved outside of the city centers, and further moves to restrict qat trading were widely anticipated. Yemenia, the national airline, also announced that it would no longer transport qat, thus greatly restricting the access of remoter non-producing areas to the drug.

6.5 At the same time, the emergence of some anti-qat movements within civil society were witnessed. Several NGOs began awareness campaigns against qat, one with the support of an international NGO.

6.6 This change culminated in a cabinet discussion in July 1999 and the decision to hold a national conference on qat in 2000. The objective would be "to set up a policy agenda on qat". Several donors have been invited to participate in preparation, which is presently underway (see Annexes 1, 2 and 4).

6.7 No change of attitude of the mainstream clerics has been recorded. By contrast, some members of Yemen's Ismaeli community (Dawoodi Buhra branch) in the Haraz mountains west of Sana'a have decided to abandon qat agriculture altogether. In the summer of 1999, Ismaeli qat farmers around al-Manakha uprooted approximately 50,000 qat plants. This move was the result of a religious decree by their Indian spiritual leader Dr. Muhammad Burhan ad-Din which likened qat as a drug to alcohol. Farmers obeying the *fatwa* received a compensation for every uprooted tree of YR 50 -100, depending on tree size. In addition, qat farmers were promised financial support for building dams in order to irrigate their fields, which up to now are mainly rainfed. Instead of qat, farmers were said to be intending to substitute coffee, maize, sorghum and millet. The financial compensation will enable them to buy new seedlings (coffee e.g. YR 80). Most farmers have however uprooted only part of their qat trees until now, in order not to be without income until their new crops will bear fruit and bring profit (coffee, for example, would come into bearing only after 2-3 years)<sup>220</sup>.

### FOCUSSING THE ISSUES - WHAT IS THE QAT PROBLEM?

6.8 The fact that attitudes to qat are everywhere ambivalent is not surprising, as the drug has characteristics that make it popular both as an economic good and as a habit for a society in transition such as Yemen. On the other hand, the ill-effects on natural resources, the economy, human health and society are palpable.

<sup>220</sup> Gatter, P. (1999): Ismaelis uproot Qat. Field Report for the World Bank.

6.9 As an economic good, qat has many favorable characteristics. Well adapted to Yemen's tough climatic conditions, it has beneficial impacts on the rural economy and ecology. Many observers attribute the preservation of Yemen's rural way of life and of its age old terrace system largely to qat. They see qat as the major contribuant to the rural economy's remarkable ability to absorb increased population at higher income levels and to reduce the rural urban drift that has so plagued other countries with similarly high birth rates. Qat has displaced other crops, but the substitution of high value cash crops for lower value or subsistence crops is a normal apart of the modernization of agriculture. However, qat production is evidently driving the serious and growing rate of mining of the nation's groundwater resources, bringing the specter of exhaustion of the resource in many areas within the next generation.

6.10 As a drug, qat seems to be relatively mild in its effects and to present relatively little health risk compared to substances like opium, heroin, cocaine, or crack. If qat were classified as a dangerous drug by the Yemeni government or by the international community, this would build the case for a much more interventionist policy, as has been the case for hashish in Lebanon, for example.<sup>221</sup> Such is not the case at present for qat, which is seen by most observers more like tobacco or wine, rather than as a dangerous drug. Nonetheless, qat has to be seen as a factor in the appalling health and nutritional status of the Yemeni population, and the risk from pesticide poisoning is substantial.

6.11 As a social phenomenon, qat presents evident advantages. Chewing is the leisure activity of choice for the entire population, and it contributes to social cohesion. It could be said that qat, as a distinctively Yemeni phenomenon, has helped Yemenis to survive the difficulties of an extraordinarily rapid modernization process with much of the traditional social and family structures and values intact and with comparatively little of the suffering of alienation experienced by other peoples. On the other hand, the evidence presented in this report of the effect of the qat habit on the family, particularly on women and children, underlines the risks to society that the excessive use of the drug brings.

6.12 Thus, qat cannot be said to be either good or bad, but to share characteristics of both. The negative impacts are basically the natural resource mining and the impacts on health and the family. This pinpoints the measures that might be considered as Government moves towards a qat "policy".

## C. ASSESSMENT OF THE CONSTITUENCY FOR CHANGE

### Factors for Change

6.13 Changing the qat habit would require a strong constituency for change. There are several factors that suggest that this constituency may be forming. First, there appears now to be a positive Government attitude towards doing something. The major change in recent months has

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<sup>221</sup> In the Lebanon after the civil war in the early 1990s, there was a concerted campaign to stamp out hashish which had been grown in the North Baqaa during the years of civil conflict and which had produced many "hashish barons". The illicit trade has now been stamped out in cooperation with the international community and including several interventions by the military.

been the emergence of leadership on the issue. There is hope that where the leaders take a position, the nation may follow. The recent re-election of the President has lent impetus to this movement. Second, there has recently been the emergence of an embryonic civil society movement against qat (see annex 5).

### **Factors Constraining Change**

6.14 In opposition to the factors listed above there are a considerable number of factors that militate against change. First and foremost, qat is the object of general recognition and tolerance – and appreciation. It is true that in the past qat *was* considered ‘*aib* (shameful) by some - but these patterns have largely broken down. There was opposition to qat amongst the ruling and educated elite in the former PDRY, but this seems to have quickly evaporated after unification. Nowadays, Yemenis are satisfied with the qat habit - and modestly proud of its “Yemeni-ness” before foreigners. They see it as a social habit, not an addiction. It has become so widespread that it is inconceivable that it could be eradicated; most Yemenis do not really see it as a problem at all. Second, there is no clear religious ruling against qat, which could have considerable influence in a traditional Islamic country like Yemen. In Saudi Arabia and other Muslim countries, qat has been declared haram by the religious establishment. In Yemen, qat has never been prohibited on religious grounds apart from a brief period in the sixteenth century. Even the conference topic “Qat and Religion” has been cancelled by the steering committee of the National Qat Conference due to concerns that the topic might prove too sensitive to be discussed openly in Yemen. Third, despite the recent moves against qat, there is not yet a broad political constituency for action on the drug. Linked to this is the memory of the failure of past attempts at control. In the north, attempts at control received political endorsement in the campaign against qat mounted in 1972 by Mohsen al-Aini. The failure of these attempts have reduced the credibility of anti-qat proposals. The association of the anti-qat stance of the former PDRY with the effective collapse of the PDRY political system has had a similar sapping impact on the credibility of political interventions.

6.15 Thus, there are some factors favoring action on qat, but there is also a complex of constraints that will inevitably reduce the scale and momentum of any change.

