LiveDiverse

Sustainable Livelihoods and Biodiversity in Developing Countries

Governing Biodiversity Conservation and Sustainable Livelihoods in the Warna River Basin, India

- An analysis of Law, Policy, Institutions and Actors-

LiveDiverse Milestone 9.2 Report

October 2011

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Seventh Framework Programme (FP7/2007-2013) under grant agreement No. 211392

Acknowledgement

The authors would like to acknowledge the insights of a range of experts that were consulted in the development of this report, including governmental officials, non-governmental organizations, international organizations, and local residents. The authors would like to especially thank Prof. Geoffrey Gooch, Mr. K. J. Joy, Mr. Suhas Paranjape, and Ms. Suchita Jain, for their feedback and suggestions which they have provided to this report:

The research leading to these results has received funding from the European Community's Seventh Framework Programme [FP7/2007-2013] under grant agreement n° 211392

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Abbreviations:

EAC	Environmental Appraisal Committee
EIA	Environmental Impact Assessment
EIAN	Environmental Impact Assessment Notification 2006 S.O.1533(E),[14/09/06]
EPA	Environment (Protection) Act, no.29 of 1986
ESA	Ecologically Sensitive Area
GoI	Government of India
IBM	Indian Bureau of Mines
ICMM	International Council on Mining and Metals
MCDR	Mineral Conservation and Development Regulations 1988
MEDA	Maharashtra Energy Development Authority
MM	Ministry of Mines
MMDRA	Mines and Minerals (Development and Regulation) Act, no. [….] of 1957
MoEF	Ministry of Environment and Forests
NABARD	National Bank for Agricultural and Rural Development
NP	National Park
SIA	Social Impact Assessment
WS	Wildlife Sanctuary

1. Introduction - Obstacles to law and policy implementation in the Warna basin

Following analysis of what we understand to be the existing legal and institutional position relating to the balancing of livelihoods and the environment, this section attempts to take this one step further. It will evaluate the extent to which implementation of the legal and policy situations takes place in practice, and will identify, where appropriate, the particular circumstances and problems that prevent, hinder and restrict implementation. In the first instance it should be noted that there are, as in many other countries, significant differences between the views of environmental and social regulators, and those of the principal economic actors in the Warna basin. There are other difficulties however, and these will be set out generally below.

The focus of the first parts of this chapter will be on two of the main economic concerns in the area, both of which have major impacts on the livelihoods of local people and on environmental protection: mining and cash crop agriculture, especially sugar cane farming. The reason for this is due partly to their importance currently, but also because there is a strong likelihood that their incidence will increase in the short to medium term. The factors driving the development of mining and the cultivation of sugar cane come from outside the State, and are led in part by global concerns. The balancing of livelihoods and biodiversity protection in Maharashtra and other parts of India will take place more and more in the conflicting priorities of climate change and global natural resource consumption.

Following this assessment, the chapter will go on to examine the respective relationships between the principal actors in the area. Note, however, that the actor network analysis will relate primarily to the Chandoli National Park. The legal analysis, conversely, will focus on the larger Warna River basin and relevant State and Union legislation. This latter examination will include the Chandoli park, but will focus on issues broader than those related to the governance of protected areas.

2 Legal context of mining in Maharashtra

Although Maharashtra is not one of India's pre-eminent mining states (Bhushan, 2008, page 2), bauxite mining is increasingly important in the area around the Western Ghats in the southern part of the state. The potential impacts of mining are widely acknowledged and particular problems are recognised in India with respect to the damage caused to Scheduled Tribes (Oscarsson 2010) and to local ecology, especially forests (Valgholikar et al, 2003). Both Union and State governments are familiar with the difficulties

involved in balancing the economic and strategic benefits of mineral extraction against the inevitable resettlement programmes and environmental devastation resulting from mining, and clarification of this balance has been the focus of increasing government activity in recent years. Following the controversial work of the Hoda committee, which reported its conclusions in 2006 (Planning Commission, 2006), the National Minerals Policy was redeveloped in 2008, a draft State Policy model appeared in 2010, and the 1957 Mines and Minerals (Development and Regulation) Act has been undergoing protracted and extensive revision (although the final version has yet to be completed).

While the 2008 Policy acknowledges the links between mining, forestry and the environment, it stresses the need for economic development, which in its view demands that mining be made a priority. A draft Sustainable Development Framework has been prepared (Ministry of Mines, 2010), following a commitment made in the 2008 policy to ensure that mining activity takes place along with suitable measures for restoration of the ecological balance and for the greater involvement of indigenous populations. The final agreed version is not yet available. The consequences of mining for local populations have been emphasised in the context of the Samatha judgement (Samatha v. State of Andhra Pradesh 1997(8) SCC 191) and the Ministry of the Environment's decision to stop development of a bauxite mine in Orissa by Vedanta in August 2010 (based on Saxena *et al* (2010)).

In addition to the relevant parts of the legislation outlined in ch.4.3, mining in Maharashtra is largely governed by the following national legislation:

- Mines Act 1952[1]
- Mines and Minerals (Development and Regulation) Act 1957
- Mineral Concession Rules 1960
- Forest (Conservation) Act 1980
- Forest (Conservation) Rules 1981
- Environment (Protection) Act 1986
- Environment (Protection) Rules 1986
- Mineral Conservation and Development Rules 1988
- Environmental Impact Assessment Notification 2006
- National Green Tribunal Act 2010

Further binding rules and guidelines exist at State and Union level, and will be referred to below where appropriate. The principal government authorities involved include the Ministry of Mines (and the Indian Bureau of Mines), the State Environmental Impact Assessment Authorities, Pollution Control Boards, and the Ministry of the Environment and Forests. Institutional responsibilities are complex, especially given the different levels of permits required at the various spatial levels.

This part will address three key elements in the Warna context of the interface between the regulation of mining, socio-economic considerations of

[1] This particular Act will not be discussed in this report as it relates primarily to labour regulation and safety in mines.

local people, and protection of the environment. These include the wider legal position with respect to environmental and social protection

2.1 Legal position with respect to environmental and social protection

A number of tools are used worldwide to reduce the short and long term impacts of mineral extraction on the local environment and population. With respect to the environment, permit regimes normally demand that mines must have closure plans in place, and environmental remediation and rehabilitation requirements determine the condition in which the extractors must leave the land when the minerals run out. Performance bonds are often used by regulators to reinforce these obligations, the idea being that it becomes more expensive for mining companies to default on their responsibilities (and hence lose the performance bond) than to adhere to them (and to get it back), Depending on the level of funds required, this should also ensure that in the event of a company failing to discharge its rehabilitation responsibilities, the authorities will have sufficient funds in the bond to cover the costs of remediation and thereby avoid having to use public funds (ICMM, 2005).

Environmental Impact Assessments allow regulators to assess the potential risk to the environment of individual mines, and enable them to set restrictive conditions appropriate for the local context, and rights of inspection access may be granted to the authorities to ensure compliance.

Used effectively and in appropriate contexts, international experience demonstrates that these tools can help to balance social and environmental needs against the problems caused by mineral extraction, although subject to a number of caveats. Even if levels of compliance are high, to what extent can such methods protect areas that are as critical as the Western Ghats, where rehabilitation of ecology and biodiversity is impossible within realistic timeframes? The 2008 Policy's statement that *"[t]he guiding principle shall be that a miner shall leave the mining area in better ecological shape than he found it*" (National Minerals Policy, para.7.10) is unrealistic even with the best compliance. All of the tools mentioned above exist in the armoury of the Indian regulators, but questions arise as to the quality of the weaponry and the extent to which they can be effectively applied in practice.

2.2 Degree of protection afforded to the environment:

Before prospecting or mining is carried out, a number of administrative processes must be completed for the various relevant agencies by the mineral extractor. These might be expected to include forest clearance applications (see para. 9.2.2.4 below), pollution control certification (whether for air or for water) and environmental impact assessments. Pollution control has been addressed elsewhere in this project.[2] This section will therefore restrict itself to addressing questions related to forest clearance, but not before it has briefly examined EIAs in the context of mining.

The Environment (Protection) Act 1986, and its associated Rules and Notifications regulate the impact of polluting or ecologically damaging activities on the environment. Prior environmental clearance is required for certain activities under the Environmental Impact Assessment Notification of 2006 (made under the EPA 1986), although the steps required for clearance will depend largely on the extent of the proposed activity. Mining projects over an area of 50ha or more require Central approval (category A), with those relating to an area of between 5 and 50ha needing State approval (category B). Category B projects are further split into B1 and B2: projects that are deemed not to require an EIA by the Environmental Assessment Committee under rule 7 are categorised as B2.[3] Small mines of less than 5 ha do not require environmental clearance (Environmental Impact Assessment Notification 2006, rule 2) – it has been suggested that this is due to the importance of artisanal mining for local employment and the relatively small area covered by them cumulatively (Ministry of Mines 2010), but presumably it is also related to administrative capacity, given the high proportion of mining licences that relate to smaller mines (Ministry of Mines 2010).[4]

The clear distinction between categories A and B is blurred slightly by the General Condition to the Schedule of the Notification, which provides that:

> *"[a]ny project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of: (i)* ***Protected Areas notified under the Wild Life (Protection) Act, 1972****, (ii) Critically Polluted areas as notified by the Central Pollution Control Board from*

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2 In chapter 4.3.

3 Guidelines for the EAC on determining which projects are B1 and which B2 are promised in the EIA Notification, rule 7, [but do not yet appear to have been developed].

4 Note, however that the statistics quoted in the Draft Sustainable Development Framework (page 19) relate to mines of less than 10ha, rather than the 5ha threshold referred to in the EIA Notification. These smaller mines cover only around 4% of the total licensed mining area (19), whereas large mines of over 500ha make up over 40% of that area despite there being only two or three licences for such mines (*id.*). These figures highlight the relative importance of the Swati Minerals mine at Udgiri because it is in fact one of the largest mines in India. Note also that the Mineral Concession Rules 1960 set the minimum area for a mining lease as 1, 2 or 4ha depending on the circumstances (rule 22D), but the draft of the revised Mines and Minerals Development and Regulation Act of 3 June 2010 sets the basic minimum area for a mining lease for so-called major minerals (i.e. those listed in the First Schedule part C) at 10ha (s.6(2) and (4)).

time to time, (iii) ***Notified Eco-sensitive areas****, (iv) inter-State boundaries and international boundaries*" (emphasis added).

Consequently, proximity to protected areas under the Wild Life (Protection) Act will increase EIA oversight, and in instances where proposed mining sites are in similar proximity to protected forest areas under the Forest Act 1927, the latter regime will also apply. In these cases, the Forest (Conservation) Act and associated Rules will govern (see below).

Environmental clearance can last up to thirty years for a mine (EIA notification rule 9),[5] but reports are due on compliance with the clearance conditions every six months (rule 10). Although these reports are explicitly stated to be public documents (rule 10(ii)), even the latest are not available on the Ministry's website as required. [see below for further points on reporting quality].

Prior environmental clearance applications are assessed by the Environmental Appraisal Committee (at State or Central level as appropriate for the category of project – the composition of the Committee is set out in Appendix VI of the EIA Notification), with the final decision being made by the relevant Environmental Impact Assessment Authority.[6] It is not obliged to follow the advice of the EAC (rule 8(iii)).

Finally, it is possible for the Central Government, in consultation with State authorities, to order premature termination of a mining lease. Under s.4A of the Mines and Minerals (Development and Regulation) Act 1957, such action can be taken in a number of circumstances, most notably here if it is expedient in the interests of "*preservation of the natural environment*….[or] *prevention of pollution*" or in such other circumstances as the Central Government sees fit. This right is subject to the lease holder's right to respond (s.4A(3)). No more detailed criteria have been set for such closure. This is a remarkably wide-ranging penalty, and in the absence of any detailed criteria with respect to how the justifying circumstances are to be interpreted, or to the degree of flexibility permitted to the leaseholder in its right to respond, could be either excessively draconian or lenient.

2.3 Economic regulation with respect to the environment:

In addition to the numerous permits required (e.g. under the Forest (Conservation) Act, the EIA Notification, the Environment (Protection) Act, the Water (prevention and control of pollution) Act 1974, and the

[5] The new draft Mines and Minerals Development and Regulation Act provides that mining leases may not be more than 30 years also, but may not be for less than 20 years (3 June 2010 version, s.7(4)). This maximum is in line with practice in South Africa, for example (Mineral and Petroleum Development Act, no.28 of 2002, s.23(6).

