

Environmental Impacts of Mining on Women in Indonesian and northern Australia

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1 Abstract

Mining can result in significant environmental damage with consequential impacts on adjacent local communities. Women usually consist of more than 50% of a community and form an integral element of society often owning the land. Negotiations about mining developments are too often on a man to man basis, ignoring the interests and welfare of women. As a result, women can be more susceptible to the environmental impacts of mining which result in destruction of traditional lands and the use of chemicals for processing. Removal of forests can prevent women from accessing traditional medicines, foods and cultural materials. The pollution of water by mining discharge can contaminate drinking and bathing water; and result in toxic levels of metals in local fish. The use of dangerous substances such as mercury by women can lead to birth deformities.

Women need to be better informed about these impacts and greater involvement and influence at both the planning and closure stages of mine developments. Consultation about the environmental impacts of mining needs to be gender specific to encourage women to discuss issues which pertain to women's roles in the provision of health, education, food security and cultural activities (ceremony). This paper discusses a number of case studies from Indonesia and northern Australia and provides examples of how women's knowledge can be incorporated into the various stages of mining projects.

2 Introduction

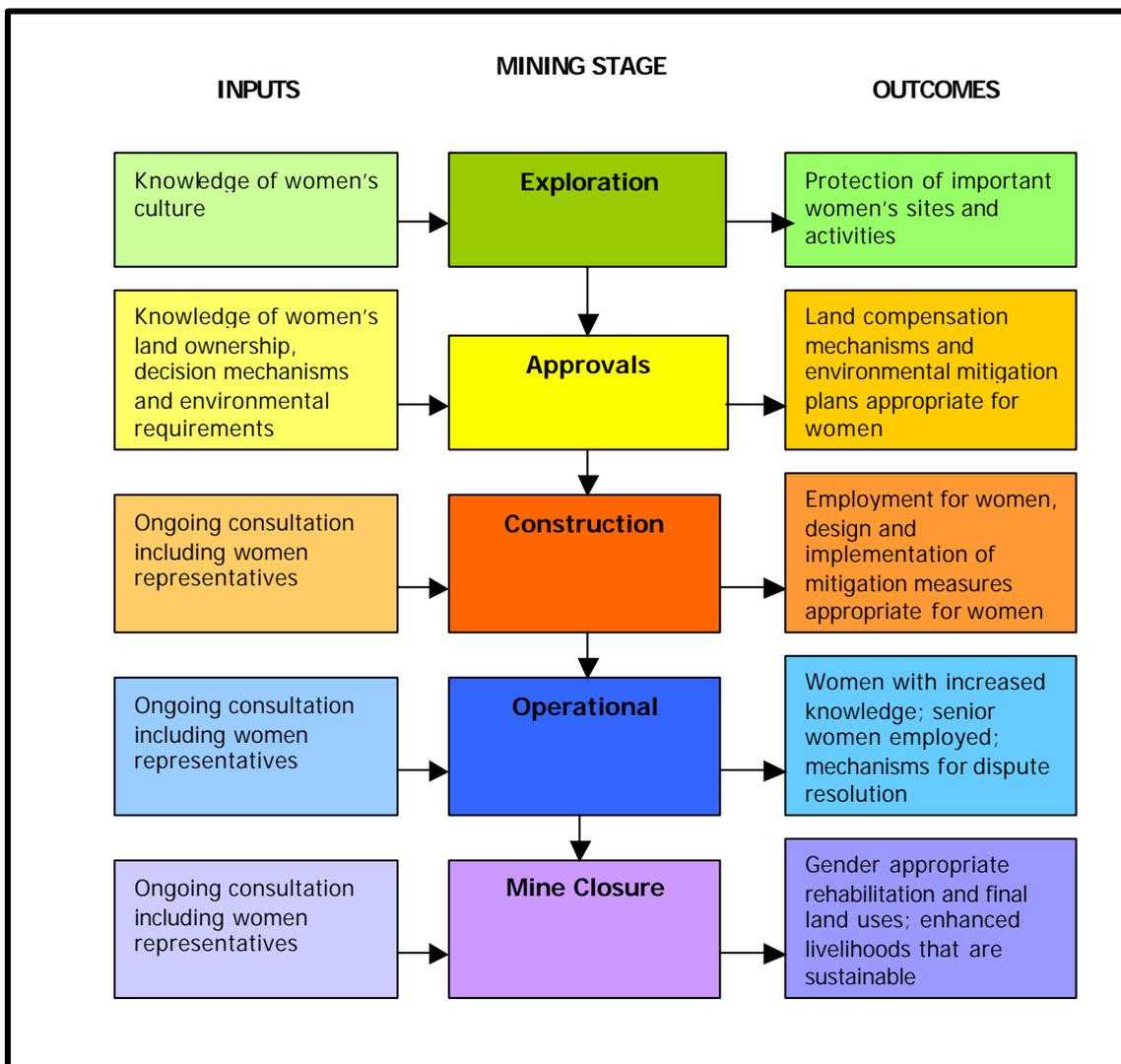
Mining projects developed by large companies are generally undertaken in a number of distinctive and successional stages as follows:

