

**anamed** (Action for Natural Medicine)

Schafweide 77

71364 Winnenden

Germany

Tel: +49 7195 910225

Web: [www.anamed.net](http://www.anamed.net)

Dr Hans-Martin Hirt: [anamedhnh@yahoo.de](mailto:anamedhnh@yahoo.de)

Dr Keith Lindsey [anamed@t-online.de](mailto:anamed@t-online.de)



## Malaria circular letter - January 2006

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### 1. *anamed* news

#### A. Seminars in Natural Medicine.

Hans-Martin will be conducting week-long seminars in Angola in February and Musoma in Tanzania in June. Keith will be conducting week-long seminars in Adi and Ombayi, D. R. Congo, and a day seminar in Kampala, Uganda, in March. In July Keith will conduct a week-long seminar in Bassar, Togo, and a shorter seminar in Lomé. He also intends to visit Ghana, where he will run a short introductory seminar. We are currently seeking funds to run seminars in Uganda and Zimbabwe.

We invite development workers, missionaries, doctors, nurses etc to attend our seminars, as long as places are available. The participation fee for African people or ex-patriots living in Africa is 250 Euro for a one week seminar. For people travelling from Europe the price is 500 Euro. This includes food, accommodation, books, a poster and all seminar materials. It does not include any kind of insurance. As for all local participants, *anamed* will never pay any transport costs or “per Diem”.

#### B. *anamed* Malaria Programme

*anamed* has now sold artemisia starter kits to over 620 projects in 70 countries. We are delighted whenever we receive feedback on how effective artemisia has been in treating malaria and other diseases. We would be most grateful if each project could give us a brief report to say how many kg of dried artemisia tea you produced during the last year, and how many people you treated. Please tell us about your successes and failures in cultivating and using *Artemisia annua anamed* for treating malaria, AIDS and other diseases.

We are in touch with projects all over the tropical world where *Artemisia annua anamed* is growing very well. If you are one of the projects that tried it once, and the artemisia failed to grow, take heart. Don't give up! Either

- a) attend a seminar that we hold once a year here in Germany (in Korntal, near Stuttgart), or that we also now hold once a year in England, in which we give detailed instruction in artemisia cultivation. Or

- b) Contact one of us. If at all possible, we will put you in touch with someone in your country who could advise you, and from whom you could buy artemisia seedlings.

If you would like more seeds, we now have more available. We can provide 5000 seeds now for the price of 1200.

## 2. Comparison of the economic benefits of growing artemisia on a large scale for the treatment of malaria using artemisia tea and artemisinin based drugs

What is your opinion? Should one grow *Artemisia annua* to produce artemisia tea as a treatment for malaria, or in order to sell the leaves as raw material to the pharmaceutical industry?

We prefer the first option. The use of the whole leaf in artemisia tea reduces the likelihood of resistance developing, and it makes malaria treatment available to the poorest people in the remotest regions. It also makes economic sense – sense the calculation below.

The use of artemisia tea as a treatment for malaria frequently comes under attack from many malaria “experts”, in academic papers (often written by scientists supported or even employed by the pharmaceutical industry), from governments and from the WHO. With their increasing knowledge and experience, 620 named partners, however, may also call themselves “malaria experts”.



A field of very healthy artemisia plants in Zimbabwe

### Artemisia tea

One artemisia plant per square metre is equivalent to 10,000 plants per hectare.

According to Pedro Melillo, this hectare of 10,000 plants yields 3 tonnes of dried artemisia leaves, i.e. 3,000,000 grams in total or 300g per plant.

To treat malaria with artemisia tea requires 35g, thus one plant produces  $300/35 = >8$  treatments.

A hectare yields  $3,000,000/35 = 85,715$  treatments.

### Artemisinin tablets

One hectare produces 3 tonnes of dried leaves with an artemisinin content of about 1%. Thus 3,000,000g of leaves yield 30,000g of pure artemisinin.

A malaria treatment requires 0.6g of Artesunate or 2g of artemisinin. We will take a middle value of 1g of artemisinin.

Thus one hectare produces 30,000 treatments.

### It comes down to basic economics:

A farmer has the choice either to sell malaria treatments in the form of artemisia leaves, or to sell his leaves to the pharmaceutical industry and then, when he is ill himself, to buy artemisia tablets.

A plant produces 300g of dried leaves or 8 malaria treatments. If he sells each treatment for 5 Euros, then he makes 40 Euro (a normal salary for one month!)

If on the other hand he decides to sell his leaves to the pharmaceutical industry, he then receives, at most, 1 Euro per kg, i.e. 30 cents per plant. Then, if he chooses to cure himself with tablets, he must sell the total yield from (5 Euro/30 cents) 16 plants, in order to buy one treatment.