[6] Except where the decision of the EIA Authority has not been communicated within the timescales set by the Notification – rule 8(iii) – in which case, the EAC decision will stand.

Mineral Concession Rules), regulators rely to some extent on financial leverage over miners, through what is now called Environmental Financial Assurance (EFA) (ICMM, 2005). This EFA is intended to cover the costs of full environmental rehabilitation of the mine site once the mine is closed. In India, the EFA manifests itself in the form of assurance payments taken from the holders of mining rights.

In the first instance, prospectors must pay a security deposit of 2,500 rupees per square kilometre prospected (Mineral Concession Rules, rule 20) – this figure is only 20 rupees per km^2 with respect to reconnaissance (*ibid*., rule 7B). Rule 23F of the Mineral Conservation and Development Rules demands R25,000 (with respect to category minerals) or R15,000 (category B minerals – note that these categories do not in way coincide with those set out in the EIA Notification 2006) per hectare as financial assurance from mining leaseholders (R18,750,000 (around €300,000) or R11,250,000 respectively for a 750ha mine as would be the case with respect to the SWATI site at Udgiri). In the current draft of the Mines and Minerals Development and Regulation Act, the security deposit is increased for mining leases, to 100,000 rupees per hectare of the lease area (s.24(1)(n)). Under this proposed regime, the total payable as security for a 750ha site would be 75 million rupees (just over £1 million).

The level at which the EFA is set requires a difficult balancing of environmental remediation considerations against imposing restrictions on the investment climate and capital availability (International Council on Mining and Metals, 2005). It is also, in theory at least, closely linked to the standard of remediation required (see below). The ICMM's survey of existing practice globally suggests that it is relatively unusual for the EFA to be calculated using a rate based on area affected. Ordinarily, the amounts needed correspond to a proportion (anything from 5% to 100%) of estimated remediation costs, with an effort being made at the EIA stage to quantify potential rehabilitation costs. India's system does not make any connection between potential rehabilitation costs and the EFA, and ignores not only the mining methods adopted, but also local circumstances and the longer term consequences of mining. Although even rough calculation of the costs of remediation is notoriously imprecise, it seems likely to this author at least that the equivalent of €300,000 will be only a very tiny fraction of the actual costs of environmental remediation of a 750ha bauxite strip mine to the standard required by the National Minerals Policy in an ecologically critical area.

Under the existing regime in India (i.e. pending finalisation of the revisions to the MMDRA), the financial assurance will be forfeit if the regional controller of mines does not believe that the mine closure plan has been complied with in relation to the rehabilitation work required (rule 23F). This highlights the inextricable link between EFA and mine closure plans, as financial assurance in whatever form will normally only be returned to the guarantor after the environmental conditions

required by the mine closure plan have been met. In India, two mine closure plans are required as part of the leaseholder's mining plan (Mineral Conservation and Development Rules, rule 23B): one for progressive implementation, and the other for final closure (*id.*, rule 23A). These plans are to be assessed by the regional controller of mines as part of the application process for a new or renewed mining lease, and must be reviewed by the mining rights holder every 5 years (rule 23B(3)). There is a clear correlation between these closure plans and the financial assurance: if the reviews of the progressive closure plans are not carried out sedulously, or the standards to which they aspire are inadequate, the potential for the final closure plan to be insufficient or unsatisfactorily implemented must be high. Consequently, the importance of the financial assurance given will be augmented, emphasising the gap between what is needed and what is in the pot.

It is not clear how long mineral extractors may have to wait before the regional controller of mines may determine that the closure plan requirements have been carried out to sufficient level as to justify reimbursing the EFA. In addition, the closure plan will contain provision for ensuring economic considerations once the income from mining has gone from the local area – will appraisal of the success or otherwise of these efforts be made after the same period as for the environmental elements? This could have a major impact on the way that closure plans are drafted and the means to be used to achieve its approved ends. Annual reports must be submitted with respect to the protective or rehabilitative efforts that have been carried out under closure plan (MCDR rule 23E(2)), but the penalties for infringing this rule are unclear – the MCDR applies imprisonment or a fine of R50,000 if any of its rules are breached, but this does not allow for gradations in severity of breach.

The institutional aspect to the mine closure process is also instructive. The decision as to whether or not a mining company has fulfilled the rehabilitation standards required lies with the regional controller of mines. The fact that appraisal of environmental quality standards is being done within the Ministry of Mines is akin to the fox being asked to look after the chickens. The proposed coordination of relevant authorities in the revisions to the MMDRA are encouraging in that regard (Draft MMDRA, s.82 *et seq.*), especially in relation to greater State coordination in the application of the [currently draft] sustainable development framework to mine closure plans (*id.*, s.83(2)).

2.4 Forests:

The Forest (Conservation) Act of 1980, and its associated Rules from the following year directly address the question of the use of forest

land for non-forest purposes. Fundamentally, without Central government approval, State governments may not authorise orders that 'de-reserve' reserved forests; allow forests to be used for non-forest purposes; assign forest land to non-government controlled organisations; or clear forests simply for the purposes of reafforestation. (s.2).

Central Government may, under s.3, set up a Committee that will advise on such authorisations, using the procedure set out in the Forest (Conservation) Rules 2003 (superseding the earlier Rules from 1981). Membership of this committee consists principally of forest officials (3 members), "eminent experts in forestry and allied disciplines" (not affiliated with the Ministry of the Environment and Forestry – 3 members again) and one representative from the Minister of Agriculture. The quorum is three (rule 5) The Committee's remit excludes proposals requesting clearance of less than 40ha, which are instead dealt with by the relevant regional Chief Conservator of Forests alone (Rule 6(5), and Rule 7(1)). Although the Committee's conclusions do not have to be accepted by the government (rule 6), it "shall have due regard" to a number of a number of factors in its decision (rule 7(2)) and may make recommendations on minimising environmental impact (rule 5(3)). The legislation apportions no hierarchy over these factors, and their mode of application is somewhat unclear, but they include the following:

- Whether the forests land proposed to be used for non-forest purpose forms part of a nature reserve, national park wildlife sanctuary, biosphere reserve of forms part of the habitat of any endangered or threatened species of flora and fauna or of an area lying in severely eroded catchment;
- Whether the use of any forest land is for agricultural purpose or for the rehabilitation or persons displaced from their residences by reason of any river valley or any hydro-electric project;
- Whether the State Government or the other authority has certified that it has considered all other alternatives and that no other alternatives in the circumstances are feasible and that the required area is the minimum needed for the purpose; and
- Whether the State Government or the other authority undertakes to provide at its cost for the acquisition of land of an equivalent area and afforestation thereof" (rule 7(2)).

The clear implication from this list is that the fact that the area of forest that is proposed to be cleared is part of a reserve, or is inhabited by endangered species, is but one factor – there is no veto here. If the State government has determined that no alternative exists, but that an equivalent area is available for afforestation elsewhere, the Committee and ultimate decision-making body would have little basis for arguing that an application for forest clearance in a reserved area be rejected. It also appears that this list of considerations is only applicable to proposals that are considered by the Committee. Smaller projects relating to areas of less than 40ha are dealt with by the Chief

Conservator of Forests under Rule 6, but the Conservator is not bound by the Rule 7 factors – these are relevant only to projects that the Central Government has referred to the Committee (Rule 7).

It has been suggested even in the Ministry of Mines' Draft Sustainable Development Framework (Ministry of Mines 2010) that mining projects in protected areas should be rejected outright (Bhushan, 2008) and that no-go areas be established, but this seems unlikely given the policy priorities and the drive for economic development in India. It also appears that the listed factors is not a subset of all relevant factors, of which there may be many – e.g. proportion of reserved area that is to be cleared; where would the equivalent area for planting be; what standards would be applied to afforestation (are the trees indigenous to the area, how many must be planted etc). The position under the Forest (Conservation) Act is complicated somewhat from the miners' perspective by the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act of 2006 (the "Forest (Rights) Act"), which makes it more difficult to change the use of forest land (Forest (Rights) Act, s.4(7) – see below).

2.5 Standard of rehabilitation:

The National Minerals Policy provides that "*the latest internationally acceptable norms and modern afforestation practices shall form integral part of mine development strategy in every instance*" (National Minerals Policy 2008, para.7.10), with remediation to take place contemporaneously with mining activity as far as possible. The Guidelines issued by the Indian Bureau of Mines (IBM) with respect to mine closure plans demand that such plans

> "*must aim at leaving the area in such a way that rehabilitation does not become a burden to the society after mining operation is over ...[and]* ***must also aim to create a self-sustained ecosystem***" (para.3, emphasis added).

More specifically, there are two broad standards in place in existing legislation:

- equivalent planting outside the mining area;[7] and
- planting double the number of trees felled.[8]

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[7] Under the Forest (Conservation) Rules of 1981, it may be possible for the Committee responsible for advising government on tree clearing applications to approve such an application if an equivalent site has been identified for replanting (at the government's expense – rule 5(2)).

[8] The Minerals Conservation and Development Rules further provide that holders of mining leases must "undertake the phased restoration, reclamation and rehabilitation of lands affected by prospecting or mining operations" and complete these before abandonment (rule 34). This must be carried "*in such a manner so as to cause least damage to the flora of the area*" (rule 41). At least twice the number of trees destroyed

The Mineral Concession Rules also require that prospectors and lessees "*restore, **to the extent possible**, other flora destroyed by prospecting operations*" (emphasis added) (Mining Concession Rules 1960, rules 14 and 27).

Application of these standards of ecological restoration poses a number of problems. Firstly, the location of the equivalent planting is potentially important, especially in the context of such a critical area as the Western Ghats. There are no requirements that any new plantations would have to be contiguous to the existing forested area, for example, and this would cause major problems for the Sahyadri Tiger Reserve, as the territory covered by one tiger is so extensive and demands continuous expanses of forest for its survival. The fact that rule 7(2) of the Forest (Conservation) Rules requires that the government bear the cost of acquiring the new land is likely to lead to governments using the very cheapest land for afforestation.

Requiring mining concerns to plant double the number of trees they fell sounds like a fair way to ensure the reinstatement of the pre-existing ecology, but the simplicity of its attraction hides some problems. The most obvious question is how to calculate the number of trees that existed in the first place. Under the 1988 Mineral Conservation and Development Rules 1988, prospecting schemes must include "*baseline information of prevailing environmental conditions before the beginning of prospecting operations*" (rule 4), and this might conceivably incorporate estimates regarding forest density. Assuming quantitative agreement can be reached on this figure between applicant and regulatory authority, the qualitative aspect needs to be addressed – i.e. what types of trees should be planted, and in what proportion. One of the key features of biodiversity hotspots like the Western Ghats is the sheer variety of flora in a given area.

It is clear therefore that application of these standards presents obstacles to the achievement of the objectives of the National Minerals Policy and of the IBM mine closure guidelines – *viz*. to leave the area in better ecological shape than it was, and to create self-sustaining ecosystems. The standards simply lack the level of detail required if an ecosystem is to be re-established in anything like the form it had taken prior to the interrupting activity. The overwhelming focus on trees is also problematic. In order to build up the biomass that can sustain the environment to the standard required, other, more pioneering, flora may be more critical. Current legislative provisions in the Mining

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as a result of the prospecting/mining activities must be planted (rule 41(2)), and the lessee must "look after them during [the] lease period".

The two standards are combined in rule 14 of the Mineral Concession Rules 1960, where one of the conditions under which prospecting licences are issued includes the holder of the licence "*taking immediate measures **for planting in the same area or any other area selected by the Central or State Government** not less than twice the number of trees destroyed by reasons of any prospecting operations*" (emphasis added).

Concession Rules require replacement of flora destroyed *to the extent possible*, but this both allows mining companies a high degree of flexibility with respect to the effort required, and ignores the fundamental fact that the order in which flora is reintroduced is also of critical importance.

2.6 Degree of protection afforded to local / affected population

This section has thus far focused on the effectiveness of environmental protection in connection with mining. These considerations may be very different from the needs of the local populations, and Indian legislation makes some effort in addressing those needs. The following discussion will differentiate between the economic and cultural considerations relevant to local groups, and the extent to which local views are reflected in the progressive development of mining sites.

