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Improving Property Rights for Sustainable Artisanal Diamond Mining: A Case Study from the Central African Republic

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Artisanal and Small-Scale Mining (ASM)

- ASM refers to mining by individuals, families, or groups—often illegal—with little or no mechanization
- Globally, 20 million artisanal miners (Source: ILO), of which 6 million are in Africa (Source: CICID)
- Often linked to conflicts, exploitative labor relationships, extreme poverty and environmental degradation
- However, offers crucial livelihood opportunity for remote communities and income for governments





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ASM in Central African Republic



- ASM dominates because of CAR's alluvial deposits; diamond exports account for 40-50% of export revenue, despite smuggling
- Lack of clear property rights perpetuates poverty and exploitation, leads to conflict, and leaves degraded land with ambiguous status
- Environmental consequences: deforestation, stream destruction, biodiversity loss, loss of productive land, health hazards



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Property Rights and Artisanal Diamond Development (PRADD) Project

- Joint USAID/Department of State initiative to support governments with compliance with Kimberly Process Certification Scheme (KPCS)
- KPCS: voluntary agreement between governments, diamond industry and NGOs to certify stop flow of conflict diamonds
- PRADD CAR started in 2007; also operates in Liberia since 2010; combined annual budget of about \$2.5 million
- **Project Objective:** *Increase the amount of alluvial diamonds entering the formal chain of custody while improving the benefits accruing to mining communities through an approach of strengthening property rights*



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PRADD Activities & Accomplishments

- Rigorous identification, georeferencing and community validation of mining claims
- To date, 3,871 “certificates of customary tenure” issued, signed by mining ministry
- Intensive, multi-pronged education campaign, including creation of diamond valuation workrooms
- Unique post-mining program that combines livelihoods diversification, property rights and environmental restoration, known as POMIGER



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POMIGER: Post-Mining Income-Generating Environmental Rehabilitation

- Some direct restoration, like stream regeneration
- Main approach: offering technical assistance in conversion of old pits into fish ponds, vegetable farms and agroforestry sites
- Without precedent: other attempts at restoration in Sierra Leone and Ghana have had limited impact
- Exponential growth: from 18 sites in late 2010 to 580 sites in late 2011
- Study aimed at identifying how and why this model appears to be working





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Research Objectives & Methodology: Overview

- Key objectives:
 - Examine the nature, scale and durability of ecological rehabilitation and economic diversification measures
 - Identify components of project model that could be replicated
 - Analyze key motivating and contextual factors behind adoption, including the role of improved property rights
- Mixed-methods approach:
 - Three-week field research, including rapid rural appraisal, semi-structured interviews, site visits, focus group discussions
 - Structured questionnaire with 104 households in village of Loppo who practice aquaculture.
 - Review and analysis of GIS data, PRADD socioeconomic survey data and a Feb. 2012 census of active POMIGER sites

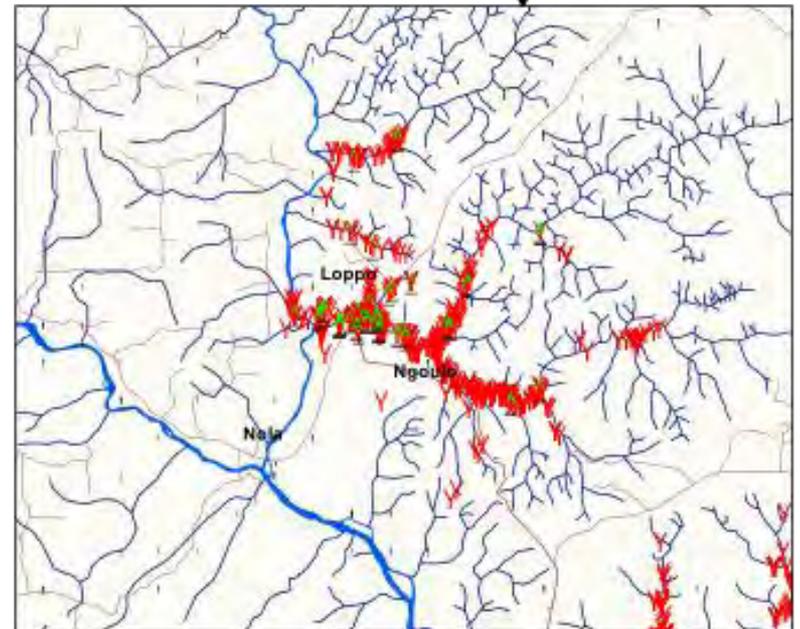


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POMIGER Accomplishments: Overview