Thus, if a project decides to plant a large area with *Artemisia annua*, either:

1. it produces  $3,000,000 / 35 = 85,715$  artemisia tea treatments.
  - a) If these are sold to Europeans for 5 Euro each, then the total income would be 428,575 Euro.
  - b) If these are sold in local communities for 50 Euro cents, then the total income would be 42,857 Euro.
2. or it sells the dried artemisia leaves to the industry, in which case his income would be  $3,000\text{kg} \times 1$  Euro, i.e. 3000 Euro. Otherwise stated, the project would suffer a loss of
  - a) 425, 575 Euro!
  - b) 39,857 Euro.

### 3. First signs of resistance to extracted artemisinin

There are the first signs of resistance to pure, extracted artemisinin. This news alarms the WHO, and us also, because there is no known good alternative. At the same time it shows the flaw in the approach of the pharmaceutical industry: “one chemical for one disease”. From the beginning since the discovery of *Artemisia annua* industry has been only concerned with the isolation of “pure” artemisinin, giving the impression that all the other components in this plant are “impurities”. Then WHO found that the use of artemisinin alone was not effective enough and gave the danger of the development of resistance. They abandoned this philosophy and insisted on adding a second drug, to make Artemisinin Combination Therapy (ACT).

In our view, industry makes the mistake of working against nature, rather than working with nature. Extracting artemisinin from a rich antimalarial plant that contains a wealth of constituents is almost asking for trouble. This is the reason why, up to today, there was no resistance reported to the use of artemisia tea, in spite of the fact that it has been used in China for 2000 years. By using the full plant as a tea, anamed works with nature, and avoids many of these problems.

Mankind should have learnt from the experience with another plant, the cinchona tree: In spite of the fact that the malaria plasmodium has developed a resistance to chloroquine, malaria treatment using tea from the bark of the cinchona is still effective.

**Resistance fears as 'life-saver' malaria drug loses potency.** Sarah Boseley, Health Editor, writing in the UK Guardian newspaper, 2 December 2005.

*Artemisinin compounds, made from plants growing in China, have been widely seen as the answer. They are supposed to be used in combination with other drugs, so as to reduce the chances of the malaria parasite, Plasmodium falciparum, developing resistance to them. A combination of artesunate (an artemisinin derivative) and the older drug mefloquine has been used successfully in Thailand for 10 years without resistance developing.*

*But scientists from the Pasteur Institute Network report in the Lancet that they found resistance to artemisinin in blood samples from patients in Senegal and in French Guiana. In both countries, they said, the drugs were not being used with proper controls. In French Guiana the scientists uncovered resistance in Cacao, a small town where artemisinin derivatives were being illegally imported from south-east Asia. Resistance was also found in the gold mining region along the Maroni river, where people were treating themselves with illegally imported artemisinin drugs. In Senegal the artemisinin drugs were being given alone, and not in combination with other anti-malarials, as is normally recommended.*

*In a commentary, Patrick E Duffy and Carol Hopkins Sibley, from the Seattle Biomedical Research Institute, warn that "the expectation that all combinations with artemisinins will have a long therapeutic life may be overly optimistic".*

A press release issued on the 19<sup>th</sup> January 2006 by the WHO includes the following:

*The World Health Organization (WHO) today requested pharmaceutical companies to end the marketing and sale of "single-drug" artemisinin malaria medicines, in order to prevent malaria parasites from developing resistance to this drug.*

*The use of single-drug artemisinin treatment - or monotherapy - hastens development of resistance by weakening but not killing the parasite. When used correctly in combination with other anti-malarial drugs in Artemisinin Combination Therapies (ACTs), artemisinin is nearly 95% effective in curing malaria and the parasite is highly unlikely to become drug resistant.*

*To anticipate and prevent the onset and spread of drug resistance in the long term, WHO urges the global malaria research community and the pharmaceutical industry to rapidly invest in the design of the next generation of antimalarial drugs. By creating ACTs with multiple-drug combinations and transmission blocking components, resistance can be prevented.*

#### **4. A story of local economic development from Ethiopia:**

##### **Apples, Artemisia and Natural Medicine**

Arba Minch lies in the Rift valley in Ethiopia, about 500 km south of the capital, Addis Ababa. Malaria is rife, and the malaria plasmodia have become resistant to conventional drugs. The headquarters of the south-western zone of the Kale Heywet Church is in Arba Minch.

An hour's drive by car, about 1000 metres higher on the mountain (altitude 2400m) is the town of Chenchä. Formerly the people in the highlands were the poor neighbours of those in the valley, as tropical fruits from the valley were sold to the poorer people in the highlands, who had little to offer in return. Today money flows in both directions as apples and other farm products produced in the highlands are traded in the valley. Today this trade includes artemisia.

