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Background: medicine factory provides morphine processing facilities for multiple project communities

As outlined in the *Poppy for Medicine* project model published in June 2007, individual project communities would be licensed to produce specific quantities of raw poppy materials. These raw materials would then be transformed into morphine tablets in a shared medicine factory. To shed light on the economics of Poppy for Medicine projects, a model scenario has been developed: one medicine factory would be shared by ten project communities, with each project community operating twenty small farms measuring two jeribs, or 0.37 hectares in size. Accordingly, the model *Poppy for Medicine* project medicine factory would be equipped to process the project communities' 3,000 kilograms of raw poppy materials into varying quantities and formulations of morphine sulphate tablets.

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Model scenario for the production of raw poppy materials

- ◆ **1 factory would provide medicine processing services to 10 Poppy for Medicine project communities**
- ◆ **Each of the 10 project communities would control 20 small poppy farms, each measuring 0.37 ha**
- ◆ **Yielding an average of 40 kilograms per hectare, these 200 project farms would generate approximately 3,000 kilograms of raw poppy materials**

Morphine processing factory specifications

The medicine factory outlined in this Case Study would be able to manufacture low dose 10 mg "immediate release" morphine sulphate tablets, as well as

Sales of locally-produced medicines benefit local communities and Afghan government

As outlined in The Senlis Council's June 2007 publication *Poppy for Medicine*, the most economically efficient way of producing medicines in rural Afghan farming communities would be to group the community's relevant resources in a cooperative model. As well as facilitating the pooling of human and agricultural resources for collective purchase of additional inputs necessary to produce the raw poppy materials, such a cooperative production system would allow for the fair redistribution of the profits on the sales of finished morphine medicines.

After selling the locally-produced morphine medicines to the Afghan government for USD 2,900 per kilo of morphine content, in the model scenario described herein, these profits would amount to nearly USD 9,000 per project community. This cash injection is above and beyond the net income of nearly USD 1,000 each of the twenty licensed project farming families would receive for their raw poppy materials.

Using funds from sales of medicines to diversify local economies

The *Poppy for Medicine* project model provides for the distribution of the profits from the sale of locally-produced medicines through a community-based 'fund for economic diversification.' Accessed through micro-finance principles, and managed by the project community, this fund would provide project participants with access to the capital necessary to diversify their economic activities.

P4M project morphine production scenario

- ◆ **1 project community would produce approximately 300 kg**

“prolonged” or “sustained release” morphine sulphate tablets in 10, 30, and 60 mg formulations. The various steps of morphine extraction, purification, manufacturing into tablets and packaging would take place in the same small medicine factory, which would include a warehouse, a dispensary, a plant room supplying utilities such as deionised water, manufacturing rooms for processing and packaging, an in-process control laboratory and a quality control laboratory.

All areas in which the product is exposed will be designed and operated to Grade D (EU) standards, and secondary packing areas will be to Pharma-clean standards. The morphine medicine factory would be designed and operated in full compliance with internationally accepted standards of Good Manufacturing Practice.

A competitive development project: the cost of establishing a morphine processing facility

The cost of establishing in Afghanistan a fully-equipped and operational facility capable of producing instant-release and sustained-release morphine-based medicines would be approximately USD 5.2 million. This is comparable to other development projects, and compared to military spending in Afghanistan and the cost of current counter-narcotics projects, this cost is competitive. This estimate includes professional factory design fees, project management and validation fees, the costs involved in the recruitment and training of qualified staff, as well as the costs of preparing all of the necessary quality assurance, safety measures, engineering, and operational documentation and systems.

This major start-up cost of implementing *Poppy for Medicine* projects, namely the construction and establishment of a morphine manufacturing factory could be covered as a viable short-term counter-narcotics and alternative development project by one of the international communities’ development organisations involved in supporting the stabilisation and reconstruction of Afghanistan, such as the World Bank, the United Kingdom’s Department for International Development, or Canada’s International Development Agency.