With respect to consultation for projects with potentially significant impacts on the environment (Category A and B1 in the parlance of the Environmental Impact Assessment Notification), public consultations must ordinarily take place with those "local affected persons and others who have plausible stakes in the environmental impacts" of the activity or project (Environmental Impact Assessment Notification 2006, rule 7, III). There are two parts to public consultation (consultations not being necessary in some instances): firstly, a public hearing to be organized by the local Pollution Control Board at the site itself, or in close proximity for local affected persons (EIAN rule 7(ii), with detailed requirements in Appendix IV). Secondly, written responses must be sought from 'plausible' stakeholders. The requirement for a local meeting may be dispensed with in certain circumstances, for instance where the organizing authority deems that it is not possible to conduct the hearing in a way that "will enable the views of the concerned local persons to be freely expressed" (7(v)). In the event that a meeting does take place, the applicant should submit its revised EIA application and environmental management plan, addressing the concerns expressed at the meeting (rule 7.stage 3.(vii)).

The emphasis in appendix IV of the EIAN 2006 is on getting the draft EIA summary and plan to the local people affected, although details as regards where the project must be advertised and the quality of the communication are not as good as they might be. The plans must be available in hard and soft copy, with locations advertised and 30 days notice given before the meeting will take place. There is no requirement for provision of a non-technical summary, however, as is normal in the European Union for example [9]There are no criteria in the

[9] Council Directive of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, 85/337/EEC, *Official Journal NO. L 175 , 05/07/1985 P. 0040 – 0048,* art.5.

Notification suggesting that local people might have a veto over the project going ahead – the project proponent must answer the questions raised at the meeting, in the revised version of the EIA Report, but the appraisal by the Committee, if that is appropriate, will revolve around environmental safeguards it would appear.

In addition, the Forest (Rights) Act 2006 gives additional protection to Scheduled Tribes and traditional forest dwellers in instances where mining is proposed for a critical wildlife habitat supporting such populations. Where forest rights have been recognized, however, and the resettlement of the forest dwellers is proposed under s.4, resettlement is feasible as long as certain safeguards have been adhered to. Schedules Tribes categorically do not have an immutable right under the Forest (rights) Act to remain untouched.

As regards the safeguarding of local economic and cultural considerations, a number of provisions apply. Holders of mining rights are obliged under the terms of their leases to favour Scheduled Tribe members and those who have been displaced by the mine with respect to employment (Mineral Concession Rules 1960, rule 27(p)). Mine closure plans should then describe the socio-economic consequences of mine closure for the area, including details of the number of local people employed at the mine, possible impact on secondary sources of livelihood dependent upon the mine, and any compensation payable to mine employees (Indian Bureau of Mines, Guidelines for Mine Closure Plans, para.5).

Although there is nothing very new in the 2008 National Mineral Policy with respect to managing the socio-economic impacts of mine closures (National Mineral Policy 2008, para.7.12), it attaches high priority to the socio-economic development of the areas proximate to mines, focusing on the use of public funds for infrastructure with respect to health, education, provision of drinking water and roads (National Mineral Policy, para.7.7). The implication is that with large-scale investment in mineral extraction, there should be correlative efforts to ensure that regional social and economic development proceeds apace. The same policy also outlines plans for the application of Social Impact Assessments in relation to the displacement of people to make way for mines (para.7.11). It is noteworthy, however, that these SIAs "will be undertaken to ensure that suitable Relief and Rehabilitation packages are evolved" (id.). There is a strong implication from this, and from the socio-economic infrastructure priorities mentioned in 7.7 that efforts will be concentrated on social protection *after* the decision to allow mining has been taken, rather than on the protection of communities from being displaced by new mines. In its treatment of tribal groups and 'weaker sections', the policy clearly focuses on economic considerations: "*a mechanism will be evolved which would actually improve the living standards of the affected population and ensure for them a sustainable income above the poverty line*" (para.7.11).

Royalties are paid by mining leaseholders. With respect to bauxite, for instance, the level of royalty currently is around 80 rupees per tonne of bauxite extracted although this varies according to the alumina content and the worldwide aluminium price.[10] This appears low, given that the current spot price of one tonne of aluminium is around US$ 2440, but in fact it is similar to the comparable rates in Australia and Jamaica, two of the world's largest bauxite producers. The proposed MMDRA (in a version that has been approved by the Group of Ministers but is not available publicly) provides that mining companies pay a sum to those resettled as a result of mining equal to the entire royalty paid in the previous year (see for example S.A. Aiyar, "*Mining royalty gives tribals a better deal*", Times of India, 10 July 2011) with respect to minerals other than coal.

It is also potentially possible for the Central Government to require the withdrawal of a mining licence under s.4A of the Mines and Mineral (Development and Regulation) Act, as the grounds for termination are wide enough to permit the government to do so "*for such….purposes as [it] may deem fit*" (s.4A(1)). This could conceivably include wider social reasons than are currently explicit in the legislation.

2.7 Legislative ambiguity

In addition to the problems outlined above, one further problem threatens the objective balancing of environment and economic factors. This is the tendency in the mining legislation to favour mining concerns by default when time restrictions imposed on regulatory agencies are breached. For example, rule 11 of the Mineral Concession Rules 1960 provides that an application for the renewal of a prospecting licence "*shall be deemed to have been renewed for a period not exceeding the period prescribed for renewal of prospecting licence under sub-section (2) of section 7 of the Act, or the period for which an application is made, whichever is less*" if the authorities fail to dispose of it on time. Similarly, with respect to the renewal of mining licences under rule 24A, if the IBM does not provide a report within three months commenting on whether or not renewal would be "in the interest of mineral development", it is assumed that it the IBM is in favour of renewal. Applications for the renewal of mining licences that are not disposed of timeously are extended until such point as the State Government does anything about them (rule 24A(6)). This practice is also unfortunately evident in the latest version of the Mines and Minerals Development and Regulation Act (s.28(3) and (4), for example).

[10] According to the Ministry of Mines Notification G.S.R.574(E) of 13th August 2009 (amending the Mines and Minerals (Development and Regulation) Act 1957), the royalty rate for bauxite is 0.5% of the London Metal Exchange Aluminium metal price 'chargeable on the contained aluminium metal in ore produced for those despatched for use in alumina and aluminium metal extraction; and 25% of sale price on ad valorem basis for those despatched for use other than alumina and aluminium metal extraction and export".

Interestingly, such default extensions are not restricted to India alone – in South Africa, for instance, mining rights are presumed to continue beyond their face expiration dates where an application for renewal has been submitted (Mineral and Petroleum Development Act, 2002, s.24(5)), until such point as a decision has been taken either way by the relevant authority.

These rather generous provisions are potentially exacerbated by the provisions of s.31 of the Mines and Minerals (Development and Regulation) Act, which allows mining leases and renewals to be granted under conditions different to those in legislation made under s.13 of that Act. No qualifications are attached to this broad power, and it could therefore open the door to the circumvention (or of course, tightening) of the rules governing mineral licences without reference to any underlying requirements as to protection of environmental or social conditions. Reasons must be stated for the special case, but there is no right of challenge apparent, and the grounds for opposing such an action are uncertain as no standards are provided for.

The question of default extensions are in fact currently causing problems for the Ministry of Mines. In a letter dated 15th December 2009 from Gaurav Kumar, deputy secretary of ministry of mines (no.7/111/2009-M.IV), the writer noted that because of slow processing of new concessions and renewals for e.g. forest clearances by state governments "*leases are allowed to operate under deemed extensions. Needless to say these circumstances provide perverse incentives for illegal mining of various kinds*". As a consequence of this, the Ministry began seeking quarterly reports from states on the processing of such renewals, but the repeated letters on the Ministry of Mines' website[11] complaining about the lack of response from States, suggest that it does not appear to have been receiving updates from many States. Maharashtra, coincidentally, is one of the worst offenders, having provided only one report since the original request from Mr. Kumar.

This could indicate any one or combination of a number of problems – that the deadlines imposed in the legislation are not compatible with the resources available to deal with the administration (because the Ministry is woefully understaffed or because the periods allowed are unrealistic in any case?); that States are not compiling the reports as required (due to an unwillingness to show in detail where they are failing, because the frequency required is too onerous or they lack the consolidated data themselves, or perhaps because they fear the scrutiny and transparency?). On the other hand, it might also suggest that the State agencies are not afraid of the Central Ministry's demands, possibly because they feel the Centre's powers of enforcement over them are weak, a point which could be vindicated by the repeated letters and their rather incongruous publication on the Ministry's website.

[11] Http://mines.nic.in, last visited 10 August 2011.

Incidentally, a search for the status of reconnaissance prospecting and mining permits on the Ministry of Mines website on 2 August 2011 (searching for 'bauxite' in 'Maharashtra'), revealed only one application from Swati minerals for bauxite in Udaigiri (sic) for 776.55 ha. It also reveals that the application was received on 24 April 1996, but rejected / returned on 27 February 1997. Mining of bauxite is very clearly happening at Udgiri, and the mining area of the application matches very closely with the area of the mine itself, but for whatever reason, the details of the permit are missing from the database.

3. Sugar cane

In addition to the pressures on biodiversity and local livelihoods from mining, other problems may be caused as a result of factors driving farmers to plant more sugar cane. These external factors emanate from the rather unlikely source of the Clean Development Mechanism (CDM) under the UN Framework Convention on Climate Change (1992). This is because the generation of energy is a bi-product of the sugar industry, and this has become something of a beacon in India, with broad support across diverse constituencies (see for example (Dutta 2009); (Energy 2009)). If this type of generation is to increase in line with expectations and beyond, there may be major impacts on water quality and quantity, and on the biodiversity in the basin through encroachment on protected habitats by sugar cane cultivation. These consequences are not adequately addressed in the CDM context, and the absence of a strict legal regime with respect to environmental protection and water management is likely to exacerbate them.

3.1 Sugar cane in Maharashtra

Sugar cane cultivation in the upper and mid Warna basin has increased over the past few years, with sugar cane as a cash crop displacing traditional subsistence agriculture (Kurane 2010). The bulk of the cane in Maharashtra is used for the refining of sugar. Maharashtra is largest sugar producing state in India, producing almost 30% more than the next biggest producer, Uttar Pradesh (USDA Foreign Agricultural Service, 2011), with 196 sugar factories in 2007 (Maharashtra State Co-operative Sugar Factories Federation website sugar statistics, at http://www.mahasugarfed.org/sugar_statistics.htm - combined totals of private and cooperative sugar factories[12]) and 526,000 ha of land under sugar cane cultivation in 2004 (Department of Food and Public

[12] Maharashtra Energy Development Agency quotes a figure of 202 factories (www.mahaurja.com).

Distribution, Directorate of Sugar, "Sugarcane Agriculture", Table 3.1 at http://fcamin.nic.in/).

The large number of sugar refineries, and the local jaggery (or *gur*) production, provide ready buyers for this cash crop, and this, combined with a number of other critical factors, makes sugar cane an attractive crop for farmers. These other factors include the availability of improved irrigation techniques, better funding opportunities from the National Bank for Agriculture and Rural Development (NABARD) (Nair 2011), and the fact that in periods of drought, sugar cane will not simply die off. This means that dry periods may reduce the yield of the cane, but not destroy the entire crop (Silva 2008). In addition, although sugar cane cultivation demands relatively high quantities of water – each unit of cane produced requires 250 times as much water (Gerber-Leenes 2009; Kostka 2009), farmers do not pay for any water they need to use, whether sourced from groundwater or from surface water. Sugar is subject to Statutory Minimum Price controls (11th Five Year Plan, para.7.1.303) so farmers are guaranteed a certain level of income), even although this price may not allow a high margin of profit (Kostka 2009). Consumptive water use is also largely unregulated, except in relation to large irrigation projects, and for farmers working on relatively small-holdings – typically less than 1 ha (Kostka 2009), this lowers both the cost and bureaucracy of diverting water to irrigate their cane crops. In the upper Warna basin, farmers can expect to produce between 30 and 40 tonnes of cane per hectare. This compares unfavourably with the Indian average of 70 tonnes/ha and the Maharashtra mean of 57 tonnes/ha (Kostka 2009), and in fact may even be lower.