- Of 381 active sites, 25 vegetable gardens, 25 agroforestry sites, 331 fish ponds
- At least 50 hectares of land converted
- 43% of active sites on former mining pits, 30% on land with certificates of customary tenure
- Restored mining pits represents about 5% of total reported exhausted land in active mining sites (367.63 hectares)

POMIGER and PRADD Certificate Sites Near Loppo, Sangha-Mbaeré Province, Central African Republic



Map created by Terah U. DeJong using data from PRADD and the World Resources Institute



Key Findings

- Ecological impact: significant positive effect on water quality, land degradation, aesthetics, social and health hazards
- Economic impact: significant complementary revenue source
- Limitations:
 - Geography (especially distance from villages)
 - Secondary environmental impacts, like water-sharing and damming
- Key motivations and factors
 - *Ongoing crisis in diamond economy*
 - *Previous experience with activities, especially aquaculture*
 - *Food insecurity, especially lack of fish and vegetables*
 - *Desire for income stability and retirement security*
 - *Behavior change communication and technical training*
 - *Spontaneous expansion*
 - *Improved property rights*



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Role of Property Rights

- PRADD's property rights methodology:
 - identification
 - georeferencing
 - validation
 - certification
- Certificate:
 - unique ID
 - coordinates
 - surface area
 - mode of acquisition


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DIRECTION REGIONALE DU SUD OUEST

CERTIFICAT DES DROITS COUTUMIERS DE PROPRIÉTÉ

IDENTITE DE L'ARTISAN

Nom et Prénoms : KETTE André
Sexe : MASCULIN
Date de naissance : VERS 1961
Résidence actuelle : Ndéléngué-SCED
ID de l'Artisan : CCH1264



DONNEES PHYSIQUES DE LA PARCELLE

ID Chantier	CCH1264-1
Latitude	3,3136709999999998
Longitude	16,33379
Cours d'eau exploité	NDELENGUE
Délimitation physique de la parcelle	Cours d'eau Marquage sur les arbres
Superficie totale (m ²)	7500

DONNEES COUTUMIERS DE LA PARCELLE

Reconnaisances coutumières	Reconnaissance par le travail investi
Mode d'appropriation de la parcelle	Don


Pour l'autorité minière :
Le Directeur Régional
Cyrille BAKI...
Ingénieur Géologue - Mineur

NB : Le présent certificat ne fait pas foi de possession et/ou de permis d'exploitation, utilisation et son titulaire n'est en aucun cas dispensé de l'obtention de ces documents.



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POMIGER and the Certificates

Hypothesis: Strengthening tenure security and clarifying property rights acts as an incentive for mitigating environmental impacts

Approach:

- Qualitative: in-depth interviews and case studies
- Quantitative: analysis of survey results in Loppo

Limitations:

- Relationship between property rights and POMIGER is indirect and difficult to quantify
- Insufficient sampling frame to fully test the hypothesis
- Results from Loppo survey cannot be generalized



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Overview of Findings

- Key effects of certificate: reduction in conflicts over limits, lower risk of expropriation, and hereditary rights
- The certificates may increase the long-term investment. Limited evidence: agroforestry has highest proportion of certificates (48%)
- Most POMIGER participants are individuals (93%), and clarifying property rights may have played a role in its popularity
- Overall, only 30% of POMIGER sites are on land with certificates. Relative to other motivating factors, property rights doesn't have a mechanical or dominant effect.



