DFID Systematic Review

Protocol

Review question:

Is the use of renewable natural resources in the developing world more or less sustainable, pro-poor and profitable under controlled access compared to open access?

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1. BACKGROUND

The literature on property rights regarding renewable natural resources (RNRs) is abundant. Property rights are a central theme of research in economics, geography, anthropology, sociology, environmental studies, development studies, etc. Private ownership and common property have also been at the centre of vivid, sometimes 'ideological' debates about the foundations of economic development, poverty alleviation, sustainable resource use, democratic consolidation and social justice. Upon this background this review sets out to take a fresh look and to generate sound evidence on the relationship between property regime and resource use.

Transfers of open access to controlled access have recently occurred with regards to multiple RNRs, even though they take different forms and we use different terms to refer to them. Some have involved a shift to common property, whereas others have promoted a change to private ownership. The transfers are typically justified with reference to the 'tragedy of the commons': users enjoying unlimited access to a resource 'race' for the resource as they seek to maximise their own short-term gain, leading to the over-exploitation of that resource. Private ownership and common property, in contrast, are expected to align the interests of resource users (individually or collectively) with societal interest in the sustainable use of the resource in the long term, use that contributes to the generation of wealth on the side of resource users, particularly the poor.

Transfers of open access to controlled access have not only taken place with regards to various RNRs, but they have also become the subject of much empirical research in these fields. This review will focus on two fields, where tenure transfers have received much attention in policy and research: forestry and fisheries.

In forestry, tenure transfers from open access situations to common property or private ownership take the form of forestland allocation (in East Asia, particularly China, Laos and Vietnam) and forest devolution (e.g. woodlots in Ethiopia, *panchayats* in India, indigenous land titling in Latin America). Common property and private ownership coexist in some countries, such as in Guatemala and Honduras, whereas other countries favour one property regime over the other. Nevertheless, empirical research has so far not revealed any direct relationship between tenure transfer and resource use but highlights the significance of various mediating factors (Agrawal et al. 2008). In particular, governance factors such as the capacity of governments or other institutions to set rules, enforce them, monitor resource use and resolve disputes are accorded key influence. They are also the reason why *de facto* property rights on the ground are often different from statutory property rights (Sikor and Tran 2007).

The predominant forms of tenure transfer in fisheries are the allocation of Individual Transferable Quotas (ITQs), besides other forms, involving transfers to groups - such as "territorial use rights in fisheries" (TURFs) (Christy, 1982) - and common property (Acheson, 2003). Originally conceived in industrialised countries, ITQs have become increasingly popular in developing countries, including Chile, Mexico, Morocco and Namibia (Arnason, 2002). Some research on ITQs suggests that the shift from open access situations to individual rights may promote the sustainable management of fisheries (Costello et al. 2008). At the same time, other research indicates that the allocation of ITQs may not enhance the sustainability of management and may not favour the poor (Pinkerton and Edwards 2009), while others have demonstrated "limits to socially optimal privatisation" in fisheries and argued for state control over ITQ schemes (Clark et al, 2010).

Thus the literature suggests that the relationship between property regime and the use of RNRs is mediated by multiple covariables and contextual factors, as concurrent changes in markets, technology, infrastructure, etc. influence outcomes. Outcomes vary between regions and localities in reaction to different economic, political and biophysical conditions, the degree of commercialisation appearing to be a key determinant. Of particular significance is the frequently observed difference between statutory and *de facto* property rights connected with governance factors. The proposed review will consequently spend significant efforts to analyse outcome heterogeneity by including an additional subquestion on factors conditioning the relationship between property regime and the use of RNRs. The review will also compare the effects of private ownership and common property on resource use as the two key alternative approaches to controlling access.

2. KEY QUESTION and SUBQUESTION

We propose using the following **key question** for the review:

Is the use of renewable natural resources in the developing world more or less sustainable, pro-poor and profitable under controlled access compared to open access?

The question, originally posed in the DFID call for systematic review proposals, was: How effective is the transfer of common property to private ownership, through conferring property rights on individuals, in providing more sustainable and pro-poor exploitation of renewable natural resources in the developing world?