### **D. TOWARDS A NATIONAL ACTION PROGRAM ON QAT**

6.16 Plainly, there is a case for an action program on qat targeted at key problems such as water mining, health and family problems, and there is an embryonic constituency for such a program.. However, it is also clear that the constraints are enormous. In particular, the option of regulation of qat is unlikely to work. Under these circumstances what are the options open to the nation?

### **Policy Development and National Consensus Building**

6.17 **National Conference and Official Policy.** First, Government and the nation at large need to move towards a consensus on qat. The medium of the national conference seems an appropriate way to handle this. In July 1999 Government laid the basis for such a conference by issuing a cabinet decree (annex 1). The aim of this gathering is according to the decree to “present strategies and policies the government could adopt regarding qat”. The organizational process which is supervised by the Ministry of Planning and Development (MoPD), the Ministry

of Agriculture and Irrigation (MAI) and the Consultative Council is shown in annex 2. This conference will for the first time in Yemeni history facilitate a country-wide exchange of ideas and scientific data, and could thus generate consensus on qat with a broad base in society and Government that could lead to an official policy. The conference could also make knowledge gaps apparent and could make recommendations for further research.

**6.18 Program of Further Study.** Second, until now a key constraint in dealing with qat is the lack of information on which to base decisions, and on which to found an action program. For example, more information would help to pinpoint exactly the health and social ill-effects that could make a difference to people's attitudes in an awareness campaign. Therefore, a program of study is indicated. The main areas for further work are on social impacts, the economy of qat, qat in agriculture (particularly water use), qat and health. Box 1 gives some examples of areas for further research.

#### **Box 1: Areas for Further Research and Study on Qat**

##### **1. Social**

- impact of qat on family life and the family budget
- qat chewing among women
- qat chewing among children and youth
- qat and poverty

##### **2. Economy**

- The importance of qat in the economy
- impact of qat cultivation on the rural economy
- the marketing of qat
- the fiscal implications of qat (taxation system, efficiency, yield, and effectiveness of qat tax and its administration)
- international qat marketing and illicit qat trafficking to neighboring countries
- simulation of what happens when qat cultivation is reduced or eradicated

##### **3. Agriculture and Environment**

- water requirements of qat in relation to other crops
- qat water use and the groundwater overdraft crisis
- developing of more drought resistant qat varieties that require less water
- new irrigation techniques to use scarce water resources more effectively
- the extent of qat cultivation (field survey, satellite mapping)
- impact of qat farming on the environment (water resources, soil)
- effects of pesticides on the qat plant, water resources and soil
- alternative and less harmful pesticides
- alternative crops that could substitute for qat

##### **4. Health**

- the impact of qat on male health (many results so far are only based on animal experiments)
- qat consumption's impact on female health
- qat and female reproductivity
- effects of qat on life expectancy and mortality
- qat and alcohol use

- effects of pesticides used in qat cultivation on health.

#### 5. Additional Themes

- position of the Yemeni religious establishment on qat consumption
- how awareness programs developed for other stimulants can be adapted to the qat phenomenon
- how plastic waste produced by qat marketing and consumption (plastic bags, plastic water bottles) can be limited

6.19 **Establish a Qat Forum.** There is obviously a high interest in the qat issue and a lot of research is being carried out within and outside of Yemen. Much is duplicated, however, due to a simple lack of co-operation and scientific exchange. There is a need to stimulate a dialogue between organizations and individuals active in the field of qat in Yemen and for establishing a documentation center where their findings as well as general literature on the subject is gathered and made available. Also a comprehensive documentation on qat projects and research activities in Yemen would be desirable (a first such overview is provided in annexes 3-5). A promising way to overcome this deficiency and to address the very complex nature of the qat phenomenon is to establish an independent "qat forum", a sort of think tank or policy research center located within the non-governmental sector. Such a forum should be open to all interested parties, from Government to NGOs, donor organizations, researchers, and the general public. The activities of such a forum could go in five major directions:

- co-ordination of the work on qat in Yemen,
- establishing an literature archive on qat,
- definition of knowledge gaps,
- action steps to make people and government aware of the implications of qat on social affairs, health, the economy and many other areas of Yemeni daily life,
- assisting Government in the drafting of a qat strategy and policy.

6.20 **Education and Awareness Campaigns.** One of the most important aims should be to make people aware of the dangers of qat consumption. An education and awareness campaign could change hearts and minds as was done with smoking throughout the world over recent decades. The nation could therefore undertake a long-term education and public awareness campaigns on qat that are driven by hard facts on qat and its socio-economic and medical effects. Ideally, an NGO should take the lead, in co-ordination with the Ministry of Public Health, the Ministry of Education etc. This could include TV and radio spots on qat, as well as leaflets that are distributed in hospitals and schools. The campaign should use experience from successful awareness and public health campaigns carried out in other countries on similar issues to design awareness campaigns for the Yemeni context (e.g. look into Yemen-specific consumption habits<sup>222</sup>). Other components could include a pedagogical teachers guide - a 10-20 page publication that could assist teachers to educate their students on qat, which is currently not part of the curriculum.

<sup>222</sup> The majority of Qat chewers does not wash the Qat leaves before consumption. Hence, pesticide traces that are on the surface of the leaves enter the system directly and are held responsible for the increasing rate of cancer in Yemen. Simply washing the leaves could reduce the intake of these substances considerably.

## **Economic Instruments**

6.21 **Qat Taxation.** Efforts could be made to develop a more efficient qat taxation. Revenues could be used to finance further research and action on qat.

6.22 **Trade Policy.** Given that Ethiopian qat is cheaper, Government could consider the advantages (in terms of groundwater conservation) of opening up qat imports.

## **Agricultural Program**

6.23 On the production side, a program with four components could be envisaged: (i) crop substitution; (ii) research and extension; (iii) action on pesticides; and (iv) information and policy analysis. A special fund could be set up to finance these actions, perhaps drawing revenues from special taxes. Alternatively, the Agricultural Fund (AFPPF) could be used.

6.24 **Programs of Crop Substitution.** In other cases of drug eradication where the cultivation represents an important economic resource for poor farmers, there has been some success through the development of programs of crop substitution. Yemen could build on an example close to home, by evaluating the Saudi qat substitution program in the Asir region (1980s) and draw conclusions for the Yemeni context.