- Exploration – determination of an economic resource requiring the collection of samples and some disturbance to land
- Approvals – the mining company is usually required to undertake a number of studies and suggest strategies to mitigate or control impacts prior to obtaining approval for the development
- Construction – building the mine infrastructure such as camp, tailings dam, processing facilities requires that necessary land is acquired, communities relocated and land cleared

- Operational – involving the production of wastes, discharges (water and air) and ongoing disturbances to land as the mine expands
- Mine Closure - after exhaustion of the ore reserves, the pit/s will be closed, infrastructure sold or removed, the site rehabilitated and post-closure management systems implemented

During the various stages of the mine, the community is impacted in different ways. Women's knowledge and view of the environment needs to be included during the various stages using mechanisms that are culturally and gender appropriate. The earlier that consultation commences the more easy it is to incorporate relevant information into mitigation measures that can be implemented throughout construction and mining; and remain sustainable after the mine closes, see **Figure One**.

Figure One: Inputs and Outcomes from the involvement of Women in Mining



3 Involvement of Women in Mining Stages

3.1 Exploration Stage

Exploration involves the collection of samples from stream sediments and drill holes to determine if an economic resource is available. This is undertaken by exploration geologists. Due to the remoteness and harsh conditions, men rather than women are usually attracted to this profession. Often local men are employed by these geologists to assist them with exploration work. Consequently, any negotiations regarding access to land or destruction of the environment for exploration sampling has usually been conducted by male representatives of the company. This is the first stage where women need to be consulted to ensure that areas important to them will not be destroyed or disturbed. In many cultures, it is not appropriate for indigenous women to discuss their culturally important areas and issues with men. An example of this is at Argyle Diamond Mines in north-western Australia. The site of diamond exploration and later mining is a significant women's creation site with associated cultural stories and ceremonies. Some regions in Australia now recognize this issue and routinely send both male and female anthropologists into the field with the exploration geologists to negotiate land access for exploration with Aboriginal communities.

3.2 Approvals Stage

The collection of baseline data is usually the first step in the approval stage. This should involve a detailed collection of both social and environmental site information. The data is then assessed against mine plans and appropriate mitigation measures developed. In some mines, such as the Kelian project in Indonesia, the initial social data collected for the Environmental Impact Assessment (EIA) was very limited and only recorded the economic status of the surrounding communities. No data on the ethnic diversity of the communities or the traditional relationship of the communities to the land was determined until after the mine commenced production (Kunanayagam, 1995). Consequently, the feasibility team (which did not include any social or environmental experts; or any women) was not aware of the local communities' relationship to land and as a result land compensation issues have besieged the mine since construction and throughout the operation stage. Land ownership in the dominant ethnic group surrounding the mine, the Dayaks, can be inherited by both men and women. Traditionally, after marriage, the husband will move to the wife's family village (Hopes, 1997). The Indonesian government requires land to be registered in the husband's name which complicates legal and traditional ownership of land. Further complexities arise when migrant and transmigrant groups move into the area and use traditional Dayak land (Green, 2002).

If social data is collected it is often collected only by men and from men; and similar to the exploration stage, the knowledge of women's interests and concerns are overlooked. The example of Argyle Diamonds fits this mode. Although, the current location of mining pit and alluvial operations was an important women's cultural site, this is not mentioned in the Environmental Impact Statement (EIS) which provided the basis for government

approval. Only recently, almost 20 years after the commencement of mining are women being formally consulted and represented on a Steering Committee which will negotiate issues relevant to the remainder of the mine life and closure.