We are proposing reformulating the question to make it more neutral than the original one (even though we appreciate the underlying hypothesis that transfers from common to private may lead to more sustainable and pro-poor use of renewable natural resources). In addition, after extensive consultations with DFID staff, we have made three further alterations to the original question.

(1) Include attention to the 'profitability' of resource use: We define resource use as 'profitable' when it generates a surplus above costs. This stems from the interest in wealth generation expressed to us by DFID staff.

(2) Changes in terminology: We have replaced the term 'common property' with 'open access' as 'open access' is the more accurate term for DFID's interest in understanding change from a 'property-less' situation to property. We use the term 'controlled access' to include private ownership and common property as the key two approaches to transfer tenure in open access situations.

(3) Attention to 'transfer': We understand that the re-formulated question drops the attention to the process of conferring property rights (which is often messy, reveals significant discrepancies between the legal and *de facto* situation, and takes a long time to reach the desired end-state of private ownership). Nevertheless, we will consider the effects of the transition process from open-access situations to a property regime in two ways. First, we will use the time since the transition in the characterisation of included studies and as an effect modifier. Second, we will focus the analysis on the *de facto* situation. This will allow us to 'rule out' cases where there may have been a transfer of legal tenure rights but *de facto* property rights have not been established on the ground (e.g., due to a lack of government enforcement power).

In addition to the key question, we would like to propose the following two **sub-questions** for the review:

(a) Under what conditions is controlled access more or less sustainable, pro-poor and profitable than open access ?

(b) Is the use of renewable natural resources in the developing world more or less sustainable, pro-poor and profitable under private ownership compared to common property?

The conditions we are interested in exploring include two types: variation in question elements and in contextual factors (see section 6 for the latter).

Variation in question elements: In addition to the use of inclusion criteria (see Table 01 and appendix 2), we will characterise all studies included in the review according to the following criteria:

- Subject: Type of RNR. Size of RNR. Resource abundance. Type of developing country (by development status and geographic region).
- Outcomes: Short-term versus long-term outcomes. Types of poor.
- Controlled access: Nature of right holder (group versus individual; type of group: incorporated group of individuals/cooperative, local community, regional association; type of individual: household, domestic private company, publicly-owned company, transnational corporation). Extent of rights (limited withdrawal right, unlimited withdrawal right, management right, alienation right – cf. Schlager and Ostrom 1992). Duration of rights (short-term/1-20 years, long-term/20-100 years, indefinite). Extent of obligations (conservation of stock, approval of management plan, management duties). Presence of secondary right holders under common and private property. Nature of right-transferring institution (state, customary authority, supra-state institution). Gender distribution of private property rights.
- Open access: Nature of lack of exclusion (who does not get excluded? outsiders only, such as migrants or powerful actors; insiders only; insiders and outsiders). *De jure* situation (public, common property, private, undefined).

3. QUESTION STRUCTURE

The characteristics of studies that will best address the question 'Is the use of renewable natural resources in the developing world more or less sustainable, pro-poor and profitable under controlled access compared to open access?' are delineated in table 01. See appendix 2 for the specific inclusion criteria, studies need to fulfill all stated criteria in order to be included in the review.

Table 01. Question structure

Question Elements	Description	Inclusion Criteria *<with definitions>*
Subject	Unit of study	Use of renewable natural resources (RNR) in developing countries *<use defined as active extraction by humans><'developing countries' defined according to World Bank Global Development Indicators, including low & middle income countries; see appendix 5>*
	Focus	Forests and fisheries *<defined according to FAO criteria; see appendix 4>*
Intervention or condition	Access regime	Controlled access <mechanisms to limit use are present and enforced>
	Focus	Private ownership <individual, transferable and long-term rights to RNRs>[1]
		Common property <locally shared rights to RNR combined with presence of collective use regulations>[2]
Comparison	Access regime	Open access <mechanisms to limit use are absent or not enforced>
Outcomes	Reliable measurement of the level of achievement of intervention goals	(a) Sustainable use of RNRs *<ability to extend use of RNR into the future at the current level>* (b) Pro-poorness of use *<ability of local poor to benefit from use of RNRs; poor to be defined in relative and absolute terms at the individual and community level>[3]* (c) profitability *<generation of surplus above costs>[4]*
Methodology	Research design used to compare "common" and "private" regimes	Eligible designs include intervention studies where a system is studied before and after a change in property regime, controlled studies where outcomes of different regimes are assessed, and observational or qualitative designs recruiting areas with both regimes.
Language		English, German, French, Spanish, Portuguese.