6.25 **Research and Extension.** Qat's huge role in the rural economy is creating an unsustainable groundwater overdraft, yet there is no public action to correct this. A program of research and study is needed to determine crop water requirements and develop new and more efficient irrigation techniques wasting less water. This should include ways to strengthen the Qat Research Unit. Strengthening this research entity, which is part of the Ministry of Agriculture and Irrigation (annex 3) could be a big step forward in closing the knowledge gap in the field of agriculture. Until now the unit has been unable to fulfil its task satisfactory due to a simple lack of funds and office facilities (especially computers). The unit could be turned in a functioning center of research that can ensure that qat is made the object of agricultural research and extension in order to exploit water saving potential. This research should include economic aspects, to assess the place of qat in the rural economy, and to gauge welfare, economic and natural resource implications of influencing qat production or of allowing qat imports.

6.26 **Tackling the Pesticide Issue.** It is essential to carry out research on alternative products and pest management and husbandry techniques that could replace harmful pesticides frequently used in Yemeni qat cultivation.

6.27 **Information and Policy Analysis.** It would be important to undertake a survey on the area of qat in order to get a clearer picture on qat production and land use. This process would help to determine the importance of qat in Yemen's rural economy, and permit simulation of the effects of reducing or abandoning qat cultivation for Yemen's economy as a whole and for the rural economy.

## **Health Strategies**

6.28 Regarding the health aspects, a two-pronged strategy could be pursued, covering education and awareness (as discussed above), and additional research and study on particular areas of concern. Priority areas for research include the health effects of pesticides used in qat cultivation, and research on qat and women. Women's health appears generally to be more affected by qat use than men's. Despite this fact many of the medical surveys on qat exclude

women. It is therefore recommended to include women more frequently in medical research. This could possibly be achieved by including female Yemeni doctors or researchers in the survey teams. This could help to facilitate initial contact and could convince families to give their female members permission to participate in such tests.

### **Alternative Leisure Pursuits**

6.29 Consumers need to be presented with alternative leisure activities and to be given time to change their chewing habits. One Yemeni youth sums up the voices of qat consumers. "Without qat what would we do for entertainment? We have no cinema, theatre, bars or clubs, as are found in other countries."<sup>223</sup> Quite frequently, alternatives for leisure sources have been presented in literature and are regularly also discussed in the Yemeni press. They range from building attractive cinemas to creating public parks and zoos. When Saudi Arabia addressed its qat problem in the Asir region in the early 1980s, it identified alternative leisure opportunities as vital in the reduction of qat consumption. It therefore built a new leisure and educational infrastructure in this southern province<sup>224</sup>. Creating alternative leisure activities has also to be seen as a long term goal of Yemeni policy makers.

## **E. THE SHORT AND THE LONG TERM OUTLOOK**

6.30 In the short run, the task of the government should be to limit the negative effects of qat cultivation and consumption, because these appear to be irreversible (health, water resources).

6.31 Long term, a reduction of qat cultivation and consumption out of environmental, health and social considerations is desirable.

6.32 Long and short term strategies do not exclude each other and should be implemented simultaneously in order to effectively address the qat problem. Since qat touches most aspects of Yemeni life, it also seems desirable that the government include civil society to address this complex issue. Also possibilities on how the religious establishment could assist the government in achieving its goals should be taken into consideration.

<sup>223</sup> Kennedy 1987, p. (Exact source will be given by C.Ward).

<sup>224</sup> Al-Thani, I. (1983): Development: the Saudi solution for the problem of Khat. In: *Shahandeh, B. et al.* (eds.): The health and socioeconomic aspects of khat use. pp. 181-194.

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**Cabinet Order No. 43 for the Year 1999 regarding Qat**

The Cabinet studied the report presented by the Ministry of Agriculture and Irrigation and the Ministry of Planning and Development regarding Qat and its effect on agriculture and water, as well as the importance of founding a specialized center for Qat research. Therefore the Cabinet decided the following:

1. The Ministry of Agriculture and Irrigation and the Ministry of Planning and Development are assigned to carry out a conference in October or November in order to discuss scientific papers that present strategies and policies the Government will adopt regarding Qat.
2. The Ministry of Planning and Development has to communicate with international organization in order to obtain technical and financial support for the preparation of such a conference.
3. The recommendations of the conference should be submitted to the cabinet soon after completing the conference. They should then be discussed and the necessary action taken accordingly.
4. The order becomes effective on 14 July 1999 and ends with the submission of the recommendation of the conference to the cabinet.

The Executives:

Minister of Planning and Development  
Minister of Agriculture and Irrigation

*(a) National Qat Conference 2000 (Structure, Topics, Process)*<sup>225</sup>

**Background:**

In July, 1999, the cabinet instructed MoPD and MAI to prepare for a National Conference on qat to bring together parliamentarians, government, donors and civil society to discuss the impact of qat on the Yemen economy and society.

**Objective of the Conference:**

Discuss problems and solutions, and thereby help develop a national policy and action plan on qat based on the recommendations of the conference.

**Timing and Duration of the Conference:**

Time for conference first half of 2000 (likely April)  
Duration of Conference: 2 days

**Steering Committee:**

The steering committee of the conference will be headed by:  
Mr. Abdul Aziz Abdul Ghani, President of the Consultative Council.

It will also comprise:

HE Mr. Ahmed Saufan, Minister of Planning and Development (MoPD)  
HE Mr. Ahmed Salem Al Jabali, Minister of Agriculture and Irrigation (MAI)  
HE Mr. Sadeq Amin Abu Ras, Minister of Local Administration  
HE Mr. Ahmed Jaber Afif, Chairman of the Afif Cultural Foundation  
Mr. Abdul Hamid Al Haddi, Member of Consultative Council  
Mr. Abdul Hadi Al Hamdani, Deputy Director of the Presidential Office  
Mr. Jamal Muhammad Abdu, Chairman of National Water Resources Authority  
Mr. Ali Al Suraimi, Chairman of the Agricultural Cooperative Union  
Dr. Oras Sultan Naji, Member of Parliament  
Dr. Abdul Rahman Bafadhl, Member of Parliament

**Responsibilities of the Steering Committee:**

To steer the process.

**Technical Group:**

A technical group comprising:

HE Mr. Abdul Rahman Tarmoom, Vice Minister, MoPD  
HE Mr. Farid Ahmad Mujawar, Deputy Minister, MAI  
Dr. Najib Abdul Malik, Dir. Office of the President of the Consultative Council  
Mr. Iskandar Al Asbahi, Dir. Gen. Foreign Relations, Ministry of Media and Inform.

**Responsibilities of the Technical Group:**

Supervise the preparation of the conference and report to the steering committee.

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<sup>225</sup> Prepared by the Secretariat of the Conference, November 1999.

