

## POLICY BRIEF No. 97.2

**POVERTY AND TECHNOLOGY:****The Case of Artisanal Mining****W. Mutagwaba, R. Mwaipopo-Ako and A. Mlaki****Research**

A study was undertaken during 1996 to identify technological problems that artisanal miners face, including current techniques and equipment used, geological information, appropriate tools and their production, and strategies to improve miners' knowledge and skills. Socio-economic aspects of mining were also investigated, in relation to the technological issues. This research has been published as REPOA Research Report No. 97.2: **The Impact of Technology on Poverty Alleviation: The Case of Artisanal Mining in Tanzania**; by *W. Mutagwaba, R. Mwaipopo-Ako and A. Mlaki*.

Artisanal or 'subsistence' mining has a long history in Tanzania, but the introduction of technology, has been slow apart from a policy paper in 1983 which suggested measures to improve and formalize the sector. In 1985 three mobile mineral processing plants for gold and tin were imported to assist small miners through provision of centralized processing services but could not be sustained due to lack of a feasibility study, poor coordination and inadequate financial resources. A few other efforts such as IPI' s equipment design and through the private sector met with limited success. The government policy to limit artisanal activities to Tanzanians only reduced access to technology that would have come from outside the country.

**Research Methodology**

The following hypotheses were postulated:

There is a direct relationship between the application of technology and increased productivity; the nature of the social and economic environment has a bearing on the decision for technological application in the production process; the organization of production determines the nature of the miners environment and hence their opportunities and constraints; the lack of information on mining technology influences the level of production and risks involved; absence of a coherent institutional framework affects the work environment of miners and hence their earnings.

Five representative mining sites were selected on the basis of importance of the minerals to small miners, variety of the minerals and accessibility of the areas and included two gold mines in Geita (Mwanza), diamonds in Mwanza, tanzanite in Arusha and ruby in Morogoro.

Through purposive sampling respondents were selected representing all different categories of mining activities, including public officials. Focused group discussions were held, in-depth interviews, participatory observations and discussions with strategic informants. Also local capacity for making appropriate tools was investigated, and a survey of tools in use outside Tanzania.

**Research Findings**

About 15,000 people were directly involved in mining in the study areas, with a larger number providing services. Exact numbers are difficult to establish due to the mobility of small miners. A rough division of labour suggests the following categories: claim holders, pit owners, mine workers, reprocessing of tailings, specialized working groups (blasting, excavation etc.), service providers (food, trading) and dealers and brokers. All these groups maintain complex relationships, often depending on a particular area or mine, and sometimes include the provision of tools, credit, cash, and (sub-) contracts. Relations with large, formal, operators are inevitable in most areas, and are often tense due to overlapping claims and unclear official agreements.

Productivity and incomes fluctuate very much between areas and periods, and earnings also depend on the type of arrangements between workers and owners. Claim holders usually take 30-40% of earnings from pit owners, without actually engaging in any work. Income from gold mining varied from Tsh 300,000 to Tsh 1 million per miner per season, with the claim holders getting more. In diamonds, more erratic, incomes varied from Tsh 500,000 to Tsh 1 million per 6 months, and in ruby rough guesses indicate an average of Tsh 200,000 per season.

Only very basic equipment was in use in the gold and diamond mines, but not in ruby (compressors, drilling machines), and miners face a number of similar problems (water, mine support). Some areas had access to good workshops for repair (e.g. near Mwanza). Lack of an appropriate marketing system was evident everywhere, and many intermediaries were involved in 'parallel' transactions.

Institutional arrangements are also inadequate, as the responsible ministry has not been able to keep up with the rapid growth of the sector. Conflicts between (centralized) mining departments and local (district) authorities are quite common, the latter having little influence over miners in their area, nor getting revenue. And most artisanal mining is basically an informal process. Conflicts of land ownership (claims, rights) were also present everywhere, but formal and informal miners associations have started to address these issues.

Health hazards in the (crowded) settlement seem worse than in the mines, but the use of mercury in gold mining is dangerous.

Women are more present in providing services (food vendors, traders) than in mining, and cultural norms and technology used create barriers for their involvement. Some are involved as miners' wives, a few own claims, and some have become successful traders. The spend-thrift and rough atmosphere in settlements contributes to sexual abuse and the spread of diseases.

The type of organization common in artisanal mining, with only claim holders being legally recognized as 'miners', contributes to lack of responsibility with regards to environmental and health (safety) concerns. Workers are often exploited, are in a vulnerable position, but still feel their share of rewards worthwhile, at least better than in alternative occupations. Miners do not receive any advice or training on safe operations or on use of appropriate technology.

### **Policy Lessons**

- The government should streamline licensing procedures to facilitate the acquisition of prospecting rights and claim titles, in order to ensure identity and the responsibility to invest in production. This would also facilitate its regulatory and monitoring functions.
- Claim size should be pegged to 'ability to develop', so as to avoid the endless sub-letting and splitting up of plots into hundreds of pits.
- Organization of small miners into associations should be encouraged, as well as access to credit.
- Marketing channels should be made much more transparent by reducing 'red tape' in formalizing mineral business.
- An integrated environmental mining policy should be put in place to regulate and control discharges of waste, land and air pollution, use of toxic chemicals, health and safety.
- Miners should get access to relevant information on appropriate technology, and local producers should be encouraged to make better tools.

### **Further Research**

Areas that qualify for further research are:

Affordable source of energy (solar, wind, water based) to reduce the heavy workload of miners; provision of information to miners; design and production of appropriate tools; the role of women and children in mining operations.

[\[Policy Briefs\]](#)