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[1] Includes government ownership if governmental entities receive 'private' rights to resources, as in the case of a publicly owned forest company that gets private title to forestland. Excludes public ownership, as in protected areas.

[2] This does not exclude case of co-management in which local groups do not receive any significant rights to RNRs.

[3] 'Local' refers to people living in geographical proximity of the RNR, the actual extent of proximity depending on the size of the resource (e.g. a village for a small forest, many villages around a lake, etc.).

[4] Costs will be defined according to context. In subsistence settings, they would include variable costs and exclude the costs of household labour and capital depreciation, mirroring local people's calculations of surplus. In commercialized settings, they would include the costs of labour and capital depreciation. In the latter settings, surplus would equate profit, but not in the former type of settings.

4. SEARCH STRATEGY

The available empirical evidence includes a large number of case studies and a few large-N studies. Some of the latter originate from ongoing research undertaken by the International Forest Resources and Institutions (IFRI) project, which is only partially published – Arun Agrawal (who currently heads the IFRI research program) has been contacted directly by the review team and confirmed access to project's publication databases. The overwhelming part of the evidence comes from single or comparative case studies, many of them published in peer-reviewed journals. The reviewers expect, however, that only a subset of the case studies will be of direct relevance to the proposed review, as most lack the required comparison between open access and controlled access. For those case studies on poor people and communities in the developing world which document comparisons of resource use under open access, on the one hand, with resource use under common property or private ownership on the other, comparability will be a key issue due to different study designs and measures.

Our search will employ the following strategies:
(1) Primary databases to be searched: general databases focused on peer-reviewed journals and other academic literature (Web of Science, Scopus/ScienceDirect, JSTOR, EBSCO, SpringerLink, Wiley Online, Ingentaconnnect and InformaWorld).
(2) Specialist databases: such as the Library of the Commons (IASC), International Institute for Fisheries Economics and Trade (IIFET), World Agricultural Information Centre and OneFish portals (FAO - Food and Agriculture Organization of the United Nations / SIFAR - Support unit for International Fisheries and Aquatic Research), regional and international development banks databases (AfDB - African Development Bank, ADB - Asian Development Bank, IDB -. Banco Interamericano de Desarrollo), JOLIS (World bank and International Monetary Fund libraries); general databases and portals focused on international developemt (ELDIS, BLDS - British Library for Development Studies and Zetoc - British Library's database), governmental agencies (DFID, DEFRA, USAID, CIDA).

(3) Web searches: additional searches for unpublished material and grey literature will be carried out on Google Scholar and the meta-search engines Yippy and Dogpile. The first 50 hits of web searches will be checked, and further examination of results may be carried out if high proportion of relevant studies is found (CEBC, 2010).
(4) Checking of reference lists of included studies
(5) Consultations with experts and organisations: Our own advisory team (Tim Daw, Mark Zeitoun, Lorenzo Cotula, Edward Allison), Arun Agrawal and the IFRI network, Ruth Meinzen-Dick and the CAPRi Programme of the CGIAR System, William Sunderlin at the Center for International Forestry Research (CIFOR), Augusta Molnar of the Rights and Resources Initiative (RRI), and the Center for People and Forests – RECOFTC. In addition to direct consultation we will also make us of moderated mailing email lists (eg. Ecopolitics) to reach a broader group of experts. Such consultation will be aimed at checking the preliminary list of included studies for missing research. Expert recommendation will assist, but not determine the search strategy.

Electronic search strategies developed will be based on those initially carried out for Web of Science and Eldis. The process of development so far is traced in appendix 1. The search strategy was refined after trial during draft protocol stage, and is currently as follows[5]:

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[5] Strategy refers to searches on titles, abstracts and keywords. "SAME" is the boolen operator equivalent to "near" or "adjacent" depending on the database. "$" and "*" are wildcards.