### Formation of Secretariat for the Conference:

A secretariat was formed under the direction of the technical group

- The Secretariat was set up in October 1999
- Composition of Secretariat: Two full time staff members (Khaled Mohammad Saiid, MoPD and Qahtan Abd Al-Malik, MAI) for the period of 6-9 months and World Bank consultant Peer Gatter for a period of 3 months.
- Functions of Secretariat:
  1. Plan and prepare for the conference
  2. Commission studies/discussion topics through appropriate committee
  3. Prepare TOR for conference topics
  4. Accompany and guide studies and discussions
  5. Screen the discussion proposals
  6. Make all logistical preparations
  7. Liaise with donors
  8. Oversee the preparation of the conference report and draft a national policy and action plan
  9. Inform steering committee and technical group in writing on any developments

### Conference Topics:

- ***Qat and the economy:*** food security, share in GDP, qat and business, qat and the elite
- ***Qat in the rural economy:*** qat as a cash crop contributing to GDP and farmer income, and its role in urban-rural financial transfers and in rural-urban migration
- ***Qat and agriculture:*** encroachment of agriculture by qat and possible qat substitution
- ***Qat and water resources:*** the impact of qat cultivation on water resources
- ***Qat and the environment:*** soil erosion, plastic waste, monocultures, impact of pesticides and fertilizers
- ***Qat and society:*** social aspects including family budget, effect on women and children, public awareness
- ***Qat and religion:*** religious sources, position of the religious establishment, possibilities and limitations of a religious approach to the Qat problem
- ***Qat and health:*** the effect of qat on health including residual pesticides and other chemicals used for control of diseases on qat crop
- ***Qat data:*** GDP of qat, qat taxation, qat inventory, need for qat mapping, qat in official statistics

### **Preparation Process:**

**Phase I:** (completed): Collect literature and determine research gaps and vital topics that should be presented and discussed at the conference.

**Phase II:** Select consultants to prepare background papers on the different conference issues. The idea is not primarily to undertake new research and contribute to the mass of existing literature on qat, but to sum up existing research findings and develop policy suggestions. Deadline for these papers is 6 weeks from inception (possibly mid January 2000).

On the basis of these papers a discussion will be initiated. Discussants will be selected among academics, journalists, political and religious figures, as well as among NGO representatives (2-3 people for each of the 9 conference topics). They will have different perceptions of the qat problem and different political affiliations.

The 9 discussions groups will start debating the qat issues from February until the conference. They will each be assisted by a scientist from the respective field as well as by a moderator who will further their debating skills. A short background paper on each issue that will sum up the discussion and contain a number of bullet points with recommendations for an action plan will be prepared.

**Phase III:** The debate is then made open and being presented to a greater public during the conference. Each of the 9 issues will be presented by two discussants, who are assisted by a professional moderator. Background papers will be made available to all participants of the conference. The aim is to issue a debate among civil society and decision-makers, which will trigger a decision taking process.

**Phase IV:** Translate the recommendations of the conference into a draft policy and into an action plan for presentation to the cabinet.

Once political decisions are taken, more research is eventually needed in order to implement decisions.

(b)

*(c) Qat Activities of Government Institutions***Qat Research Unit (AREA)**

The Qat Research Unit which was founded in 1995 is part of the Agricultural Research and Extension Authority (AREA). It is housed in the former American funded horticulture project in al-Irra, north of Sana'a. Construction of the building in which the Unit will be lodged has just been completed, but until now no office equipment (including computers) is available. However, the Qat Research Unit has embarked on its first research project in June 1999 (duration 2 months) for which the Ministry of Agriculture has allocated 340.000 Rial (ca. \$ 2.150).

Farmers in five different Regions (Sana'a, Hajja, Taiz, Dhaleh, and Dhamar) were being questioned on qat related topics. The team consisted of five participants and was led by Dr. 'Ali No'man 'Abdallah, Director of the Qat Research Unit. He was accompanied by three AREA experts and a local mediator, whose task it was to introduce the team and to help overcome farmers' notorious fear of government agents.

The questionnaire prepared by the research unit focuses on water (crop water requirements, means of irrigation and its costs), input and output of qat farming (farm size, labor costs, taxes, qat prices, fertilizers, pesticides), qat and other crops (change in crops, profits from qat compared to other crops), and qat varieties and quality. The results of this study will provide a data base that the research unit wants to use for understanding the problems associated with qat agriculture. This will provide a solid basis to implement other projects that are on the agenda of the Qat Research Unit. These are:

- irrigation efficiency improvements for qat;
- determining the real water requirements of qat;
- using hormones to prompt the growth of qat leaves as an alternative to pesticides;
- studying factors that determine the growth of qat (soil, water, plant analysis);
- surveying the area under qat;
- varietal research and fertilization for qat;
- effect of qat on the environment (groundwater?);
- social and health problems of qat;
- qat extracts and by-products for medical purposes;
- the marketing of qat.

**General Department of Plant Protection**

The General Department of Plant Protection is part of the Ministry of Agriculture and Irrigation. In 1995/96 this department has carried out several studies on the residual effects of pesticides and on the enzymes contained in qat. Since until now there are no laboratories in Yemen that could carry out such analysis, this work had been carried out abroad. In cooperation with the FAO the department is however now looking into the possibility of setting up such a facility in Yemen. This would enable Yemeni scientists to carry out future research on the topic at much lower prices.

**Central Water Monitoring Unit (General Directorate of Irrigation)**

As part of its water saving project the Water Monitoring Unit has a vested interest in qat. In cooperation with the Qat Research Unit (see above) the bureau wants to launch a field study in

order to determine how much of Yemen's water goes into qat farming. In a further step the unit wants to conduct research on minimum water requirements of qat and on the potential use of more sophisticated irrigation techniques that might help to save water.

### **National Water Resources Authority (NWRA)**

NWRA is currently embarking on a water management project for the Sana'a basin, where qat cultivation is said to be using up to 80% of available water resources. With a further expansion of qat farming in this densely populated area, the water supply of Sana'a city could be threatened in the near future.

#### Governorate Level

Several governors have followed President 'Ali 'Abdullah Salih's example and have quit chewing qat. In some of Yemen's major growing areas, such as the governorates Ibb, Ta'iz, Dhamar, and al-Baydha high level government representatives are supporting local awareness programs and anti-qat campaigns (for Ibb governorate see below: "Friends without Qat").

### **Central Statistics Organization (CSO)**

In 1999 the CSO included in the annually published national accounts for the first time figures for qat. Until now only very vague estimates on the share of qat in Yemen's GDP were possible. However, the figures given in the national accounts are projections based on data obtained during two incomplete agricultural censuses between 1978 and 1983.