In fact, the economic level of the community in Chenchä is being visibly transformed; children are attending school, young people are going for higher education and families are improving their houses.

What is the story behind this remarkable change?

One of the earliest developments, supported by the British charity "Send a cow", was the introduction of improved "Holstein Friesian" cows, which produced a maximum of 19 litres of milk and an average of 10 litres per day instead of the usual 2 to 3 litres. Local farmers were arranged in "pass-on" groups of ten, and five of them were given a heifer. When that heifer produced a calf, this was given to the other five in the group. Then when these calves themselves calved, the animals were given to the first five in another group of ten.

Also some years ago, missionaries introduced the growing of apple trees. Today 70 different varieties of apple are grown, along with different varieties of pears and plums.

The government has attempted to introduce new ideas and techniques in the rural areas, but with very limited success. It is sometimes said that the church is the biggest "grass-roots" organisation there is. This is certainly the case with the Kale Heywet Church, which is to be found throughout the country, located in the heart of poor communities. This church has a real commitment to both the spiritual and physical needs of people. In Arba Minch, this church has enjoyed much greater success in its community development work than the government has ever managed.

Through its training events, the church has continued to teach and introduce improved cattle to groups of farmers, and to train them in the cultivation of fruit trees. A Christian, German, economic agriculturalist, Ralph Wiegand, has contributed a lot in this area. The programme of training seminars in livestock and fruit farming has been considerably developed, and they have been attended by people from far and wide in Ethiopia.

Then, early in 2001, *Artemisia annua anamed* was introduced. It was quickly discovered that, in the humid atmosphere of Chench, the plant thrives. A Christian community development worker of the church, Theophilus Tesfaye, has taught local farmers how to cultivate and harvest artemisia, and has organised the marketing. The church pays each farmer 4 Ethiopian Birr (40 European cents) for 40 grams of dried leaves in a sealed polythene bag.



Theophilus Tesfaye with his artemisia

The artemisia tea is taken down to Arba Minch, where the Kale Heywet Church passes it on to patients for the same amount, 40 cents for 40 grams. During 2004 alone, according to carefully kept records, the church has supplied artemisia tea to no fewer than 1800 people. Artemisia tea seems to have been successful in every case. Furthermore, following the treatment of malaria with the tea, both children and adults have been healthy for much longer than is normally the case without suffering a further attack.

At first the local health centre and hospital opposed this programme. But then when the nurses themselves became sick with malaria, and after taking repeated doses of the conventional drugs their illness was still not healed, they too tried treatment with artemisia tea, with immediate success. As a result, when hospital patients are treated unsuccessfully with successive courses of tablets, they are advised to take artemisia, which they buy from the church.

*Anamed* ran training seminars in Natural Medicine in Arba Minch in 2002 and 2003, each time for 6 days with about 30 people. These seminars taught not only how to cultivate and use *Artemisia annua anamed* to treat malaria, haemorrhoids and bronchitis, but also introduced participants to the use of several other locally available plants.

The economic uplift of the people of Chench is as a result of all this activity, which has engaged almost the entire community. The programme includes the improved cows and increased milk production, the cultivation and sale of apples and other fruit, the sale of seedling trees, the cultivation of *Artemisia annua anamed* and the sale of artemisia tea and the production, use and sale of other Natural Medicines. Theo Tesfaye is now planning the establishment of cooperatives in order to establish firmly the community ownership of this activity, and to ensure that the responsibilities and the new found wealth are distributed fairly throughout the community.

In Arba Minch, patients with malaria and haemorrhoids (a chronic problem in the region) are treated every day. It has been discovered that diabetes is also helped with artemisia tea. Other examples of the success of natural medicine in the area are

- a) two women are engaged full-time in producing rheumatism ointment from chillies. This ointment is extremely popular, and each woman earns 800 Birr (80 Euro) every month.
- b) A lady with severe kidney problems was referred to the hospital in Addis for treatment 500km away, but in vain. On her return she was given *Euphorbia hirta* tea, and was cured.

Today in Chench, training seminars in the agriculture



A Chench gardener shows his artemisia plants and small nursery to seminar participants

continue three times a year, but with a difference. Still with people from all over Ethiopia, these seminars include the cultivation and use of *Artemisia annua anamed* and also aspects of Natural Medicine.

The training events last for 7 weeks. As a result, people from many regions of Ethiopia have been trained in Chenchä. All participants leave with artemisia seedlings, and now artemisia can be found growing in many parts of the Ethiopian highlands. Government officials have been invited to these training events, and the government is now recognising the success of this programme of agriculture and natural medicine. The Kale Heywet Church, together with *anamed*, intend to arrange an event in Addis Ababa to which they will invite representatives from Government ministries and other influential organisations, with a view to gaining support for a country-wide programme of community (economic) development, with agriculture and Natural Medicine as important components.