(countries names truncated, see below) **AND** (forest* OR fisher* OR fishing OR wood* OR timber* OR "forest dweller*") **AND** (private OR common OR shared) **AND** (property OR rights OR access OR quota* OR tenure OR title OR deed OR governance OR market OR ownership)

The search strategy will include countries names and generic terms describing developing countries and transitional economies (see appendix 5 for the list of "developing countries" according tot the World Bank classification adopted in this review). See also the appendix 1 for preliminary results and a discussion of the inclusion of search terms, particularly countries names.

The results of this search, and the one on Eldis, will be checked against a set of studies felt to be relevant and suggested by our expert team. This assessment of the strategy's sensitivity will be followed by further development of the search strategy as necessary.

Studies will be limited to those available in English, French, Spanish, German and/or Portuguese. Funding for full translation of inaccessible languages is not available for this review, and there is insufficient time to request translations from authors.

5. SELECTION OF RELEVANT DATA

We will proceed in three steps using the criteria specified in the inclusion/exclusion form (as in section 3 above - see also appendix 2).

(1) Studies will be excluded on the basis of titles only initially.
(2) Potentially relevant titles will be assessed in conjunction with their abstracts.
(3) Any potentially relevant papers will be collected and assessed for inclusion as full text.

Daw and Sikor will crosscheck the selection at each stage by acting as secondary reviewers on a 10% random subsample of abstracts and full texts. We will use kappa analysis to ensure decisions of primary and secondary reviewers are comparable.

6. DATA EXTRACTION

We will extract details of the characteristics of the included studies (participants, exposure, comparison, outcomes and methodology) along with study validity in using a data extraction form developed for the review. The first draft of this form is found in appendix 3, but will be adapted once it has been tried out in duplicate on three included studies. Data extraction will occur independently in duplicate for 10% of the studies, the remaining 90% will be extracted by Hellebrandt. Quantitative outcome data will be extracted in as complete a way as they are available. This will ideally include numbers of participants in each group, baseline and end mean data with standard deviations (or other measure of variance) or baseline and change in mean data over the course of the study (with variance information) or differences between the groups at baseline and end of the study period (with variance information).

Effect modifiers: As mentioned in section 2, variation in context determines the conditions under which transfer of property rights may lead to sustainable and pro-poor use of RNR. To characterize contextual conditions, we expect to include attention to the following key variables (cf. Agrawal 2001):
  • Demographic: population density; rate of out/in-migration
  • Economic: degree of market integration, infrastructure access, cost of extraction technology,

skills levels
- Social: presence of social capital at community level, inter-community networks, presence of pronounced inequalities (ethnic, economic, gender, political)
- Political: state enforcement capacity (monitoring, enforcement, dispute resolution), presence and enforcement capacity of other politico-legal institutions (e.g., customary authorities), management regime (objective, species targeted for use)

7. ASSESSMENT OF STUDY VALIDITY

Study validity will be addressed as part of the data extraction. Validity assessment is based on characteristics suggested for randomised and non-randomised studies by the Cochrane Collaboration ('Chapter 8: Assessing risk of bias in included studies' and '13.5 Assessing risk of bias in non-randomized studies' in the Cochrane Handbook[6]) and from work by the EppiCentre[7],[8].

The Cochrane Collaboration suggests that the key components of bias (and therefore in assessment of validity) in any study are:
- A. selection bias (systematic differences between baseline characteristics of the 2 groups);
- B. performance bias (systematic difference between care or support provided to the 2 groups);
- C. attrition bias (systematic differences between the 2 groups in withdrawals from the study);
- D. detection bias (systematic differences between groups in how outcomes are determined); and
- E. reporting bias (systematic differences between reported and unreported findings. Includes publication bias).

EppiCentre formulates the risk of bias as being composed of the
- F. trustworthiness of results (methodological quality, as discussed by Cochrane, including transparency, accuracy, accessibility and specificity of the methods);
- G. appropriateness of the use of that study design to address the review question (methodological relevance, including purposivity);
- H. appropriateness of focus for answering the review question (topic relevance, including relevant answers and legal and ethical propriety); and
- I. overall weight of evidence (a summary of the above).

Our method of assessment includes most but not all of these domains (see Table 02). We will not combine the measures of validity in an overall score or weight them in any way, but report the study strengths and weaknesses by domain. Some of these domains will relate to study reporting, and some to actual reported validity (which may be made more difficult to assess by poor reporting).