Local production of low-cost international quality morphine medicines

The cost of producing morphine in Afghanistan would be relatively low. It would be possible to produce finished morphine tablets in Afghanistan for approximately USD 2,600 per kilogram of morphine. This price includes the cost of purchasing raw poppy materials from project farmers for USD 130 per kilogram, with ten kilograms needed to produce one kilogram of morphine.

After initial drying in a tray drier, the raw opium will be dissolved in boiling water in a closed steam-heated vessel, filtered by pumping from one closed vessel to another and back again through an agitated Nutsche filter. Separate smaller vessels will then be used with a final small-scale bas filter. The final purified product will be dried in an enclosed fluid bed drier and filled into sealed drums directly from the bottom of the drier in order to minimise product exposure. The

of raw poppy materials

- ◆ ***These 300 kg of raw materials would be processed into 29.6 kg of morphine***
- ◆ ***It would cost USD 2,600 to produce 1 kg of morphine***
- ◆ ***Project communities would sell the morphine to the Afghan Government for USD 2,900 per kg***
- ◆ ***Each project community would generate a net profit of USD 8,880***

By selling Afghan-made morphine medicines to other countries for USD 3,300 per kilo of morphine content, the Afghan government would also benefit from the local Afghan production of morphine medicines. After labelling and trading costs, the Afghan government would generate USD 300 per kilo of morphine content in tax revenues and profits.

The morphine tablets would be exported to countries lacking affordable morphine, and sold there for a fraction of the current retail price of morphine. Depending on the purchasing country, export and retailing costs would increase the total price of Afghan-made morphine to approximately USD 5,000 per kilo of morphine content. At USD 5 cents per 10 mg dose, Afghan-made morphine would make essential pain medicines affordable for those most in need.

International morphine sales

- ◆ ***Afghan government purchases morphine from project communities for USD 2,900 per kg of morphine content***
- ◆ ***After labelling the morphine, the Afghan government could sell the morphine to other countries for USD 3,300 per kg of morphine content***
- ◆ ***Total taxes and profits on the morphine produced in one small medicine factory would amount to USD 190,000***
- ◆ ***Afghan-made morphine medicines would retail for USD 5 cents per 10 mg dose***

Local production of medicines will fuel local economic development

If initial capital investment costs were covered by donors, the morphine production process would cover its own operating costs and be profitable from the first year onwards. As such, *Poppy for Medicine* projects represent a real development opportunity for Afghanistan. By building on Afghan farming

morphine sulphate will then be processed into tablets using direct compression systems and packaged. In-process analysis of moisture and morphine content will be performed in the in-process control laboratory, and quality control of the bulk purified product will be performed in the central quality control laboratory.

P4M project morphine production scenario

- ◆ ***10 Poppy for Medicine project communities would produce approximately 3,000 kg of raw poppy materials***
- ◆ ***300 kg of pure morphine sulphate can be extracted from these poppy materials***
- ◆ ***This morphine sulphate can be processed into 6,000,000 immediate release 10 mg tablets, and 4,000,000 sustained-release 60 mg tablets***

communities' existing resources and Afghan farmers' competitive advantage in poppy cultivation, *Poppy for Medicine* projects would bring to rural Afghan economies the benefits of the economically efficient production of high added-value products. Manufacturing highly valuable and much-needed essential products in rural Afghan communities would be a sustainable way to trigger local development, both directly and through positive spill-over effects.

As development projects, *Poppy for Medicine* projects would provide direct cash injections to farming communities, to be used as microfinance seed money. Each project community would use its economic diversification fund to finance collective development projects and to grant microcredit loans to community members, and the combination of higher net incomes and access to microcredit would end the exclusive dependence of farmers on money lending by drug traffickers and others.

By allowing investment in irrigation systems, agricultural equipment, and light infrastructure, the benefits resulting from the production of medicines would provide farming communities with access to the strategic economic assets necessary to end their reliance on poppy cultivation over time.

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