Environmental data which is collected during baseline studies usually only records scientific information such as geology, water quality, animal species and plant species. Traditional knowledge on the importance or use of certain land area, water bodies or species is not recorded or required by government for the approval processes. However, if this information is not collected, the decision to disturb an area will be based on by on scientific reasons rather than traditional knowledge. For example certain areas may be excellent areas to use as quarries during the construction phase but no information is available on their cultural importance. Recently, approval was provided by a community advisory group at Kelian (which included senior traditional law women) about using rock from a mountain that was required for upgrading a dam. The community advised the mine that they could use the rock from one side of the mountain on the condition that they didn't alter the height of the mountain as it was an important location in their traditional mythology and creation stories.

3.3 Construction Stage

The construction stage of the mine usually involves the disturbance and compensation of land; and building of mining infrastructure. This should be based on approved plans which are the result of wide consultation with community members. Not always is this the case due to a lack of knowledge of the community and the community decision making processes. Therefore, the decision making mechanisms of the society need to be determined at an early phase in mine development, preferably prior to construction. The example of the complexities of Dayak land inheritance indicated that resolution of land compensation requires ongoing consultation with both male and female community representatives throughout the construction stage.

The issues of community health often surface during the construction stage as community members become aware of the extent of disturbance. The enormity of many mining ventures is often outside the realm of experience of many individuals in remote communities. Therefore even if consultation about impacts has been undertaken, it is extremely difficult to visualize the impacts. In high rainfall locations, such as Indonesia, construction is usually associated with high levels of erosion, resulting in sedimentation of river systems. These rivers are often important sources of food and necessary for the demands of daily living such as washing, bathing and cooking. In many societies, it is these tasks undertaken by women during the care of their families which are impacted by these polluted river systems. If women have not been consulted, impacts are amplified as they have not been expected and alternative arrangements, such as clean water supplies, have not been constructed.

Downstream of the Kelian mine in Indonesia, live approximately 4000 people who are associated with artisanal mining activities and depend of the river for their livelihoods. The relationship with these people and the mine has on occasions been extremely hostile with numerous incursions into the mine area. In addition there are ongoing

complaints of "itchy skin" disease attributed by the community to the mine, although there is no evidence to support these accusations. In recent months, through the community advisory group, senior women in these down stream communities have been involved in health surveys with the local doctors to determine the cause and hopefully develop a cure for this chronic affliction.

3.4 Operational Stage

The aim of this stage is to extract, process and sell the commodities of the mine, such as gold, diamonds, copper etc. Mining and processing are the major activities taking place in the operation which can have environmental impacts. Usually these activities result in ongoing disturbances to land and require the use of fuels, oils and chemicals.

Mitigation measure such as rehabilitation and water treatment processes need to have input from women to ensure that they include women's concerns. Unless women are included in appropriate consultation processes their knowledge will not be incorporated in the mitigation measures. For example, a rehabilitation plan using local plant species at an Aboriginal community in northern Australia, only included the plants which were significant to Aboriginal men. These were plants that upon flowering indicated that it was time to hunt turtle or fish on the adjacent reef. The reason for this oversight was because the rehabilitation plan was designed by a man in consultation with the men of the community. After a woman became involved in the project, the Aboriginal women told her the plant species that they also wanted in the project. These were species of important medicine plants and others that had seeds which could be used to make necklaces.

The management of contaminants in water discharges is a critical activity during the operational stage of the mine. This activity can impact more severely on women, depending on the types of chemicals used. Most artisanal gold mining operations in Indonesia use mercury to separate the gold from other impurities. The mercury, which has been mixed with the gold is then "burnt off" or vaporized over a hot flame. Mercury can be absorbed through the skin during handling, and the vapors from the burning procedure can be inhaled. Often it is women who undertaken the processing of alluvial gold because the men are occupied in the more manual mining activities. If women are pregnant or breast-feeding they and the off-spring are most susceptible to mercury toxicity. Deformed babies have been born in North Sulawesi In Indonesia after their mothers have been exposed to mercury vapors and high levels of mercury have been found in the breast milk of artisanal mining women in Java in Indonesia.

Provision of health information to women prior to and during the construction stages of the mine can assist with the development of alternative methods to reduce risks. There is a husband and wife team of mining engineers in Java, who have developed a simple piece of equipment which allows the safe vaporization of mercury. They have trained local people, including women, in the use of this equipment which also enables mercury to be captured and reused.