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[6]   Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.0.0 [updated February 2008]. The Cochrane Collaboration, 2008. Available from www.cochrane-handbook.org.

[7]   Gough D (2007) Weight of evidence: a framework for the appraisal of the quality and relevance of evidence. In J. Furlong, A. Oancea (Eds.) Applied and Practice-based Research. Special Edition of Research Papers in Education, 22, (2), 213-228

[8]   EppiCentre website, 'Quality and relevance appraisal', http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=177 (accessed July 2010)

Table 02. Criteria for validity assessment. Capital letters in the first column refer to the key components of bias outlined above (as suggested by Cochrane Collaboration and EppiCenter)

Criterion	Score as:
Clarity of the research question (F)	• 'done' when the question addressed by the research is clear, specific and addressed by the methods & results • 'not done' when there are any major problems with the above
Description of RNRs (A,F)	• 'done' when the RNRs are well described (to include size, species composition, abundance/scarcity, stock unit, availability of technology to assist in harvesting, duration of current exploitation levels) • 'partial' when one to three of these factors are not well described • 'not done' when four or more factors are not well described
Similarity of RNR between the access regimes (controlled and open or private ownership and common property) (A,B,F)	• 'done' when before/after study and when RNRs appear very similar (eg geographically close, similar ecosystems & context – including migration, market integration, infrastructure access, resource abundance) • 'partial' when there are both similarities and differences (or some factors are similar and some unclear) • 'not done' when the RNRs exhibit substantial differences (or several factors are unclear) • 'unclear' – where there is not enough detail reported to assess
Temporality (B)	• 'done' when the time of assessment of the 2 systems is equivalent and both systems are equivalently 'settled' • 'not done' when differences in time or in how settled a system is may alter the outcomes • 'unclear' where either are unclear
Confounding (B)	• 'done' when the study attempts to account for and minimise the effects of any differences in area, level and type of poverty (or these are equivalent in both settings) • 'partial' when one or two of these factors are not equivalent, accounted for or minimised (or are unclear) • 'not done' when three or more factors are not equivalent, accounted for or minimised (or are unclear)
Description of conditions (F)	• 'done' when the access regimes are well described, and have been well investigated on the ground • 'partial' when these factors are described in parts only • 'not done' when these factors are not well described
Researcher bias (A-E)	• 'done' when study funding and financial interests of authors are declared, no bias is apparent, and the selection of the case(s) is justified in appropriate manner • 'partial' when funding or financial interests are not declared (but case selection is justified in appropriate manner) • 'not done' when funding, financial interests or case selection are not declared and there is potential bias apparent
Outcome ascertainment (D)	• 'done' when outcome measures are appropriate for both systems, and appear valid and well executed (in terms of sample size, sampling strategy, rigorous data aggregation) • 'partial' when any one criteria above is not met • 'not done' when at least 2 criteria are not met • 'unclear' where it is not possible to tell
Any other validity problems for this study?	• 'Done' if no further issues around validity • 'not done' if additional validity issues are raised
Summary of validity (I)	• Low risk of bias when all criteria above are 'done' • Moderate risk of bias when similarity of RNR is 'done' but one or two other criteria are partial, not done or unclear • High risk of bias for all remaining studies

8. DATA SYNTHESIS

We will tabulate details of study characteristics and study validity. Study outcomes will also be tabulated, including details on the property regimes and differences in use of RNRs. The summary tables will inform a narrative synthesis of the data, following a 'framework synthesis' approach (Barnett-Page and Thomas 2009) and employing qualitative analysis techniques (Miles and Huberman 1994). In response to the subquestion, the synthesis will analyse impact heterogeneity by detecting outcome patterns and identifying differentiating factors through the use of supplementary tables. Data will also be checked to assess whether quantitative pooling (meta-analysis) will be feasible for any of the outcomes (where there are studies with similar enough questions and outcome measures that present their data in a quantitative way). If feasible random effects meta-analyses will be undertaken using ReviewManager 5.0 software (Cochrane Collaboration). However, the review team does not foresee that such studies will be available due to low numbers of studies reporting quantitative data, multiple outcomes and many effect modifiers.