(a)

### **Qat Activities of International Organizations**

In general, the donor community sees qat as a brake on development, both in terms of its consumption of mined water and as an economic and social *cul-de-sac*. Despite this perception international donor organizations have until quite recently not been involved in projects dealing with qat. Since Government's move against qat in 1999 however there has been a strong response among donors and the National Conference on Qat has found a broad basis of support.

#### **FAO**

Under the supervision of Dr. Wen Ting-Tang the FAO is currently carrying out an agricultural mapping project which includes qat (Environmental Resource Assessment for Rural Land Use Planning). This is a very necessary project, for the only numbers that exist on the extent of qat cultivation date from two incomplete agricultural censuses of the 1970s and 1980s. These numbers are not only vague, but probably by far underestimating the extent of qat cultivation. A research done in early 1980 already then speaks of 89,000 hectares under qat in Yemen. A qat map resulting from this same publication is until now the only existing mapping of its kind. However, the state of qat cultivation reflected on this map is that of the early 1970s, since it was using aerial photographs dating from 1973.

On the basis of the World Bank's 1998 Agricultural Strategy Working Paper, the FAO has developed an own project on the topic. This project was scheduled to be implemented in September 1999 and will have a duration of one year ("Assistance for Policy Formulation for Qat"). This approach to qat will assist the Ministry of Agriculture and Irrigation (MAI) in formulating a policy for qat. Five facets of the qat phenomenon are going to be covered by the project. These are:

- Studies on agricultural policies,
- Studies on agronomic aspects,
- Environmental studies,
- Legal studies, and
- Studies on household food security and nutrition

#### **UNDP**

The issue of qat has been included in the UN Assistance Strategy for the Republic of Yemen. It is within this framework that the UNDP is financially supporting the National Conference on Qat. Some USD 70,000 were made available for this purpose.

#### **European Union (EU)**

The European Union is financially supporting an agricultural census in Yemen that will be carried out shortly. This project might help to obtain more recent data on the extent of qat cultivation in Yemen. Until present, all statistics on qat in Yemen are projections based on an agricultural census in the years 1978-83. In addition the EU is financially supporting Yemen's National Conference on Qat with USD 25,000.

### **Royal Tropical Institute, Netherlands**

The Dutch Foreign Ministry is currently funding a study on Muslim women and development in six Islamic countries and in the Muslim community of the Netherlands. The study is implemented by the Royal Tropical Institute and carried out with partner organizations and local counterparts in the respective countries. In Yemen these partner organizations are the Dhamar Women Health Care Center and the Yemeni Women's Union of Aden. The scope of this 18 month study is to gain insights into the life of women and sees women as agents of change in the fields of education and reproductive health. In the particular case of Yemen, the direct and indirect influences of qat chewing on women's lives will also be studied.

### **Oxfam GB**

Oxfam GB is an international non-governmental organization, which has been supporting relief and development programs in Yemen since 1983. As part of its strategic plan (1998-2000) Oxfam has identified qat as one of the most important factors hampering development and has hence, made the qat issue one of its strategic areas of intervention.

Oxfam is attempting to enhance its understanding and analysis of the qat issue in consultation with a number of development agencies and individuals in Yemen. The NGO has supported initiatives to raise awareness against the negative effects of qat.

In March 1998 a one week campaign of the Guide and Scout Association against qat and its effects on youth was supported in Taiz. This included a leaflet campaign, a banner march through the streets, as well as a discussion forum with government representatives. In April and May of 1999 Oxfam co-financed a campaign of the National Society for Combating Qat Disadvantages that raised awareness among pupils with discussions, leaflets and a sticker campaign (see below). Currently Oxfam is financially supporting the National Conference on Qat with USD 20,000.

As strategic aims for future work on qat and in cooperation with local partners Oxfam wants to:

- start a local national debate on the qat problem;
- influence decision-makers to take action against qat;
- reduce levels of consumption and production;
- implement pilot projects at governorate level
- create and support alternative social activities;
- search for production alternatives (crop substitution);
- set up a coordinating committee for working together with other organizations taking action against qat.

### Qat Activities of Yemeni Non-Governmental Organizations

#### **National Society for Combating Qat Disadvantages (NSCQD) (*al-Ja'miat al-Wataniya li Muwajihat Adrar al-Qat*)**

The NSCQD is a non-governmental organization established in 1992 and is chaired by Mr. Ahmed Jaber al-Afif, former Minister of Education and chairman of the Afif Cultural Foundation (see below). The members of the society come from a wide range of backgrounds. It includes businessmen, government and private sector employees, students, as well as Yemenis residing abroad.

The main objectives of the society are:

- creating a general anti-qat awareness among the different social strata, especially among students, on the health, social and economic implications of qat;
- to use all suitable and legal means in order to limit qat cultivation and find alternative crops that might replace the plant;
- to direct time and efforts wasted during qat chewing hours towards positive and profitable activities and thereby to achieve a development and welfare in Yemen;
- to enact the necessary laws, regulations and rules in coordination with the concerned organs to achieve the above objectives.

Despite its limited financial resources the NGO has embarked on a series of activities. During April 25-26, 1995 it conducted a symposium in collaboration with the Afif Cultural Foundation under the title: "The qat phenomenon: problems and effects". The NSCQD also organized a debate between anti-qat activists and qat supporters, and once again in cooperation with the Afif Cultural Foundation and the *26 September* newspaper, conducted a symposium under the title "Yemen without Qat" (October 27, 1997). It also compiled an extensive data base on qat and set up a library on the topic. Monthly the bulletin "*Yemen without Qat*" (*Yemen bi la Qat*) is published.

In addition to these activities the NGO launched the first national program for raising awareness on qat disadvantages in April 1999. The two month program was financially supported by Oxfam (see above) and was designed to rouse awareness among qat consumers by a kind of shock therapy (this included a poster campaign showing a disfigured qat chewer, sharing qat leaves with a goat). It also was intended to rise awareness among students and create a "psychological barrier" between them and their qat chewing parents. Eventually this should force the parents to give up this habit.

In the first phase of this campaign 113 governmental and 18 private and non-governmental schools were visited. In discussion rounds and games some 210.000 male and female students were reached (April 13 to May 5, 1999). In a second phase, in seven governmental and private universities awareness campaigns were carried out (May 6-13, 1999). The NGO emphasizes that by this campaign all social strata has been reached, even the family of President 'Ali 'Abdullah Saleh, whose sons and daughters were being involved in this campaign. In addition to visits in educational institutions, posters and labels were distributed in supermarkets, hospitals, clinics, banks, and commercial and governmental establishments. Banners were displayed at intersections and public squares of the capital.

The echo to this campaign was quite remarkable. Throughout Yemen the media covered the society's activities and, thus, created a public discussion on the issue.