3.2 Potential influence of the demand for renewable energy?

Aside from issues relating to the encroachment of sugar cane cropping in forested areas and the reduction in the cultivation of traditional subsistence crops, the reason this particular crop is important is because of its potential to generate electricity. The sugar refining process produces two principal by-products that are useful in other industries – molasses and bagasse. The bagasse, that is the milled cane husks, can be used in the production of textiles (Chiparus 2003), but can also be used as a fuel. In sugar refineries and jaggery factories, something approaching a closed system can be established whereby the raw material that fuels the process is itself a product of that process, without the need for another external fuel. We were told at the interview with the Chief Engineer of one major sugar plant in the case study area that while roughly 135kg of bagasse is produced from the milling of 1000kg of raw cane, only 50% of this is needed to generate sufficient power to run the boilers needed for the process of refining the sugar. The other 50% can be used for textiles or, more saliently here, for the generation of electricity from renewable biomass. These figures are not exactly matched in the literature, however, with Restuti

and Michaelowa quoting a figure of 320kg of bagasse per tonne of cane (Dewi Restuti 2007), with only 30% of the bagasse produced from milling being needed to power the refinery (*id.*). In any case, this means that between 50-70% of the bagasse resulting from the milling process is available for what is termed co-generation (or more commonly, cogen), the combination of using the bagasse to produce both heat for the refinery and electricity for the grid (Dutta 2009).

In 2010, installed capacity for bagasse cogen in India was 1411MW (Ghosh 2011), with the potential thought to be in the region of 5000MW (Ministry of New and Renewable Energy 2011).[13] The figures for Maharasthra alone, in 2008, are around 231.5MW in installed capacity according to the MEDA, which also projects that the production potential for the state is 1250 MW (MEDA), although this potential peak is not expected to be reached for another 20 years. One tonne of sugar cane will produce anything between 10-20kWh (Dewi Restuti 2007) and 50-70kWh, or more, in a very high efficiency plant (Tyler McNish 2009).

In theory, one of the beauties of the bagasse cogeneration process is that it does not generally demand that sugar refineries mill any more cane than they currently are (Tyler McNish 2009). It is not clear at this point how valid the assumptions that underpin this prediction actually are. There are a number of factors that influence variation in cane cultivation activity, the price of sugar being the main one. The Government of India is keen to increase its renewable energy capacity, and has introduced capital incentives for sugar factories to develop cogen capacity, along with a favourable 'cost-plus' tariff for the rate at which electricity distributors will buy the energy generated by bagasse cogenerators.

The tariff for the sale of electricity to the grid provides the incentive for sugar refineries to install cogen facilities, along with favourable financial terms (including sales tax holidays, rapid depreciation and infrastructure import duty relaxation) and preferential lending for capital investment from the Indian Renewable Energy Development Agency Ltd (http://www.ireda.gov.in/), and the respective Ministries of New and Renewable Energy, and Food [sourced from www.teflas.com/presentations/Vinay_Kumar-NFCSF.ppt]. With respect to the case study area, the tariff is set by the Maharashtra Electricity Regulatory Commission under powers vested in it by ss. 61 and 62 of the Electricity Act 2003. The current tariff level was set in 2005 (MERC Case No. 123 of 2008, para.64) and sits at 4.79 rupees/KW/h (see also MERC Tariff order dated 8 August, 2005 in case no.37 of 2003), based on cost of generation plus 16%.[14]

[13] Note that this estimate for potential capacity is rising – Maharashtra's Energy Development Agency cites an earlier figure of 3500MW potential (www.mahaurja.com).

[14] The Maharashtra Energy Development Agency apparently intends to generate 10% of the state's power from renewables by 2015

How the market will develop is of course uncertain, because there are existing buyers for the bagasse and those markets will be altered where cogeneration demands for bagasse restrict its availability for other uses. It may also be that the presumption that no further cane cultivation is needed if projections are to be met is based on some questionable expectations. For instance, the figures assume that the efficiency of the boilers at these factories will be high and that cane yield will also be high. Where boilers are of lower efficiency, the quantity of bagasse needed to produce the energy will increase, and this will be compounded in situations where the calorific value of the bagasse itself is low. In situations such as these, which appear relevant to this part of Maharashtra, the area needed to produce the cane would increase rapidly, and that land would have to come from somewhere, putting forests at risk potentially. Kostka et al assume that the political sensitivity associated with growing biofuels will combine with the relatively low price of sugar in India to limit the spread of cane cultivation (Kostka 2009), but this author wonders if the level of acceptability of sugar cane farming, and the power of the sugar lobby, in Maharashtra could have the opposite effect.

It is important to note that the issues described here relate to the generation of electricity from biomass (and more specifically from residue biomass (Bluemel 2006-2007), and do not refer to the quite separate issue of the use of sugar cane as a biofuel source. The two do overlap to some extent however.

The point is that bagasse cogeneration is regarded as being of potentially major importance for Maharashtra and for India as a whole by almost the entire spectrum of observers. Its attractiveness is enhanced by a number of factors unique to Maharashtra, including the fact that the current energy generation mix in India would mean that "*a bagasse power project located in Indian would receive twice as many carbon offset credits as an equivalently-sized project located in Brazil*" (Tyler McNish 2009). Furthermore, the cost of investment in bagasse cogen in the state is actually the cheapest of all the renewable options (at 35 million rupees per MW – the same as for other biomass investment costs, but less than wind, and less than half of small hydro) (Mayabhate 2006). The economic weakness of sugar refineries also plays a role (Chan 2009) along with the power of the sugar lobby in the state.

The impact of bagasse cogeneration projects in India's involvement in the Clean Development Mechanism (CDM) has been significant. The CDM process under the UNFCCC seeks to pair funding from developed nations to individual projects in the developing world that on a net basis can reduce the carbon emissions of the former. For an Indian project to be considered for such investment by the global Executive Board of the CDM, it must first be approved by the National

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(http://www.dnaindia.com/mumbai/report_power-starved-maharashtra-banks-on-renewable-energy_1363970).

Clean Development Mechanism Authority in India. The CDM is primarily focused on the reduction of greenhouse gas emissions, but also addresses the broader question of the sustainability of the projects it approves. In 2009, India had registered 36 bagasse power projects with the CDM Executive Board, with 60 pending (the highest number out of any country) (Tyler McNish 2009). In order for prospective CDM projects to gain approval from the National CDM Authority in India, the promoters must demonstrate the 'financial additionality' of the project, along with its sustainability with respect to water quantity and quality, among other things. The extent to which this assessment is properly addressed by the promoters, evaluated by the NCDMA, and policed by the relevant enforcement authorities, will be of critical importance in whether or not bagasse cogeneration in Maharashtra, and more generally, the CDM process as a whole in India, will work in a way that effectively protects both water quantity and quality, and local biodiversity. If the CDM authorities fail to take account of the poor monitoring capacity, limited scope of enforcement powers and lack of financial and human resources of the local, state and national authorities in relation to water and biodiversity, they risk imposing additional burdens on those agencies and on the local environment that institutions are unable to meet. Bagasse cogeneration could be highly beneficial for India and for local populations through income generation and electricity availability, but will require institutional capacity commensurate with its potential impact on the environment.

Further details relating to the institutional capacity to address the environmental problems caused by intensive sugar cane farming are set out in the following section.

4. Observations from field trips and interviews

The following observations are based on field trips to the Kolhapur district and Chandoli National Park in December 2009 and October 2010.

The capacity, staffing and financial resources of the government authorities that are variously responsible, whether directly or indirectly, for the protection of the environment, are complicated and almost inevitably inadequate for the task at hand. There are problems associated with institutional coordination, and the comparative levels of power of the regulatory authorities on the one hand and the government authorities relating to sectoral users such as industry and agriculture on the other. This section will not address the separate question of the appropriateness of the legal powers, management responsibilities and institutional function conferred on relevant authorities as these have been largely addressed in ch.4.3), but will instead focus on resource issues.

As noted in part 9.2.1 above, the Pollution Control Board within the District Collector's office holds responsibility for the monitoring of environmental impact assessment conditions and pollution control permits. It may therefore visit sites with EIA approval, such as mines, unannounced, in order to check compliance with respect to any conditions that have been imposed. Unfortunately however, the lack of financial resources available to the respective DPCB limits their capacity to do so, and they must therefore rely on the mining company to organise transport to and from the mine site. While there is a limit to the amount of temporary improvements that may be made to a mine with short notice, the fact that the DPCBs are beholden to the mining companies must compromise the utility of these 'unannounced' visits – dust levels along access roads may be reduced with water spraying, and official 'steered' away from possibly contentious areas. Such problems may also, of course, be indicative of an institutional unwillingness to apply the law to its fullest extent, a problem that is clearly augmented by corruption. Corruption is the largely unmentioned and largely unquantifiable aspect of the environmental management regime that we were unable to properly address when visiting sites. India ranks 87th out of 178 in the Transparency International Corruption Perceptions Index 2010 (www.transparency.org), and anecdotal reports that we heard when travelling in the basin suggested that corruption is rampant in the area.

The relative incapacity of enforcing institutions is further reflected in the follow-up with respect to EIAs and mining permits. According to Swati Minerals, the bauxite mine that we visited in Udgiri is being remediated in line with legal requirements – we were told that they were planting between 5 and 10,000 trees annually to comply with conditions imposed by the Department for the Environment and Forestry. Evidence from the mine, however, during our previous visit a year earlier, suggested that the remediation efforts were inadequate. The trees planted were neither indigenous nor as numerous as stated. They were also planted in such a way as to virtually guarantee their own demise, with minimal soil being used and saplings being planted in polythene bags, isolated from the rock. It was very difficult to believe that the remediation efforts were sufficient to meet the requirements of the licence, and this in turn raises serious questions with respect to the level of enforcement being applied by the relevant authorities. It also potentially highlights the quality of the standard applied to mining concerns with respect to environmental remediation – 5-10,000 trees may indeed be twice the number felled, as required under the Minerals Conservation and Development Rules (para.9.2.2.5 above), but was demonstrably inadequate as a means to achieving self-sustaining environments.

Government officials in the office of the Conservator of Forests complained of their powerlessness in the face of determined and well-resourced private concerns who were able to challenge decisions through the entire hierarchy of courts, simply because they lacked the funds to pay for rigorous legal representation in this process. It may be that the recent Green Tribunal Act of 2010 will go some way towards countering the difficulties caused by members of the judiciary having little or no sympathy with environmental protection concerns, a problem voiced by a number of interviewees (e.g. interview with Videh Uphadyay, Delhi, 21 October 2010).

As regards physical capacity, in addition to the complete absence of a quality monitoring network on the Warna river, government authorities at State and Union levels are undermanned in relation to the tasks they are responsible for. For example, the Wildlife and Forestry wing of the Ministry of Environment has 14,000 aging employees to police 69 million hectares (around 500ha each) (Interview with Brij Mohan Singh Rathore, Joint Secretary of the Ministry of the Environment and Forests, Delhi, 11 October, 2010). Replacement of these older, more experienced, employees is difficult because younger people do not want these jobs. The DPCBs in Maharasthra are under-manned, and in Delhi, only 10 field officers are employed to assess around 200,000 industrial concerns (interview with Videh Uphadyay, Delhi, 21 October 2010).

While fragmentation of responsibilities is recognised by the GoI as being problematic (National Environment Policy, para.5.1), it is further exacerbated by the lack of coordination and communication between relevant agencies. While the interviews we conducted demonstrated a level of awareness that the work of other agencies was relevant to the work of their individual authority, this did not correspond with efforts to bring those agencies together for a coordinated approach (interview with Kolhapur District Pollution Control Board, October 2010). The legislation does not oblige coordinated or integrated approaches, and lower level employees are likely to be reluctant to initiate such approaches unless prompted from above. This is problematic because the institutional framework is unlikely to be radically restructured. In addition, coordinated action, with 'mainstreamed' duties with respect to social and environmental protection, for example, will therefore need to be robustly implemented if progress is to be made. Again, this has been recognised elsewhere (Rathore 2007) – "*the gross inadequacy of a sector or department alone to provide a sustainable conservation umbrella to the full range of biodiversity*" (45).