9. REPORTING AND DISSEMINATION

We will closely engage with potential users of the research at all stages of the review process, as we have begun with the formulation of the review question. We will continue to seek repeated interactions with the relevant DFID staff and the two advisors (Allison and Cotula) to jointly validate the protocol, quality assessment form and report.

In addition, we will involve a much larger group of potential users in the review of the draft report. We will make the draft report publicly available through the UEA website and seek feedback from potential users outside academia through presentations at suitable organisations (e.g. Overseas Development Institute, Institute for Development Studies, Oxfam, Flora and Fauna International) and at the next Global Conference of the International Association for the Study of the Commons in January 2011 (the paper proposal has been accepted, participation funded from other sources). Given DFID approval, we will explore the possibility for organising a webinar (web conference) or electronic consultation process together with the CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi).

The final report, policy brief and summary will be publicly available through the UEA website. We will submit an article based on the report to a leading international journal (e.g. Science). We will also disseminate the policy brief and report through postings to a variety of electronic newsletters and blogs.

10. POTENTIAL CONFLICTS OF INTEREST

Thomas Sikor has conducted empirical research on property regimes and the use of RNRs for some 15 years, including research on the devolution of forestland in Vietnam and privatisation of land rights in Albania and Romania. He has also been a leading participant in international debates on property and is a long-time member of the International Association for the Study of the Commons. Yet throughout his engagement with property issues, he has sought to maintain a critical and scholarly approach and not to take sides in the sometimes 'ideological' debates about the desirable forms of property. Denis Hellebrandt and Lee Hooper have no known conflicts of interest.

11. TIMELINE

Start date	End date	Stages
01/06/10	30/06/10	Registration of title with DFID
01/06/10	31/07/10	Preparation of protocol
01/08/10	**23/09/10***	DFID and External Review of protocol
01/06/10	15/10/10	Study search
10/06/10	15/10/10	Assessment of study relevance
27/09/10	07/11/10	Extraction of data
08/11/10	21/11/10	Synthesis and/or statistical analysis
08/11/10	05/12/10	Preparation of draft report
06/12/10	31/12/10	DFID review of draft report
06/12/10	31/12/10	Dissemination of draft report
03/01/11	15/01/11	Revision of draft report
16/01/10	13/02/11	External review of draft report
14/02/11	28/02/11	Final report

actual delivery date of last feedback from external peer-review.

	June				July				August				September			
Months / Weeks	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Registration of title with DFID	▓	▓	▓	▓												
Preparation of protocol	▓	▓	▓	▓	▓	▓										
DFID and External Review of protocol									▓	▓	▓	▓	+	+	+	
Study search	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	
Assessment of study relevance		▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	
Extraction of data													-	-	-	▓

	October				November				December				January				February			
Months / Weeks	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Study search	X	X																		
Assessment of study relevance	X	X																		
Extraction of data			X	X	X															
Synthesis and/or statistical analysis						X	X													
Preparation of draft report						X	X	X	X											
DFID review of draft report										X	X	X								
Dissemination of draft report										X	X	X								
Revision of draft report													X	X						
External review of draft report															X	X	X	X		
Final report																			X	X

Key

+	delay	x	proposed change to timeline in response to delay
-	suspended due to delay in previous activity		

12. CONTACT DETAILS

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13. ACKNOWLEDGEMENTS

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Appendix 1: SCOPING: SEARCH TERMS and FIRST RESULTS

A series of trial searches were carried out as scoping exercise. Such trial searches aimed at testing an initial set of search terms (Table 06) and possible search strategies and sintaxes (Table 03). Two databases were selected: ISI Web of Knowledge and Eldis. The objective was to target databases representative of both peer-review journals (ISI's audience and reference base are the academic community and its journals) and grey literature (Eldis is an internet portal in the field of international development aimed at research, practitioner and policy audiences). Below are the summary results for the trial searches.

(1) **ISI Web of Knowledge (WoK)**
Scope: all databases (full list available at:
<http://images.isiknowledge.com/WOKRS49B3/help/WOK/h_database.html#WOS> .
Search fields: title, abstract and keywords ("Topic" in WoK terminology).
Timespan: all years, from 1945 to present.