In its 1999/2000 fiscal year, the society plans to embark on a second national anti-qat program in four governorates. It intends to intensify its documentation activities and collect and edit unpublished data on qat associated with water, pesticides and economic issues. Also a workshop is planned with the intention to train social advisors that would create awareness in schools. Currently the Society for Combating Qat Disadvantages is establishing branches in Taiz and Hudeida governorates.

### **Friends without Qat (*Asdiqa' bi la Qat*)**

In cooperation with the University of Ibb the governor of the province, Abd al-Qudri Hilal, founded the "Friends without Qat" on June 9, 1999. The aim of this NGO is to reduce qat consumption and further alternative leisure activities.

The organization owes its existence to the desire of Governor Hilal to study English and get more knowledgeable in using computers. The Vice Rector of Ibb University, Dr. Abd as-Salam al-Jaufi, agreed to arrange afternoon courses at the University for the governor and his aides, but demanded that no one attending these classes should be allowed to take part in them while chewing qat. The lessons (two days English, and two days of computer sciences per week) were quite successful and soon leaders of the police, the army, managers, local politicians and even Qadis, the religious judges, came to study. Very soon these afternoons turned into an alternative forum to chewing qat and the 66 participants under the lead of the governor decided to act against qat. Wednesday became their "day without qat", on which they publicly promoted alternative leisure activities. Some 300 people joined in the activities on the first such Wednesday (April 28, 1999) and participated in playing chess, football and table tennis or in book reading. On following Wednesdays bicycles were awarded to teenagers who won sports events and who were opposed to qat. Teenagers winning in Qur'an memorizing competitions were awarded cassette recorders. On the occasion of a mini Marathon (8km) Governor Hilal came riding to the event on his bicycle without any body guards, in order to show that there is a real change taking place and to be approachable for everyone who wants to join in the event. Very soon the idea was born to found a society opposing qat with the governor at its head. After getting the permission from his superiors, the governor actively supported the idea of such a grouping. Names for the association like "Anti-Qat and Cigarettes Society" or "Society for Combating Qat" were outruled because of their negative connotation. Hence, the positive sounding name "*Friends without Qat*" was adopted.

When the society was founded on June 9, 1999 the ceremony involved all political parties, social and religious institutions of Ibb. Besides the governor and his cabinet, the police, the armed forces, the Islamic Islah and Hikmet parties, representatives of different NGOs, Kheiri Sabiya, the Socialist Party, mosque representatives and members of Ibb University's Faculty of Education and Health were present.

Some 600 people marched from the governors palace to the city's football stadium, carrying banners reading "*Qat is the reason for health problems*", or "*Qat is the reason for corruption*". The football match itself made was attended by several thousand spectators and made headlines in Yemen. Along with the governor and members of his cabinet, local managers and even members of the Islamic *al-Hikmat al-Yemeniya* party were chasing the ball. The audience was not less illustrious. Members of the Islah party sat next to their socialist opponents, and honorable Qadis next to senior police and military officers.

When electing the board of the society that day, it was eagerly observed that every political grouping was represented in it. The governor of Ibb was elected President, the vice rector of Ibb University, Dr. al-Jaufi, became vice president and Abd ar-Rahman al-Eimad, a prominent Islah

representative was made honorary president. On this occasion the governor made it very clear that President 'Ali 'Abdullah Saleh does not only firmly stand behind this campaign, but that it is him, who leads it.

The society is quite active, and in its Wednesday sports events regularly some 200 people take part. But the overall number of people reached is still very limited. Due to a lack of computer facilities at Ibb University the afternoon classes for computer science can accommodate only 66 persons. Without exception these are educated people of whom more than 80% hold an university degree. The majority holds positions in the government and many of them have also previously not been qat chewers.

#### a. Aden Society for Combating Qat (*Jam'iat Makafahat al-Qat*)

The Society for Combating Qat was established in Aden in 1996 under the chairmanship of Adel Bamatraf. The organization has a present membership of some 130 academics and university students. Its aim is to alarm the Yemeni public of the dangers of chewing qat and to spread awareness through lectures in schools and universities, clubs and other community groups. Qat is seen as an addictive drug and the society has arranged first treatment sessions. Public response, however, has been quite limited. The society attributes this to its meager resources, widespread poverty in the city of Aden ("which makes people not look beyond their daily struggle for food"), the negative attitude of the public towards anti-qat activities, and the widespread nature of the qat phenomenon.

The organization has presented several proposal to international organizations in order to obtain financing for cultural, social and recreational anti-qat projects, such as the creation of parks, the establishment of public libraries, and the preparation of anti-qat publications. Assistance provided by the government and community organizations has so far been limited, which made it hard to embark on large scale activities. So far the society is struggling to meet the payment of the electricity and water bills of its office. It depends mostly on contributions by its members.

In a recent campaign the organization tried to create awareness for the qat problem with a "shock therapy". It distributed posters showing a qat chewer whose face turned into a goat. It read: "Qat... it transforms our humanness and deforms the human face" (*al-qat... masakha li janibna al-adami wa tashwih li wajhina al-insani*).

The society also cooperates with government entities, such as the Agriculture Office and the National Water Resources Authority for drawing up water conservation measures, an important issue due to the high consumption of water by qat farming. It lobbies for more government investment in the Aden area to create jobs in order to absorb the great number of unemployed young people, and thus drawing them away from chewing qat.

Bamatraf indicated that the cooperation with the government needs to be more active, especially in the area of the state media. With the help of qat specialists government organs should carry out Yemen wide campaigns to make people aware of the dangers of qat.

Besides such campaigns governmental decrees against qat are necessary to reduce qat consumption effectively. Recent remarks by the president against chewing and a cabinet decree (see above) that places the qat issue high up on the national agenda, are, however seen as hopeful signs. As a next step the Aden society sees a decree banning qat chewing in government facilities during working hours (especially in airports, seaports, and customs areas).

Currently the society is trying to set up branches in other governorates and tries to coordinate activities with organizations that have a similar aim. These activities also include the founding of a preparatory committee in the Hadramaut, where qat consumption is slowly spreading.

Supported by the NGO Oxfam (see above) the Society for Combating Qat is setting up a culture club and is preparing family projects for the prevention of qat addiction, public awareness lectures, and counseling activities for people who want to quit chewing qat.