In addition to the problems associated with horizontal institutional fracturing, vertical coordination is also complicit. The Ministry of Environment and Forestry splits control of the Environment as a whole, from wildlife and forests. Vertically, Union control of the environment is residual, with primary responsibility resting on States, although this causes problems in terms of the effective imposition of national standards and targets on individual States (interview with Brij Mohan Singh Rathore, Joint Secretary of the Ministry of the Environment and Forests, Delhi, 11 October, 2010). State priorities tend to limit the extent to which national targets can be imposed.

Management of water resources in particular is also hobbled by the sectoral institutional splits, and by an overwhelming concentration on irrigation rather than on the broader management of all uses. Water quality is managed by the District Pollution Control Boards (DPCBs), water quantity (and by default, flow) with respect to projects (i.e. irrigation projects) is managed by the relevant Development Authorities – i.e. the authorities responsible for managing the irrigation projects. Comprehensive water quantity management does not exist. Surface waters are managed only to the extent described above, and while groundwaters are nominally controlled by the Groundwater Survey, use of groundwater resources is otherwise effectively unregulated

except for some powers vested in panchayat bodies in relation to drinking water from boreholes. The Maharashtra Water Resources Regulatory Authority oversees major projects, but in fact does not control ecosystem protection, groundwater, water quality or diffuse pollution. It relies on compliance reports provided by officials embedded in irrigation and hydropower projects (interview with Shri Sodal, Director, MWRRA, 13 October 2010), and is focused principally on drawing up the criteria to be used by the State government in deriving the tariff for water use.

The DPCBs have no control over irrigation discharge or diffuse pollution. The latter is becoming increasingly important as cane growers keep stands for longer and longer, depleting soil nutrients more and more. The average period of ratooning in Maharashtra is five years, compared with the more normal 2 (Cheeseman, 2004, p6), with consequent demands for fertilisers and reduction in cane yield (ibid.) Instead, the DPCBs control only industrial pollution in practice, along with sewage treatment plants. This is largely irrelevant on the Warna as not only are there are no sewage treatment plants on the river, but there is only one quality monitoring station on the entire river, and that is at the confluence with the Krishna River (interview with Amar Dargule, Assistant District Officer, Kolhapur PCB, Kolhapur, 14 October 2010). The river is consequently the unmonitored sewer for those who live in the Warna basin.

5. Chandoli National Park - Actor Network Analysis

5.1 Chandoli National Park: Introduction

Chandoli National Park (NP) is located in the North Sahyadri Range of Western Ghats. It is located in Maharashtra state, and located at the junction of four districts including Sangli, Kolhapur, Satara and Ratnagiri. The protected area is 317.67 square kilometres (Gogate 2009). Approximately sixty percent of the area is classified as forest area and reserved forest, and the remaining forty percent of the area belongs to the irrigation department and private Malki lands (Maharashtra State Forest Department undated). Most of the Chandoli NP is covered with dense semi evergreen forest, with wide range of flora (Maharashtra State Forest Department undated). Among many tree species growing within the protected area, Narkya-Mappia foetida (synonyms-Nothapodytes nimmoniana, Nothapodytes foetida) is known to contain a compound called camptothecin, which is a curative agent for breast cancer (SOPPECOM 2010). According to the Maharashtra State Forest Department, the protected area shelters an abundance of wildlife including tigers, India gaur, sambars, panthers, sloth bears, barking deer and giant India squirrels (Maharashtra State Forest Department undated).

The NP is located within the Warna river basin, and it forms a catchment area for the Warna dam, which began construction in 1975. When the dam construction was completed in 1985, the government of Maharashtra established the surrounding catchment area as the Chandoli Wildlife Sanctuary (WS) under the Wildlife Protection Act 1972. The Government of Maharashtra issued a notification of its intention to declare the area as Chandoli NP in 2004 (Revenue and Forest Department. Government of Maharashtra 2004; Press Information Bureau: Government of India 2007; Kouwenhoven 2010). Chandoli NP became part of the Sahyadri Tiger Reserve in 2010, with an area of 741.22 square kilometres, which also includes the Koyna Wildlife Sanctuary (National Tiger Conservation Authority: Government of India 2010). The figure 1 shows geographic relationship among Chandoli NP, Sahyadri Tiger Reserve, and Warna river basin. The core zone area indicated on the map is the Chandoli NP.

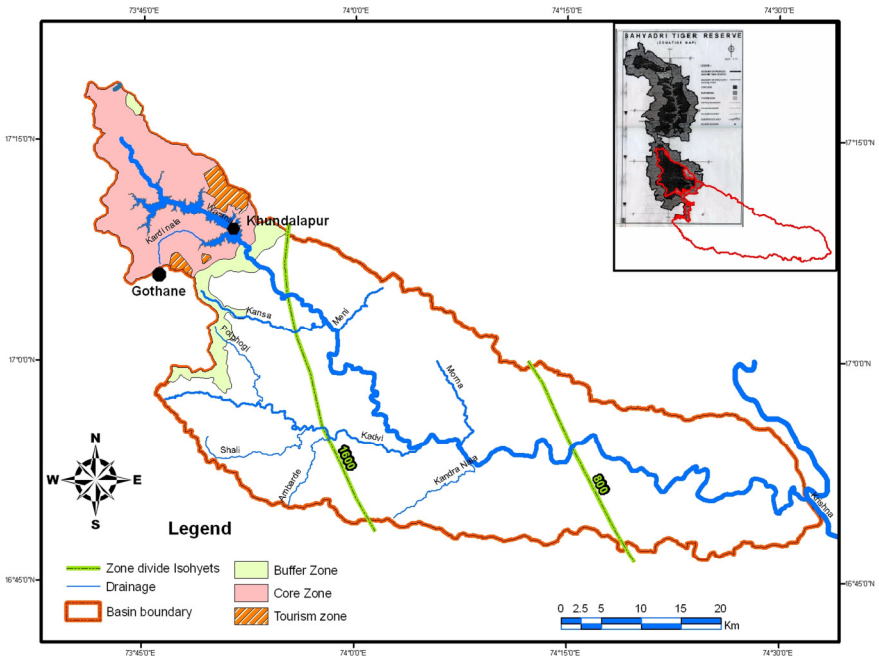

Figure 1: Chandoli National Park, Warna River Basin, and Sahyadri Tiger Reserve. Source: (SOPPECOM 2011)

5.2 Biodiversity Conservation and actors

The Indian constitution defines protection of forests and wildlife as the responsibility of both national and state governments . The daily management of the national parks, wildlife sanctuaries and reserves are the responsibility of the district conservator of forests, which is part of the state forest department (Gooch, Rieu-Clarke et al. 2010). In case of Chandoli National Park, which falls within four districts, the management responsibility was initially shared among four district conservators. However in 1994, it became the sole responsibility of the Kolhapur district conservator of forests (Kouwenhoven 2010).

While declaration and management of national parks and wildlife sanctuaries are the responsibility of the state governments (Chapter IV, Wildlife Protection Act, India), the central Ministry of Environment and Forests (MOEF) is responsible for developing national plans, strategy and programmes related to biodiversity conservation (Gooch, Rieu-Clarke et al. 2010). The National Tiger Conservation Authority (NTCA) is part of the MOEF, and it manages the project tiger scheme which has been in operation since 1973. The NTCA approves the tiger conservation plan which State governments develop, and it provides technical and financial support to the state governments for their management of tiger reserves

Various state and national level actors were involved in the establishment of Chandoli WS and its promotion to a national park and tiger reserve. According to the Conservator of Forest in Kolhapur district which administers Chandoli National Park,

the idea of establishing Chandoli Wildlife Sanctuary was initiated by the State Forest Department (Rao 2010). One of the policies which influenced the establishment of the Chandoli WS was the National Forest Policy of India 1952 which included a target of having at least 33% of the national land cover under forest (Joshi, Pant et al. 2011). This policy influenced the provincial forest department's effort to locate land to designate as protected areas (Rao 2010). The policy was amended in 1988 with an increased target of two thirds of the area in the hills and mountain regions to be covered under forest (Department of Environment Forests & Wildlife: Ministry of Environment and Forests: Government of India 1988). Another factor which is considered to have indirect influence is the civil society movement to save Western Ghats, comprised of concerned scientists, academicians, activist, artists, writers, musicians, politicians and grassroots workers which emerged in 1980s. As part of this movement, a march was organized where concerned citizens marched throughout Western Ghats, in order to raise awareness and protest against development which was seen to destruct nature in Western Ghats (Acharya 2008; Kohli 2010; Pawar 2010; Save Western Ghats undated).

Another motivation for the establishment of the wildlife sanctuary was to protect the watershed for the Warna dam. Protecting the upper catchment of the dam is important in order to avoid heavy siltation and to prolong the lifetime of the dam (Samant 2010; Trepp 2010). The dam was designed to irrigate farms downstream, as well as to produce 16MW of electricity (Maharashtra Water Resources Department undated). The dam currently provides water to Shahuwadi taluka primarily (Collector Office Kolhapur 2009), where farmers grow mono-culture cash crops, primarily sugarcane (Samant 2011). Sugarcane became an important agro-industry over the past thirty to fourty years in the region particularly in the middle to lower sections of the Warna river. Its cooperative institutions have grown and formed important social institutions such as, educational institutions and banks, in addition to agro industrial set ups such as sugar factories (Gooch, Rieu-Clarke et al. 2010). As illustrated in figure 1, the shape of Chandoli NP reflects the catchment of the dam, however, if biodiversity was the main criteria for determining the protected area, it would have been a different shape (Samant 2010).

In 1998 and 1999, meetings were held among national level ministries, local government bodies and conservationists who were keen to promote Chandoli Wildlife Sanctuary as a tiger reserve. Among the conservationists were the IUCN Cat Specialists Group members, and Maharashtra Critical Tiger Habitat Expert Committee (Gogate 2010; Kouwenhoven 2010). The meetings concluded to promote Chandoli WS as a national park first, as a stepping stone towards declaring it as

a tiger reserve. According to the former Chief Wildlife Warden of the Maharashtra State Forestry Department, another actor who had potential influence over this decision was the Shiv Sena, which is a political party with a roaring tiger as its symbolic icon (Gogate 2010). Shiv Sena was part of the ruling coalition of Maharashtra from 1995 to 1999. At the time when the idea to upgrade Chandoli WS as a tiger reserve emerged, the Minister of the MOEF was also from Shiv Sena (Kouwenhoven 2010).

Relocation of local residences is one of the major obstacles in establishing protected areas (Kulkarni and Mehta 2010), particularly national parks and tiger reserves which do not allow local people to live within the borders and utilize its resources. Tiger reserves require the establishment of core areas which do not allow any human intervention . When Chandoli Wildlife Sanctuary was promoted to Chandoli National Park, local residents were already in the process of relocation, which did not create additional obstacles in the process for promoting it to a national park and later, a tiger reserve. As the area is prone to seismic activities and its remoteness was even enhanced through Chandoli dam, policy maker at the time of decision-making saw it as an opportunity to convert weakness into opportunity for conservation (Gogate 2010). Promoting the area to a tiger reserve meant more funding from central government to the area, which is one of the motivations for higher protection (Gadgil 2010; Kothari 2010).

There are initiatives to conserve nature at a larger landscape level which include the Chandoli NP. The Chandoli NP and Sahyadri tiger reserve are both located within the Western Ghats, which, according to Conservation International (CI), is one of the global biodiversity hot spots (Conservation International 2007). CI defines biodiversity hotspots as 'region which contain at least 1500 species of vascular plants as endemics, it has to have lost at least 70 percent of its original habitat (Conservation International 2007).' The Western Ghats cover an area of 160,000 square kilometres which includes a stretch of highlands 1,600 kilometres from the southern part of Gujarat state as far as Sri Lanka (Conservation International 2007). The Indian government has submitted its application to designate the Western Ghats as a UNESCO World Heritage Site, which includes serial sites within the area. The proposal is currently under evaluation by UNESCO (DHNS 2010; Sudhi 2011; UNESCO World Heritage Centre undated). In order to manage the natural heritage of the Western Ghats, the MOEF established the Western Ghats Natural Heritage Management Committee which consists of representatives of each state within the Western Ghats (Ministry of Environment and Forest: Government of India 2010).