3.5 Closure Stage

A key focus at the closure stage is the selection of sustainable post-closure land uses. This is another avenue to involve women in consultation with the mine. However, unless women have participated in discussions during the operation of the mine and have an understanding of the technical issues, it is extremely difficult for them to contribute at this stage. In the Kelian project, the Mine Closure Steering Committee requested the contributions of local women at the mine closure planning meetings. A local Dayak health worker from the nearby Community Foundation agreed to attend the meetings. She required a lot of background information and needed to attend several meetings before being able to effectively contribute. However, it was due to her contributions that a village level mine closure communications program for 28 critical villages was designed and implemented. In one meeting she stated, 'the mine closure plans that you are talking about in this meeting are not the same discussions on mine closure that women are having at the washing holes on the river – they need to be the same'.

Other women who were involved in the mine closure process ensured that agreed criteria were used to select post-closure land uses which would be sustainable and have wide community support. The option chosen for the site was relocation of buildings to a nearby population centre for use by the community as education or cultural facilities; and rehabilitation of the site. In contrast the local Mayor (also a member of the Steering Committee) wanted the buildings to remain on the site for use as gambling center.

4 Conclusions and Recommendations

Involvement of and consultation with women should be an integral component of mine planning; not just an add-on or after thought. If the following steps are included early in the mine development, impacts on women will be reduced and more women will be able to contribute to development of inclusive mitigation measures and sustainable mine closure options. If the mine is already in operation, be proactive, obtain the information that is required and start to involve women in consultation forums.

- Include women's cultural and environmental knowledge as early as possible in mine development
- Allow local women access to professional women who can appropriately record their knowledge
- Develop an understanding of traditional land ownership by consulting with both men and women
- Include decision making mechanisms which include women into planning processes
- Involve women and their knowledge in discussions about mitigation measures
- Include women in steering committees on mine planning and closure options

5 References

Green, A (2002) Review of village baseline study for Kelian Equatorial Mining. (Internal report for PT Kelian Equatorial Mining).

Hopes, M (1997) A study of the communities in the vicinity of PT KEM mine and their relationship to the company. (Internal report for PT Kelian Equatorial Mining).

Kunanayagam, R (1995) Social impact study conducted for Kelian Equatorial Mining. (Internal report for PT Kelian Equatorial Mining).



Women in Mining

Environmental Impacts of Mining on Women

Stages of Mining

- 🐉 **Exploration** – resource determination
- 🐉 **Approvals** - formal approval of impacts
- 🐉 **Construction** - acquisition of land, disturbance of environment
- 🐉 **Operational** - management of discharges, rehabilitation
- 🐉 **Mine Closure** - land use options, sustainable management



Exploration Stage



- ❧ **Exploration Geologists** - Male dominated profession; no consultation with women
- ❧ **Destruction of sites** – important women's site and activities

Approvals Stage

- ❧ **Social Baseline Studies** - often overlooked or not be gender inclusive
- ❧ **Env. Baseline Studies** - usually from scientific basis only and do not capture traditional knowledge
- ❧ **Mitigation & Control Mechanisms** - not relevant to women's issues as not all relevant information has been gathered



Construction Stage



- ❧ **Relocation** - prevents access to traditional plants, medicines and foods
- ❧ **Land clearing** - often disturbs sites of cultural important to women
- ❧ **Impacts on water and air** - sedimentation and dust create health issues of importance to women who have the major responsibility for family and community health

Operational Stage

- ☞ **Consultation** - need to include women to obtain feedback on community concerns e.g. Itchy Skin
- ☞ **Site discharges** - information on discharges needs to be provided to women e.g. Hg, As
- ☞ **Rehabilitation Standards** - plants of importance to women need to be included e.g for traditional crafts, medicines, food



Mine Closure Stage



- ❧ **Post-closure land uses** - need to take into account women's' aspirations and needs e.g. Ceremony and traditional plant uses
- ❧ **Post-closure management of ongoing impacts** - need to continue to involve women's' concerns and knowledge

The Way Forward

- ❧ Develop culturally appropriate mechanisms to capture women's' environmental knowledge, land ownership and decision making mechanisms as early as possible
- ❧ Incorporate this knowledge into mitigation strategies and control mechanisms
- ❧ Continue to include women's knowledge and concerns during operational and closure phases

Outcomes from Involving Women in Mining