#### **Afif Cultural Foundation (*Mu'assasa al-'Afif al-Thaqafiya*)**

Under the chairmanship of Ahmed Jaber al-Afif, the former Minister of Education, this NGO devotes a lot of energy to qat. Besides providing the Society for Combating Qat Disadvantages with a base and being the editing place for the bulletin "*Yemen without Qat*", the Foundation maintains a vast library with a big section on qat. In the afternoons this library is open to the public. The foundation sees its library as an alternative to the afternoon qat chews. On Tuesday afternoons conferences and meetings are arranged, very often they circle around qat. Chewing qat as well as smoking are strictly forbidden on the premises of the Afif Foundation as various signs outside the building indicate.

#### **b. Yemeni Cancer Society (*Jam'iat Makafahat as-Sartan al-Yamaniya*)**

The Yemeni Cancer Society which has some 200 members was founded in 1993 under the chairmanship of Dr. Ahmed al-Hadrani of the Medical Faculty, University of Sana'a. One of the main areas of interest of this society is the relationship between smoking and cancer. In this context also research on Qat chewing and smoking has been carried out. The society identified passive smoking during qat sessions as one of the contributing factors to cancer in Yemen. In 1996 the Cancer Society published a book on the dangers of smoking (new edition 1997: "*at-Tadkhin*") which contains a chapter on smoking and qat. Under the patronage of Prime Minister al-Iriyani the "First National Conference on Hazards of Pesticides and other Chemicals on Human Health and the Environment" was carried out by the society in March 1999, where the connection between qat chewing and cancer was discussed.<sup>226</sup> In April 1999 the first issue of the Yemeni Cancer Society's quarterly journal was published (*Medical Knowledge Journal*). One of the authors of the first issue, Dr. Husnia al-Qadri, has conducted Ph.D. research on the effect of anti-cancer drugs on the male hormones (1997). In her studies she included also qat, and in animal experiments proved that the male hormone testosterone highly declines due to qat consumption.

#### **People for the People (*Nas li n-Nas*)**

The NGO focuses on rural women and tries to improve their income generation opportunities. This is done by introducing new techniques and crops from other developing countries, such as India. The organization encourages women to grow other crops than qat. It tries to further the cultivation of plants that provide a lot of protein (like peanuts) and improve the nutritional situation of families. Also plants which improve the often exhausted soil (like leguminous plants) are recommended to the farmers. One of the aims of the organization is to make women aware of the dangers of pesticides, especially used in qat cultivation.

#### **Nahl Committee for Environment Protection (*Ja'miat an-Nahl al-Hemayat al-Bi'a*)**

Qat is high up on the agenda of this environmental protection agency, which is raising awareness on the side effects of the qat phenomenon. Its members regard qat cultivation as a threat to the ground water table and see its marketing and consumption as one of the main causes for the incredible amount of plastic waste (bags, bottles) which is being carried by the wind even to the most remote desert areas of the country.

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<sup>226</sup> See Abstracts of the "First National Conference on Hazards of Pesticides and other Chemicals on Human Health and the Environment", No. 16: "Is Khat Carcinogenic", Ahmed al-Hadrani, Faculty of Medicine (Sana'a, University).

c. The Sana'a Health and Cultural Center (*Merkez as-Sihha wa-l-Thaqafi*).

The aim of Sana'a's Health and Cultural Centre is the social mobilization of Yemenis. It was founded by physicians of the University of Sana'a.

On one side it provides health services on a cost recovering basis (in addition to primary health care, this includes psychological treatment. A psychotherapist and trained psychologist gives, among others, support to people who got their "lives hooked around qat").

On the other side the organization is running an art centre. Here music lessons are given and once a week discussion rounds are held on a wide range of cultural, social, and political topics. Dr. Nizar Ghanem of the Medical Faculty of Sana'a University sees in these gatherings, that are open to both male and female, an alternative to the afternoon qat-chews and an example to the public, on how to enjoy life without qat.

In the past the organization had branches in four Yemeni governorates (Ibb, Dhamar, Aden and the Hadramaut). Due to financial difficulties, however, the Dhamar and Aden branches ended their activities.

**d. Ar-Raqib Newspaper**

Inspired by a column appearing in the *Mustakilah* newspaper, "What the sleepers write" (*ma yaktubuhu al-na'imum*), *ar-Raqib* journalist Asir as-Soudani created the column "What those who chew qat write" (*ma yaktubuhu al-mukhazzinun*). Being kept awake by the effects of qat chewing for long hours in the night, he writes on qat related issues. Despite being a daily chewer, as-Soudani fights qat in his own way and is making people aware of the problems associated with qat. The plant is for him "a dangerous virus that strongly intrudes our lives. But change will take time and today there are simply no adequate substitutes for chewing qat in Yemen, nor are there until now any short and medium-term strategies in fighting qat." He openly doubts if the *Society for Combating the Disadvantages of Qat* has thought in its campaigns of the fate of the large number of people who depend for their livelihood on producing, transporting, and marketing qat. "Do we have alternative businesses for these people?"<sup>227</sup>.

<sup>227</sup> Interview with the *Yemen Times*, May 10, 1999.

### **Main Environmental and Crop Requirements of Qat**

**Remarks:**

- hardy plant (considered more hardy than coffee, with which it shares a similar environment in Yemen),
- can grow on poor soils, in particular with low N content,
- although the plant can withstand high humidity, prolonged humid periods in combination with high temperatures may give rise to the growth of fungi,
- irradiation requirement ranges from light to half shadow,
- tree starts producing after 3 to 4 years, achieving its optimum in 10 years, this may last until it reaches 50 years, but can become > 100 years old.

**Management:**

- tree is sterile, and propagated mainly through replanting of suckers, use of cuttings is not widespread,
- in some frost-prone areas the plant is cultivated as 1-1.5 m high bush to limit possible frost damage to aerial parts,
- in rainfed areas the plant would be harvested only once every 3 years,
- wide variations in plant density (1,200-8,000 plants/ha) depending on several factors, medium spacing 2-4 m<sup>2</sup>/plant (5000-2500/ha),
- intercropping with tree crops (central highlands) or arable crops (western slopes and southern uplands) used to be common as protection against frost, erosion etc., nowadays less prevalent,
- young plantations hoed/cultivated 3-4 times per year, mature plantations 2 times per year (after first heavy rains, i.e. March/April and July/Aug.),
- little manure or fertilizer is applied, usually only some FYM at planting.

*Source:* Crop Requirement Tables by Wen Ting-Tiang, AREA/FAO 1998



### Methcathinone<sup>228</sup>

Methcathinone was first synthesized in Germany in 1928, and used in the Soviet Union as an anti-depressant during the 1930s and 1940s. Abuse of methcathinone, also known as "ephedrone", "Jeff", or "Mulka" has been reported in the Soviet Union since the late 1960s. Studies carried out in the mid-1950s by an American pharmaceutical company revealed that it had physiologic effects similar to amphetamine. In the USA Methcathinone emerged in 1989 when students of the University of Michigan began manufacturing the drug in clandestine laboratories. Its use quickly spread and the drug has become one of the biggest challenges faced by the U.S. Drug Enforcement Administration. Methcathinone was classified as a *Schedule I* controlled Substance under the federal Controlled Substances Act on May 1, 1992, under the emergency scheduling procedure. The classification was made permanent effective October 15, 1993.