Another on-going discussion at the landscape level protection is to designate all or part of Western Ghats as an Ecologically Sensitive Area (ESA), under the Environment (Protection) Act, 1986. The MOEF

has established the Western Ghats Ecology Expert Panel in 2010, which is tasked to make a recommendation for the ESA and also to recommend the modalities for the establishment of the Western Ghats Ecology Authority (Ministry of Environment and Forests 2010). At the time of writing this paper, the Expert panel is discussing the possible idea of categorizing the Western Ghats in five categories, using criteria which will be developed by the panel. The zoning may possibly impact on on-going activities such as mining which takes place in proximity to the ecologically sensitive zone (Sudhi 2011).

5.3 Local livelihoods and actors

Historically, the area where Chandoli NP is located has been inhabited primarily by the Dhangar (shepherd) community. The area is remote from development, and is also an earthquake prone area. Originally, there were 32 villages within the boundary of the Chandoli Wildlife Sanctuary, and all of them had rights over Malki land which is a privately owned forest land by local residents, totalling 84.29 square km. When the Warna dam was completed in 1985, eight villages were submerged under the reservoir, and they were relocated and rehabilitated. The Chandoli Wildlife Sanctuary was established in 1985, and in 1995, the Maharashtra state government made a decision to relocate all the villages residing within the sanctuary. The process of relocation began in 1997 (Salunke and Khot 2005). The declaration of Chandoli National Park in 2004 included one additional village, which is Amboli village in Kolhapur district (Kouwenhoven 2010). The relocation of some of the villages is still in progress (Joy and Jain 2010; Pawar 2011).

The villagers who were relocated due to the Warna dam received compensation from the government. The Maharashtra Resettlement of Project Displaced Persons Act 1976 and the Maharashtra Project Affected Person Rehabilitation Act, 1989 both applied only to the relocation caused by irrigation projects (Asian Development Bank 2011; The Bombay High Court Judge's Library undated). When the relocation of villagers affected by the establishment of Chandoli Wildlife Sanctuary began in 1997, there was no applicable law for the relocation of people caused by the establishment of protected areas. The Maharashtra Project Affected Persons Rehabilitation Act 1999, which also applies to projects other than irrigation projects, only came into force in 2001 (Government of Maharashtra 2001). Prior to this Act, the application of the law to displacement caused by non-irrigation projects depended upon the discretion of the government (Trepp 2010).

Villagers relocated due to the establishment of the Chandoli Wildlife Sanctuary claimed they did not receive the compensation which they had expected to receive from the government (Pethvadgaon elders 2010). Some of them even had to build their own houses at the resettled location, and they did not receive the levels of compensation

which was given to the villagers relocated because of the Warna dam (Patankar 2010). In 2000 and 2001, a mass protest was organized at the Chandoli dam, which helped the villagers to receive compensation for the construction of their houses (Patankar 2010). Mass demonstrations have been organized every year since then, in order to demand compensation from the government (Patil 2010). While some compensations have been made after these protests, villagers are not yet fully compensated for what they had lost to date (Patil 2010; Pethvadgaon elders 2010).

These mass demonstrations were organized with support from Maharashtra Raja Bharang Dharan va Prakalp Grashta Shedkari Parished (referred to as Parished hereafter). Parishad is an organization of dam affected farmers in the whole Maharashtra state. The Chandoli Dam affected farmers as well as those affected by the formation of the Chandoli Wildlife Sanctuary and National Park have been working as part of the Parishad. Most of the leading activists in the Parishad in the area, were part of a political group called the Shramik Mukti Dal. In 2009, the Shramik Mukti Dal was split and most of the activists in the Parishad joined a newly formed Shramik Mukti Dal Democratic (Anonymous village elder 2010; Anonymous village elder group 2010; Kouwenhoven 2010; Paranjape 2011).

The funding for rehabilitation of the people relocated due to the establishment of protected areas comes from Wildlife Funds at the MOEF, and the rehabilitation from the establishment of Tiger Reserves is funded by the national government (Project Tiger 2005; Gogate 2010; Kouwenhoven 2010). However, as of 2005, there was not enough funds to rehabilitate all the people living in Tiger Reserves throughout India (Project Tiger 2005). While the rehabilitation of displaced people are funded by the MOEF, it was the responsibility of the State Water Resources Department and its district water resource department to rehabilitate villagers relocated due to Warna dam and Chandoli WS (Kouwenhoven 2010; Samant 2011). In 2007, the Maharashtra state government issued a decision to establish Maharashtra State Rehabilitation Authority, which is responsible for taking decision in all matters related to the rehabilitation of project affected persons. This decision also established Rehabilitation Committee at each district and divisional levels, with aim to accelerate the rehabilitation work. Three Grievance Redressal Authorities are established in Pune, Aurangabad and Nagpur, in order to help solve the problems (Government of Maharashtra 2007). Creation of the Rehabilitation Authority facilitated villagers' and social rights groups' negotiations with government, as they no longer needed to approach different government departments associated with the rehabilitation issues (Patankar 2010).

When villagers received notification in 1997 to relocate within a year, there was no prior consultation with the villagers about the relocation. Some of the villagers were not aware of their relocation prior to 1997, while others requested to be relocated due to seismic activities

prevailing in the area and its remoteness which was exacerbated due to the relocation of eight villages from the Warna Dam construction (Salunke and Khot 2005; Gogate 2010; Kouwenhoven 2010; Narote 2010). The Wild Life Act 1972 which was used as a basis for establishing the Chandoli Wildlife Sanctuary did not require prior consultation to the local community of its intension to establish protected area . The Act, however, requires any person who holds land within the declared area, to provide a written claim to the district Collector, with necessary details and amount of compensation (Article 21) and also requires the district Collector to investigate the existence of rights that are not claimed (Article 22). Based on this requirement of the Act, the district collector offices of four districts which Chandoli WS was located within, made an investigation and reports of the land ownership (Kouwenhoven 2010). Part of the national park is still legally owned by the local people and the government is in the process of purchasing the land and relocating people (Prakash 2010).

Gothane village is one of the few villages still located within the Chandoli NP. According to one of the Gothane villagers, the village recently proposed to have a wall between their land and the park, in order to protect themselves from wildlife while allowing them to live within the natural forest area. The idea was proposed to the government, including district collectorate, irrigation department, and to the chief minister of Maharashtra and the state department of forest. However, the government has not agreed to this idea, as the rest of the villages are already relocated out of the park (Prakash 2010). In addition, the forest department does not consider local communities capable of managing the forest by themselves (Rao 2010).

As a way to support local livelihoods associated with the creation of the protected area, the management plan of Chandoli Wildlife Sanctuary proposes two activities: tourism and village eco-development (Salunke and Khot 2005). Tourism however, is currently very rare in the park, with estimated 2-3000 visitors per year, each paying a 20 rupee entry fee. The park receives few international visitors per year who tend to have specific reasons for visiting (LiveDiverse 2010). The local community's engagement towards tourism in the park is currently limited although there is an interest from the community (Gawade 2010). Village eco-development is a type of Integrated Conservation and Development Programme (ICDP) deployed by Indian government in 1990s, aiming at reducing negative impacts of local community on biodiversity, and increase their participation in conservation efforts (Gubbi 2006). As part of the Maharashtra Forestry Project financed by the World Bank from 1992-93, village eco-development was implemented for Mandur, Ukhlu, and Sonawade villages, located at the fringes of Chandoli National Park. These villages received support for plantations and soil conservation works (Salunke and Khot 2005). The Chandoli Wildlife Sanctuary Management Plan indicates its plan to implement similar

village eco-development activities in fourteen other villages until 2011 (Salunke and Khot 2005).

Communities in close vicinity of the national park face the potential of human-wildlife conflict. As there is no fence in the boundary of the park, wild animals can move freely, and often destroy crops planted within the community. There are also incidences where cattle from a village entered into the park and were killed by wild animals (Gawade 2010; LiveDiverse 2010). The Wild Life Act 1972 provides authority to the Chief Wild Life Warden to permit the killing of certain wild animals listed in the Act if they become danger to human life or its property. However, some mammals such as tigers, are not included in this list (Art. 21 (b)). According to one of the village elders in Khundalapur village, located at the border of the park, villagers do not receive any compensation for lost cattle inside the park as authorities tell them domestic cattle should not have been in the national park (Gawade 2010).

5.4 Other factors influencing the Chandoli National park and related actors

Chandoli National Park houses plant species such as Awala, Hirda, and Narkaya, which are ingredients of medicines. Prior to the designation of Chandoli WS, pharmaceutical companies have collected these species as ingredient for medicine. The designation of the sanctuary put pressure on the industry (Salunke and Khot 2005; Lad and Samant 2010). Illegal harvesting of Narkaya trees still continues to date, and according to the Conservator of Forest in Kolhapur district who struggles to enforce the law against illegal harvest, approximately 60,000 trees have been considered to be removed from the park area. While any harvest of flora within the national park is prohibited, cropping the tree as opposed to the whole removal of the tree prolongs the lifetime of the tree, which is the local authority's preferred option (LiveDiverse 2010).

The Chandoli National Park and its adjoining area are geologically high in minerals, particularly bauxite ore. At the outskirts of the National Park, at Udgiri village, two private companies operate bauxite extraction, which causes disturbance to the wild animals and their habitats (Salunke and Khot 2005), as the blasting of rocks and minerals generates noise, vibrations and dust. The air-borne dust settles on tree leaves and plants, which affect their growth. Bauxite mining in the area is conducted as open cast mining, and it changes the surface topography drastically, causing alterations in surface drainage pattern. The discharge of mine water causes water pollution within the area. The increases in local population through temporary immigrant labour force causes deforestation and land erosion in surrounding area (Lad and Samant 2010). M.S Swati Minerals, which

is one of the companies operating in Udgiri village bordering the Chandoli National park, currently has a proposal to expand its mining area from its current production of 337,000 ton to 1.2 million tons (Maharashtra Pollution Control Board 2010).

The threat to ecosystem from development pressure is a common threat throughout the Western Ghats, particularly in the northern part which has received less attention for conservation compared to its southern part where protected areas are located relatively close to each other (Institute of Environment Education and Research 2010). Although the Wildlife Conservation Strategy (2002) requires 10km around national parks and sanctuaries to be notified as eco-fragile zones (Article 9, Government of India: Ministry of Environment and Forests 2002), some of the Maharashtra Industrial Development Corporation sites are located within 10km of national parks and sanctuaries (Institute of Environment Education and Research 2010).

The Maharashtra Pollution Control Board (MPCB) which is part of the state environment department, is responsible for implementing legislation related to pollution control. The MPCB's regional office in Kolhapur is responsible for monitoring and enforcement of pollution standard from mining operation which takes place within the district (Maharashtra Pollution Control Board 2009). When the mining company applies for permits of mining operation, the Unit for Impact Assessment for Industry Infrastructure River Valley and Mining at the MOEF reviews environmental impact assessment prior to permission is given to the company (Gooch, Rieu-Clarke et al. 2010). The current mining lease for the M S Swati Minerals runs until 2015, when the assessment process needs to be conducted again for any renewal (Swati Minerals 2010). The renewal and the mining activity may be affected by the proposed designation of Western Ghats Ecological Sensitive Area (Sudhi 2011), considering the proximity of the Udgiri village mining site to the protected area.

Downhill from the Udgiri mining site lies Udgiri sacred grove (LiveDiverse 2010). Sacred groves are a traditional way of forest conservation, where local people protect the forest in association with their traditional beliefs (Gadgil 1992). They can play an important role in India's biodiversity conservation along with protected areas. The Udgiri sacred grove is affected by the mining activity, particularly the long access road to the mine which passes through thick forest area including the sacred grove (LiveDiverse 2010).