For more information, contact Belay Bekele, Email [bbekele@uni-hohenheim.de](mailto:bbekele@uni-hohenheim.de)

## 5. The economic impact of malaria

*Synopsis:* Where malaria prospers most, human societies have prospered least. The global distribution of per-capita gross domestic product shows a striking correlation between malaria and poverty, and malaria-endemic countries also have lower rates of economic growth. There are multiple channels by which malaria impedes development, including effects on fertility, population growth, saving and investment, worker productivity, absenteeism, premature mortality and medical costs.

This is our summary of a paper by Jeffrey Sachs & Pia Malaney (2002), “The economic and social burden of malaria”, *Nature*, Vol. 415, 7 Feb 2002. Jeffrey Sachs is a brilliant American economist who is not afraid to challenge the status quo.

**The vicious circle:** Malaria causes poverty, and poverty causes malaria.

### **Poverty causes malaria because:**

Individuals and families spend little on bed-nets, or grids on doors and windows. Perhaps the children are even malnourished, and therefore have little immunity to disease.

Countries spend little on bed-nets, insecticides, control programmes and the health service in general.

### **Malaria causes poverty because:**

#### **Stage 1. The immediate effects:**

**a) Individuals** must spend money on prevention (bed-nets), and then, when ill, on transport to medical facilities, doctor’s fees for diagnosis and treatment, the treatment drugs, and care if a stay in hospital is required. Sometimes this uses all their savings, and more.

When malaria strikes, individuals and families suffer a loss of income because the patient cannot work. If the patient dies, the income of many working years is lost.

**b) Countries** spend money on prevention, treatment (drugs, health centres and salaries), education, research.

Farms and factories suffer because of sick employees, and they and the country suffer from the reduced economic activity resulting from the death of active workers.

#### **Stage 2. The knock-on effects.**

**a) Changes in household** behaviour which lead to personal poverty.

Where there is high infant mortality, there is usually high fertility, because families have more children to make sure that a minimum number survive. Having more children puts a strain on household finances. As a result, families invest less on education for their children. This affects girls in particular, because girls are considered likely to spend most of their lives rearing children and not having a paid job.

Further, families are unable to save.

- b) Impact on the **macroeconomy** which leads to low economic growth and GNP.
- i) It has been observed that there is little mobility of labour between malaria endemic regions and regions where malaria is not endemic, i.e. people are not willing to go to malaria areas to find work, and people from malaria areas lose any immunity they may have once they have been away for any length of time.
  - ii) There is little foreign investment in malaria regions, because ex-patriots are seldom willing to work there.
  - iii) For similar reasons, tourism in such regions is very limited.

### **Malaria drugs and people living below the poverty line**

In another paper with the title “The cost of making the poor pay” (see [www.scidev.net/](http://www.scidev.net/), 31 October 2005), Jeffrey Sachs says:

*Universal coverage of long-lasting bed nets and ACTs cannot be achieved until all donors abandon the idea of social marketing and other methods that attempt to extract payment from people who are living below the poverty line. It is urgent, therefore, that all donor and recipient countries adopt a policy of mass distribution of free nets and mass free access to ACTs, in accordance with the recommendations of the UN Millennium Project.*

Do you agree? We believe that dignity and self respect are also very important factors. It is surely better to enable people to become self-reliant in their treatment of malaria, rather than becoming dependent upon free drugs, however good and effective they are. In any case, they could be available today and not tomorrow.

Even a programme of education and training in Natural Medicine requires vision, strategic planning and finance.

### **6. 2005 World Malaria Report** See <http://rbm.who.int/wmr2005/>

This WHO web-site is well worth a visit because, for each country in which malaria is endemic, it gives very detailed information about the extent of malaria, and the programmes to combat malaria. The following is from the introduction:

*This report is the first comprehensive effort to compile, analyse and present available information on progress rolling back malaria in all affected countries. It outlines the epidemiological situation of malaria in all regions of the world, and reports on the status of malaria control, including control policies, service delivery and coverage of key interventions. For 24 endemic countries, the situation of malaria and malaria control and the support provided by the international community are reviewed in more detail.*

*Between 350 and 500 million clinical episodes of malaria occur each year, resulting in over 1 million deaths. The disease takes an economic toll as well because of reduced productivity, which is responsible for an estimated average loss of 1.3% of economic growth annually in countries with intense transmission. Malaria control is increasingly recognized as playing a key role in poverty reduction in high burden countries.*