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Specific Effects (I): Land Market

- PRADD certificates may increase value of land.
- Evidence of land market for both active and exhausted mining sites.
- In Loppo, 12 fishpond owners purchased the land for their pond. 7 people reported selling fish ponds.
- Other advantages: traditional document used in sale (*attestation de vente*) often entitles customary authority to cut in subsequent income
- Perceived as providing recognition from the state, because of georeferencing



Pictured: *Leonard Likamule, left, plans to sell exhausted land for \$30 to Jean-Claude Yapoubisi to convert into a pond.*



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Specific Effects (II): Land Tenure Security Perception

- Loppo survey included 4 statements in Sango related to perceptions of land tenure security. Answers coded as strongly agree (2), agree (1), and disagree (0).
- Average scores were compared between those with certificates (for any site, not just fish ponds) and those without any certificate
- T-tests conducted to test for significance in variations of the means between the two sub-groups



Specific Effects (II): Land Tenure Security Perception

Question	Mean score (n=95)	Mean score with certificates (n=40)	Mean score without certificates (n=55)
1. <i>The limits of my pond are clear and respected by most members of the village</i>	1.78	1.88**	1.71**
2. <i>I can sell my pond without asking for permission from anyone</i>	1.34	1.6***	1.15***
3. <i>I am confident that a company cannot seize my land where my pond is located without negotiation with me</i>	0.71	0.8	0.64
4. <i>I am confident that my children will inherit my pond</i>	1.96	1.98	1.95

** Significant at 95% level *** Significant at 99% level



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Specific Effects (III): Conflict Reduction

- After PRADD certificates introduced, reports of land conflicts changed from 142 to 4. RRA showed similar result.
- PRADD database has been consulted by courts to resolve disputes, according to 2011 legal study by local consultant
- POMIGER: anecdotally, only conflict found in field was in Beya, where there were no certificates
- Effect of land tenure security perception: score on Question 1 negatively correlated with reports of conflicts over limits (coefficient: -0.31, $p < 0.01$)





Specific Effects (IV): Wealth Level

- Two indices constructed from Loppo survey, based on factor analysis and qualitative research
- Index 1:
 - 6 wealth indicators items (satellite dish, electricity generator, motorcycle, plastic chairs, television and tin roof), 2 dummy variables on financing others and buying diamonds
 - Scale reliability: Cronbach alpha 0.82
 - Mean score: 1.34; Std. Dev.: 1.90
- Index 2:
 - 5 ownership variables for tools (shovel, crowbar, jig, probe, and pump)
 - Scale reliability: Cronbach alpha 0.79
 - Mean score: 2.51; Std. Dev.: 1.64



Specific Effects (IV): Wealth Level

- Logistic regression with PRADD certificate dummy variable to examine relationship between certificates and wealth
- Results: On average, the odds of having a PRADD certificate are 1.4 times greater for every unit increase in *either* wealth index scale.

Number of observations = 95
LR chi2(1) = 8.78
Prob > chi2 = 0.0031

<i>Certificate Dummy</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>Odds Ratio</i>	<i>Std. Error</i>
8-point wealth index	.3534043***	.1330782	1.423907***	.1894909

Number of observations = 95
LR chi2(1) = 6.46
Prob > chi2 = 0.0110

<i>Certificate Dummy</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>Odds Ratio</i>	<i>Std. Error</i>
5-point wealth index	.3337094**	.135469	1.396137**	.1891333



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Summary of Findings

- Impact on people's confidence in selling their ponds, even if the ponds do not have a certificate
- Impact on conflicts over limits and rights to resources
- In general, fear of expropriation remains high and inheritance by children isn't linked with certificate
- Concerns and limitations:
 - Certificate has clarified size and limits, but not duration and full recognition, since only signed by mining authority
 - Concerns about maintenance of certificate database, with control transferred to mining ministry
 - Spouses not included in inheritance
 - Not a full land title, though it is an intermediate step



A model to apply elsewhere?

- Key elements of the POMIGER model:
 - Offers economic incentives for environmental restoration
 - Holistic understanding of ASM in context of rural economy (complementary livelihood, not alternative livelihood)
 - Space for both group-based and individual incentives
 - Emphasis on sustained on-the-ground technical assistance, entrepreneurship, and person-to-person knowledge transfer
 - Property rights framework strengthens incentives
- Limitations
 - Geography prevents wide-scale application
 - Unintended environmental consequences, especially water
 - Possibility of « mission creep » given broad scope
 - Model replication requires understanding of local context



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Implications of Property Rights Approach for REDD+

- Relevance: property rights strengthening and clarification as precondition and safeguard in REDD+
- POMIGER shows positive environmental effects where property rights is *combined* with economic incentives at individual / family level
- POMIGER shows that while full development of statutory system (land titles, cadastres) may be unrealistic in short-term, intermediary solutions exist
- Similar approach could be developed for carbon rights, especially in sub-Saharan Africa



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