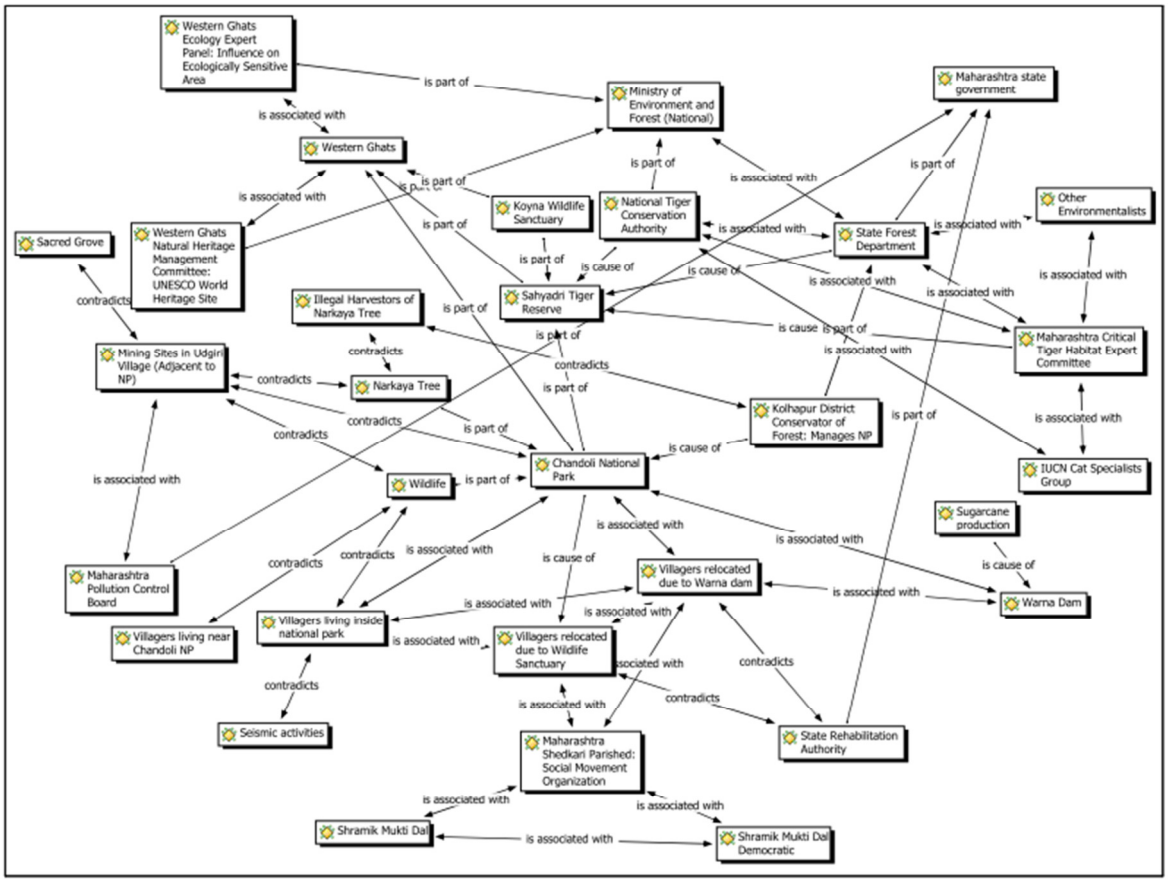

Figure 2: An Actor-Network map for the Chandoli National Park, Maharashtra State, India

5.5 Actor Network Analysis of Chandoli National Park

As a way to analyze the biodiversity and livelihoods governance which surrounds Chandoli National Park, this paper uses Actor Network Theory (ANT) as a method for analysis. As discussed in the introduction section, ANT allows to analyze relationship between human and non-human (Latour 1997; Latour 2005) This approach is useful in analyzing factors which affects governance surrounding protected area, which is composed of an assemblage of non-humans such as forest, animals, water, law, policy, and human actors such as villagers, government officials. As a starting point of analysis, actor network map was created which is illustrated in figure 2. It illustrates key relationships among actors and actants related to the national park.

Chandoli NP is part of a larger landscape level protection including Sahyadri Tiger Reserve and Western Ghats. The relationship between Chandoli NP and the larger landscape level protection is reciprocal. Chandoli NP contributes to the Tiger Reserve through its biodiversity protection within the park. The park benefits from the

Tiger Reserve as its status brings more funds for management of the park. Chandoli NP also contributes to the Western Ghats Ecologically Sensitive Area, composing one of its core areas, and also consists one of the elements within the proposed Western Ghats UNESCO World Heritage nomination sites (UNESCO World Heritage Centre undated). The expected designation and zoning of Western Ghats Ecologically Sensitive Area (ESA), has a potential to help protection of Chandoli National Park from adjacent activities which negatively influence the park's biodiversity, such as mining (Sudhi 2011). In general, this type of landscape level zoning supports protected area, as one of the main threats to the protected area generally arises from activities occurring at adjacent land use (Leverington, Hockings et al. 2008).

The potential usefulness of the landscape level zoning for conservation partly depends on whether the law has 'teeth' in truly protecting the landscape. ESAs to date has been based on the Environment (Protection) Act 1986, which gives power to central government to take measures to protect environment (Section 3). The Wildlife Conservation Strategy (2002) indicates that 'lands within 10km of the boundaries of National Parks and Sanctuaries should be notified as eco-fragile zones (Wildlife Conservation Strategy2002)'. Neither policy provides specific process nor criteria for designation of ESAs, which may be one of the reasons why some of the lands around protected areas are not designated as ESAs. The recent guideline from the MOEF on declaration of eco-sensitive zones around national parks and wildlife sanctuaries, attempts to establish parameters for designating ESAs in India. The Annex I of the guideline provides a list of prohibited, regulated and permitted activities within ESAs (Government of India: Ministry of Environment and Forests 2011). The adoption of this specific guideline may facilitate further designation of ESAs.

National Park, Tiger Reserve, Ecologically Sensitive Area, and World Heritage are all within the jurisdiction of the Ministry of Environment and Forest (MOEF). The actor network map illustrates the relationship between MOEF and institutions (organizations or groups, in this case) that are tasked to either manage or advise the management of different landscape and protected areas. These institutions include: the Western Ghats Ecology Expert Panel; the Western Ghats Natural Heritage Management Committee; the National Tiger Conservation Authority; and the Maharashtra State Forest Department. All of these institutions work in favour of conservation, which is one of the objectives of MOEF. There is another set of actors who work in favour of conservation. They are pro-environmental actors such as IUCN Cat Specialists Group, Maharashtra Critical Tiger Habitat Expert Committee, and other environmentalists. These actors took part in the discussion of promoting Chandoli WS to a Tiger Reserve. Their relationship with MOEF and the Maharashtra State Forest Department that act on

behalf of Chandoli NP is reciprocal, as biodiversity conservation is the common interests among actors.

It is interesting to note that these pro-environmental actors did not have to face typical obstacles associated with the establishment of protected areas. Many villagers did not oppose relocation when the Chandoli WS was established, partly as they were not aware of the real condition associated with rehabilitation, and partly as the law at the time did not allow them to raise their opinions about relocation. Some of them even requested to move out from the Chandoli NP area, as the place became too remote after the initial 8 villages were relocated due to the Warna dam, and frequent seismic activities were seen as threatening to them. Most conflict arising from relocation occurred only after the actual relocation took place, when villagers learnt the poor rehabilitation conditions provided by the government. By the time of promoting Chandoli WS to a national park, which placed more stringent rules for natural resource use within the park, the relocation process was already in process, which facilitated this promotion.

The actor network analysis shows that the biodiversity resources which are part of Chandoli NP, are a cause of conflict among actors associated with these resources. For example, the existence of Narkaya trees within the park, creates conflict relationships between illegal harvesters and Kolhapur district conservator who manage the forest. The wildlife which is part of the Chandoli NP affects villagers' livelihoods negatively through destroying crops. The relationship between wildlife and villagers are one way relationship bounded by law. While Wild Life Act does not allow killing some of the animals inside the park that affects human livelihoods , animals do not get any punishment from destroying village crops. The law only protects wildlife in this case, not the livelihoods of human beings.

In contrast, the natural resources extraction activity which is taking place outside of the Chandoli NP, namely mining, negatively affects the park's biodiversity. The relationship in this case is contradictory. While noise and dust pollution from mining activities which take place at the border to the national park affects its flora and fauna, the law only regulates dust pollution and not noise pollution[15]. However, this

[15] Dust is considered as suspended particulate matters, which is subject to regulation and monitoring, according to Indian national standards and guidelines. Areas10km around the periphery of protected areas are considered as sensitive areas, where stricter standard applies (1981). The Air (Prevention and Control of Pollution) Act, 1981. 14 of 1981. India.

, Central Pollution Control Board (2003). Guidelines Ambient Air Quality Monitoring

, (2009). National Ambient Air Quality Standards. Notification: No. B-29016/20/90/PCI-L. Central Pollution Control Board. **Tha Gazette of India No. 217**.

relationship may change once criteria for zoning under Ecologically Sensitive Area is defined that may restrict human activities near core zone, which national park would be part of.

There are four types of villagers associated with Chandoli NP: villagers relocated due to Warna dam; villagers relocated due to protected area; villagers remaining inside the national park; and villagers living within close vicinity to the national park. The villagers remaining inside the national park and nearby villagers have a negative relationship with biophysical actants of the Chandoli NP, such as wildlife and seismic activities which occurs in the area. Rehabilitated villagers have reciprocal relationship with social rights organizations. With the support from social rights organizations, villagers are able to organize themselves better to demand compensation from the government. Social rights organizations benefits from supporting affected villagers, as strengthening villagers who are society's working class leads towards achieving the overall objectives of the social rights groups (Omvedt 1993). As most villagers feel their livelihoods are not properly restored after the relocation and they are still demanding the compensation from relocation, they are in conflict with the state rehabilitation authority.

While the majority of the communities relocated due to the Chandoli NP have negative views about the national park (Trepp 2010), the park benefits the livelihoods of the downstream sugar cane farmers through securing water supply for irrigation. The relationship is reciprocal as sugar cane production depends on the supply of irrigation which is partly sourced by Warna dam. On the other hand, the establishment of Chandoli WS benefited from the needs for watershed protection for Warna dam, which provides water to downstream sugarcane farms, as it was used one of the justification for the protection. In addition, the fact eight villages were already relocated due to the construction of the dam facilitated the relocation process when establishing Chandoli WS. Improving the livelihoods of the downstream sugarcane producers was the cause of developing Warna dam, which affected the livelihoods of community who originally inhabited and utilized natural resources in Chandoli NP.

. In regards to the noise pollution, the Noise Pollution Control (Regulation and Control) Rules 2000 and its subsequent amendments do not provide clear guidance on the regulation related to noise pollution around protected areas (2000). The Noise Pollution (Regulation and Control) Rules, 2000. Notification S.O.123(E). Ministry of Environment and Forests.

, (2000). Ministry of Environment and Forests Notification. S.O. 1046(E).

, (2010). Ministry of Environment and Forests Notification. S.O. 50 (E).

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5.6 Interaction between law, policy, actors and institutions

The analysis of actor network illustrates that the actor network of the Chandoli NP works predominantly in favour of conservation. This trend corresponds with law and policy which also support conservation. The historical trend of the Indian government's policy related to protected area segregates local people from biodiversity resources, and undermines local livelihoods that depends on biodiversity (Gubbi 2006; Bhullar 2008; Kulkarni and Mehta 2010). Forest governance in India stems from the forest law introduced during the colonial time, which neglects local knowledge and practices, and considers people as enemies of wildlife (Awate 2010; Kothari 2010; Kumbhar 2010). As an example, the Wild Life Act of 1972, which is the legal instrument used to establish a Wildlife Sanctuary, did not require the government to consult with local people prior to the establishment of the protected area.

However, there is a shift in this trend, which recognizes the community's rights and aims to include them into natural resources management. Wild Life Act 2002 was amended to allow local community to use forest produce for bona fide needs of community living within and around protected area (Paragraph 19,). The Act also allows establishment of conservation reserve which is a government owned area adjacent to national parks and sanctuaries, as well as community reserve which is a private or community land not within protected areas (Article 36.A and 36.C). The Act provides a structure for community to be engaged in the management of both types of reserves (Article 36.B and 36.D).

Similarly, the national forest policy 1988 sets a direction towards Joint Forest Management, which allows community to jointly manage and share benefits from forest management. Based on this policy, Maharashtra state government has issued a decision on forest management through the involvement of rural people (1992), which primarily applies to degraded and barren forest land in rural area (Maharashtra State Revenue and Forest Department 1992). There are critics who claim that the 'jointness' is limited to minor matters such as choice of species or how to patrol forests, and communities still do not have opportunity for influencing bigger policies (Sundar 2000). In either case, the forest and reserve areas which allow community's engagement is limited to outside of national parks and wildlife sanctuaries, and protected areas are still managed solely by the state.