#### Ingredients Used in Methcathinone Synthesis

The ingredients used in various recipes for home-made methcathinone include:

- ephedrine or pseudoephedrine (found in the *qat*, asthma and cold medications)
- acetone (explosive paint solvent)
- muriatic acid (used in sandblasting and cleaning mortar off bricks)
- sulfuric acid (usually purchased from auto supply stores as battery acid)
- lye (usually in the form of a crystal drain cleaner such as Drano)
- sodium dichromate or potassium dichromate
- sodium hydroxide
- toluene (explosive paint thinner).

#### Effects of Methcathinone Intoxication

The most common means of taking methcathinone is snorting (nasal insufflation). Other routes of administration include taking it by mouth (oral ingestion) mixed in a liquid such as coffee or soft drinks, intravenous injection, and smoking it either in a crack pipe or added to tobacco or marijuana cigarettes. Methcathinone is often used in binges lasting from two to six days, during which methcathinone is used repeatedly.

Effects of short term intoxication are similar to those produced by crack cocaine, methamphetamine or the chewing of *qat* leaves: stimulation of heart rate and respiration; feeling of euphoria; loss of appetite; increased alertness; pupils may be dilated; body temperature may be slightly elevated. Acute intoxication at higher doses may also result in: insomnia, tremors and muscle twitching, fever, headaches, convulsions, irregular heart rate and respirations, anxiety, restlessness, paranoia, and hallucinations and delusions.

#### Problems Associated with Methcathinone Use

While research on the long-term effects of methcathinone use is just beginning in the United States, anecdotal reports from users in treatment in this country, and from published research in Russia, paint a similar picture. Chronic use of methcathinone produces a range of problems typical of addiction to powerful stimulant drugs including:

- paranoia and delusions
- hallucinations, including a sensation of bugs crawling under the skin

<sup>228</sup> Excerps from W. Bailey (1995): Methcathinone. Indiana Prevention Resource Center, Indiana University.

- anxiety followed by depression
- tremors and convulsions
- anorexia, malnutrition, and weight loss
- sweating, dehydration, and electrolyte imbalance
- stomach pains and nausea
- nose bleeding, eventual destruction of nasal tissues and erosion of the nasal septum
- elevated blood pressure and heart rate
- body aches

In addition, following a binge, users report a "crash" that often includes severe psychological depression, and suicide intention.

Anecdotal reports from patients in treatment facilities in Michigan and Wisconsin suggest that methcathinone is highly addictive, similar to crack cocaine, and some users report developing tolerance and withdrawal symptoms after just one incident of bingeing (six to ten days) on methcathinone. Addiction to methcathinone appears to be as difficult to treat as addiction to crack cocaine. Data from Russia report that many methcathinone addicts suffer permanent brain damage and exhibit symptoms similar to Parkinson's disease. In extreme cases, deaths have been reported, and are related to heart failure, lethal overdoses, drug-related violence, and manufacturing accidents.

## Annex 8

## Qat Tax

In the past there was a 'field tax' of 10 percent on qat assessed by inspectors, but the yield was only 2-5 percent of what was due and the tax was abandoned.<sup>229</sup> Today qat taxation has moved from production to consumption areas. Qat tax is now collected only at entrances to main cities and in public markets. For example, in Sana'a, a qat tax check point can usually be found on the Wadi Dahr, Amran and Marib roads.

Qat taxation is regulated by Law No. 70/90 (Taxes on Production, Consumption and Services). Chapter (3) of this law is devoted to Qat Consumption Tax. This chapter consists of 10 articles (13-22) which regulate the collection of this tax and specify the punishments for evasion and the incentives for collectors. Article (21) gives the tax collectors the right to get 10 percent of the revenue increase which they can achieve over the previous six-month period. In order to implement this law the Minister of Finance issued a resolution (No. 172/1992).

The Qat Taxation Department of the Ministry of Finance, and its equivalents within each Tax Office in every city, is the governmental body responsible for collection of "qat consumption tax". The qat tax is, by law, 20 percent. Practically, however, staff of the taxation department estimate that the government collects no more than 1 percent. (i.e.  $1/20 = 5$  percent of what it should get). Furthermore, they estimate that what the government actually gets is only 5 percent of the total collection. As one commentator says, 'Everyone knows that those who collect the tax on qat receive qat to assure a reasonable tax assessment'.<sup>230</sup> However, tax collectors are not well respected among qat merchants and have in the past more than once fallen victim their bullets.

In 1994, revenue from the qat tax totaled Rls. 665 million or 3.1 percent of non-oil tax revenue. Data for the first half of 1995 indicate that the Government's estimate of qat tax was about Rls. 650 million (Rls. 1.3 billion, say \$10 million). The actual collection for the semester amounted to about Rls. 427 million (see tables 1 and 2).

The Ministry of Finance believes that the revenue is unacceptably low in view of the widespread use which has been growing, both in the number of users and frequency of use in recent years. Based on the daily consumption of qat, they estimate that the annual revenue to be generated from this source could be in the range of Rls. 3 billion.

Month	Estimated Revenue (Rls. millions)	Actual Revenue (Rls. millions) Average January - June '95 = 71
May 1995	108	78
June 1995	108	80
July 1995	108	86

<sup>229</sup> Kennedy 1987, p. 157.

<sup>230</sup> Messick, B. (1978): Transactions in Ibb: Economy and Society in a Yemeni Highland Town. Unpublished PhD Thesis, Princeton Univ., p. 210.

**Table 2: Qat Consumption Tax Revenues for 17 Governorates and the City of Sana'a during the Period January-June '95 (Source: Tax Authority Data)**

Governorate	Estimated Revenue (Rls millions)	Actual Revenue (Rls millions)
Sana'a City	76	29
Sana'a	67	35
Aden	73	45
Ta'iz	107	75
Hudaydah	157	140
Hadramawt	13	7
Ibb	39	23
Dhamar	18	5
Hajja	29	22
Lahj	14	12
Abyan	13	9
Sa'ada	13	10
Baydha	13	2
Marib	3	1.5
Mahweet	5	2
Shabwah	8	7
Jawf	1	0.3
Maharah	1	0.5
<b>TOTALS</b>	<b>650</b>	<b>425.3</b>

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