Another policy integrating local community's rights to biodiversity is the National Biodiversity Act, 2002 which establishes the National Biodiversity Authority, the State Biodiversity Board, and the Local Biodiversity Committee. The Local Biodiversity Committees are established at panchayats and municipal levels, and they promote conservation and sustainable use of biological diversity in respective local area. The National Biodiversity Authority and the State Biodiversity Board need to consult with the Local Biodiversity

Committee prior to the use of biological resources in specific local area. The National Biodiversity Authority and the State Biodiversity Board also need to provide funds to the Local Biodiversity Committee to establish local biodiversity funds which should be used to support local biodiversity conservation (Gooch, Rieu-Clarke et al. 2010). In Maharashtra state, the Maharashtra Biological Diversity Rule suggests to establish District Level Committee, as well as the Local Biodiversity Committee at each panchayat level (Article 23). While Local Biodiversity Committee has not been established for communities around Chandoli NP (Joy and Jain 2010), if the Act is properly implemented within communities in Chandoli NP, it should be the vehicle for promoting co-management of biodiversity resources.

The Scheduled Tribes and other Traditional Forest Dwellers Act 2006 (Forest Rights Act, 2006), for the first time, provided rights to community which traditionally utilized forest for their livelihoods. The Act recognizes rights to hold individual or common forest land for inhabitation or self-cultivation, access rights for collection of forest produce, right to access biodiversity, and community right to intellectual property and traditional knowledge (Article 3.). However, these rights do not necessarily apply within national parks and sanctuaries (Article 4), which may be a reflection of resistance to this Act by environmentalists (Bhullar 2008; Gadgil 2010).

The shift in user rights of forest product also reflects the trend to acknowledge rights of people living in the forest. One interesting example is the use of bamboo, which is typically considered as a non-timber forest product (CIFOR undated). However, the Indian Forest Act (1927) defines bamboo as tree (Article 3(7)), which allows state governments to regulate its transport (Article 41 (1)). This has meant that even if bamboo grew outside of state forests or protected areas, its transport has been regulated by the state authorities, and did not allow community to harvest and sell bamboo freely in markets (Narain 2010). The Forest Rights Act, 2006 recognized bamboo as minor forest produce, and it provided the right of ownership, access to collect, use and dispose of minor forest produce by the scheduled tribes and other traditional forest dwellers. (Article 3 (c); Article 2(i),). According to the Centre for Science and Environment, an Indian public interest research and advocacy organisation, even after the adoption of the Forest Right Act, the forest department in Maharashtra state had been refusing to issue transit pass book, which is necessary to take bamboo out of villages and sell it in markets. Finally in April 2011, the Maharashtra state forest department has handed over the pass book to one of the village leaders, a historic moment in Indian forest management (Centre for Science and Environment 2011).

In summary, Indian law and policy which protects biodiversity and natural resources is shifting from strict protection to integration of people's livelihoods. While this shift is taking place, law and policy

does not recognize local community as a partner for conservation in strictly protected area, such as national parks and tiger reserves.

5.7 Actor Network Analysis - Conclusions

The analysis of actors, law and policy associated with Chandoli National park revealed that the implementation of law and policy, which supports biodiversity conservation, is facilitated by the existence of actors who predominantly support conservation. The historical trend of Indian law and policy which favoured biodiversity conservation over people's rights in forest areas, also facilitated biodiversity conservation. On the other hand, policy and law which supports livelihoods of local community came in too late for the community which was affected by the establishment of Chandoli WS and NP. Even if they were developed in time, as they do not allow local community's intervention for protected area, there is a limited scope for community to benefit from biodiversity protection.

The analysis of actor network centred around Chandoli National Park illustrates the existence of a larger network of actors which has influence on Indian conservation agenda. The network includes multiple levels of governmental and non-governmental actors including local, national and international levels. This network of actors, as illustrated in the case of Chandoli National Park, seemed to have played an important role in designation of protected areas. In contrast, the network of actors who support local livelihoods, tends to be at local scale and fragmented as illustrated by the case of social rights organizations for Chandoli Wildlife Sanctuary and Warna Dam. When groups of similar interests are fragmented into a number of smaller associations, it tends to provide negative impact on their activities (Meissner 2004). The dichotomy and difference in the strength of 'assemblage' which ties different networks together, may be directly reflected to the power relationship between conservation agenda versus people's rights agenda in India. The actor-network analysis surrounding Chandoli NP contrasts between how 'push' towards conservation agenda and livelihoods agenda reflects the scale and strength of networks.

The analysis of Warna dam and establishment of Chandoli WS as watershed for the dam, illustrates that biodiversity conservation and development of water resources had mutual interests, and it resulted in supporting livelihoods of the downstream farmers. This fact illustrates that at a landscape level, the protection of biodiversity within Chandoli NP and livelihoods had a win-win situation, however with a sacrifice of livelihoods of local community within the national park. While it was not the scope of this paper, biodiversity which is downstream of the Warna dam may have been negatively affected dues to changes in hydrological regime.

There were two initial ideas from the government on how to improve community's livelihoods along with conservation within Chandoli NP, namely tourism development and eco-development. To date, none of these schemes seemed to have worked to benefit local community. A more recent development which allows local community to be engaged in and benefit from protecting biodiversity is reflected in the Biodiversity Act which allows local community to establish local biodiversity committee, requiring state and national level authorities to consult with this committee prior to accessing biological resources. This scheme, however, does not seem to be implemented in the community surrounding Chandoli NP. With recent adoption of Nagoya protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization to the Convention on Biological Diversity (Nagoya Protocol), if India signs up to this protocol, it is required to develop further mechanism for ensuring benefit sharing from biological resources among communities (Article 52011). The future development of law and policy needs to ensure their implementation by local actors. Nagoya protocol also requires parties to develop capacity to effectively implement the protocol, and it specifically mentions importance of capacity building at indigenous and local communities (Article 22, ibid).

It is important to note that the implementation of law and policy which protect biodiversity at larger landscape level, is a challenge which faces Western Ghats. As discussed in this paper, the Western Ghats region, particularly its northern part, faces development pressure which threatens biodiversity including mining, industrial development, and development of hydropower dams. Current law and policy which provide basis for designating ecological sensitive area particularly surrounding protected areas, provide neither clear process nor 'teeth' in ensuring protection of ESAs. The on-going discussion to designate all of Western Ghats as ESA, as well as proposed UNESCO world Heritage designation, along with new guideline published by the MOEF on declaration of eco-sensitive zones, are expected to provide opportunity for protecting this biodiversity-rich landscape.

In summary, law and policy on biodiversity and livelihoods currently in place related to Chandoli NP historically favoured biodiversity conservation over livelihoods. The system is still set up which does not allow local population for co-managing strictly protected areas such as national parks and tiger reserves. However, recent emergence of law and policy which recognize local people's rights for natural resources and its traditional knowledge, have scope for providing opportunities to create mechanisms which protect biodiversity as well as local people's livelihoods. The recent development of international agreement on access to benefit sharing, also gives opportunity for India to effectively protect its immense biodiversity resources as well as local livelihoods. While development of law and policy to accommodate this new direction is critical, proper local application of existing law and policy, as well as building capacity for local actors to properly implement these policies are

crucial for effectively protecting both biodiversity resources and local livelihoods.

6. Conclusions – Warna Basin

From the above analysis, it will be clear that there are significant problems in Maharashtra with respect to both content and implementation of the existing law, whether relevant to livelihood protection or to the conservation of biodiversity.

The Actor Network Analysis concludes that, broadly, the support for the conservation of biodiversity is better entrenched in the legal and institutional framework than the protection of local livelihoods. The main actors are perceived to be both more focused on the conservation of biodiversity and environmental quality and to have better links to national and global networks. The analysis of implementation obstacles highlights some nuances to this conclusion however.

While environmental protection and biodiversity conservation may be more prominently apparent in legislation, it appears that these strengths are undermined by qualitative problems that limit their effective application. Activities at the smaller end of the scale escape much of the regulation imposed on larger projects – for example, small scale mining requires no prior environmental clearance unless it sits within the 10km boundary of a protected area. The evaluation of projects requiring the felling of less than 40ha of trees avoid close scrutiny or the application of the factors that may limit the scope for felling permits. Statistically (Mines 2010), this means that 66% of licensed mines beyond this 10km buffer zone require neither full forest felling permits nor prior environmental clearance. The irrigation of sugar cane plantations, other than those linked directly to the construction of the big dams, are unregulated. Cumulatively, it is impossible to gauge the impact of these projects and activities on water quality in the Warna basin because there is no monitoring network on the entire river and biodiversity conservation is not assessed. The impact of these practices on groundwater resources, those that many in the basin rely on for drinking water, is also uncertain, although concern has been raised about the impact of fertilisers on groundwater bodies in the area by the Groundwater Survey of India.

Part of the problem seems to be that although the Indian authorities are able to draw upon similar enforcement tools to those available in more developed countries, the standards that are encapsulated in the relevant legislation are insufficient to allow effective implementation. The environmental financial assurance scheme, for example, makes no attempt to connect the potential damage from particular mining activities to the funds provided for rehabilitation. This consequently leaves default liability for remediation with the public purse, or instead may simply mean that environmental rehabilitation is not funded and the land remains barren and useless to local people for the long term future. It is also clear that even if the standards of

environmental recovery required by legislation were enforced diligently, the re-establishment of self-sustaining ecosystems would still be unattainable in the short to medium term because the quantitative focus on planting simply trees neither reflects best practice nor provides the best basis for environmental regeneration.

The legislation also fails in a number of other key respects. Decision-making criteria, in relation for example to approval of tree-felling permits, are insufficiently clear, exhaustive or definitive. This is partly a function of the relationship between effective law and clear policy. Policy making in areas related to the conservation of biodiversity, environmental protection and the development of local livelihoods are mutually contradictory, despite the appearance of many integrative statements in these documents. It is clear that there is an awareness that these areas of policy development need to be prepared in a way that brings otherwise mutually antipathetic interests together, but in practice this coordination does not take place in any meaningful way. This may be because of the lack of cross-sectoral institutional coordination that is so pervasive, or through the absence of regulatory organisations that have the power to oversee resource management across the board – e.g. the split between the ministry of the environment and forestry, the lack of a comprehensive water resource managing agency. In the latter case, the absence of such a body results in the cumulative impact of intensive agriculture, for instance, on watercourses, drinking water and aquatic ecosystems, being ignored from an institutional perspective.

The interests of local people may also be detrimentally affected by what might be described as excessively development-favouring provisions in legislation that are not fairly balanced against the administrative capacity of local enforcement agencies. Where turnaround time of administrative permits is specified in legislation, regulated activities may be allowed to continue despite their damaging effects. This is a difficult area, however, because Indian public authorities have acknowledged problems with human and financial resource availability. To bind corporate or public income generation bodies to the capacity of government agencies would be to potentially strangle economic development. A balance must be found that better permits financial development in a way that serves local populations and environmental concerns without imposing undue pressure on enforcement capability. In turn, regulatory authorities must have powers and capacity commensurate with their responsibilities, that can be used with the levels of transparency required by existing sectoral legislation and the Right to Information Act.

There is also a feeling in some of the legislation intended to protect the interests of local people that the focus should be on the protection and enhancement of their economic well-being – witness, for example, the concentration in the mining and forest protection legislation (with the notable exception of the Forest (Rights) Act) on the quality of resettlement packages from the point of view of income generation, irrespective of the opinions of local people. As will be seen from the LiveDiverse report from Work Package

with respect to cultural and spiritual wellbeing, economic development is only one part of the enhancement of local livelihoods.

The major economic actors in the Warna basin are in some senses regulated in ways that bear little relation to the protection of the local environment or populace. It is in encouraging that the recent advances in the mining and forest legislation will allow scheduled tribes to derive greater income from mineral extraction and potentially allow them greater security to stay in the forest. Whether these safeguards will continue to be effective in the face of increasing external pressures from the national and global levels is more questionable. On balance, national policy favours rapid economic development, believing that existing ecological and social conditions can be replicated over the short to medium term. As has been shown, however, the standards that are being used to achieve these replication objectives are not fit for purpose. Without effective institutional coordination, clear policy signals and transparent regulation, local people will continue to be ill-served by regulation and the deterioration and reduction of critical ecosystems will be prolonged.

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