Table 03. Initial set of search terms and sintax (see Table 04 for changes to the sintax):

Question element	Search terms and sintax [1, 2]
Unit of study	((developing OR industriali$ing) SAME (countr* OR region* OR state* OR area*) OR (transition* SAME countr*)) OR ((Poor* OR Vulnerable* OR Marginal* OR Excluded) SAME (people OR group* OR communit*)) [list of country names to be added, see appendix XX]
Focus	((forest* OR fisher* OR fishing OR wood* OR timber* OR "forest dweller*") OR ((fish OR aquatic) SAME (stock* or resource* or population*)))
Intervention	(("open-access" OR commons OR common-pool OR group-property OR customary OR transferab* OR enforce* OR property OR individual OR allocation OR right* OR quota* OR share* OR tenure OR "land title" OR "land deed" OR reform OR governance OR market OR ownership OR "free-rid*" OR (race fish)))

(1) Terms and sintax broke down according to question elements for clarity. Actual sintax as follows:
Topic=(((developing OR industriali$ing) SAME (countr* OR region* OR state* OR area*) OR (transition* SAME countr*) OR ((Poor* OR Vulnerable* OR Marginal* OR Excluded) SAME (people OR group* OR communit*))))
AND Topic=(("open-access" OR commons OR common-pool OR group-property OR customary OR transferab* OR enforce* OR property OR individual OR allocation OR right* OR quota* OR share* OR tenure OR "land title" OR "land deed" OR reform OR governance OR market OR ownership OR "free-rid*" OR (race fish))) AND
Topic=((forest* OR fisher* OR fishing OR wood* OR timber* OR "forest dweller*") OR ((fish OR aquatic) SAME (stock* or resource* or population*))) Timespan=All Years

(2) *Wilcards*: $(replaced by any other <u>single</u> character) *(replaced by any number of other characters). *Boolean operators*: used according to WoK search rules, in the following order of precedence: SAME, NOT, AND, OR (SAME searches for terms in the same sentence, defined as either the article title or actual sentences in the abstract). *Parentheses*: used to override operators order of precedence. *Inverted commas*: terms between them are searched as an exact expression. For details on WoK use of operators and search rules see
<http://images.isiknowledge.com/WOKRS49B3/help/WOK/ht_search_rules.html>

Table 04. **Results of trial searches in the ISI Web of Knowledge**, starting with the initial sintax and search terms as in Table 03. Search terms in *italic*.

Set	No. of articles	Changes to sintax	Comments
1	29294	Complete initial sintax.	Results include high number of clearly unrelated articles from such as from chemistry etc.
2	71621	Without terms identifying the types of RNR (focus)	Same as above, even broader results.
3	20892	Change sintax in type of intervention: without *transferab*, enforceab*, market*	Improved on set 1, still too broad. Articles potentially related to the review question do not appear in the first 50 results.
4	12631	As above, and without *property*, Added "*individual right**" Without (*Poor* OR Vulnerable* OR Marginal* OR Excluded*)	Same as set 3
5	7335	As above, and without *market*	Articles potentially related to the review question appear in the first 50 results ([a]).
6	7203	Changed sintax in the unit of study element (separated search terms identifying transition countries): Added *OR (transition* SAME (state* OR countr*)*	Similar to set 5
7	6192	Refined above: *OR (transition* SAME countr*)*	Idem above
8	6082	Added *NOT patent*	Despite the apparent high number of articles dealing with intellectual property and patents, changes to the sintax did not have a significant effect on the overall result.
9	386	Added terms identifying types of RNR	Articles potentially related to the review question are predominant in the first 50 results.
10	455	Change sintax in the unit of study element (merged search terms identifying transition countries with others)	Similar to set 9

Table 04. **Results of trial searches in the ISI Web of Knowledge (continued)**

Set	No. of articles	Changes to sintax	Comments
11	547	Same as 9, added market	Similar to set 10
12	1325	Restored the original sintax and terms identifying type of intervention.	Idem above, slightly more "noise" from unrelated articles, but broader range of studies also appear to be selected.
13	8042	Added *(Poor* OR Vulnerable* OR Marginal* OR Excluded)*	As above, but with considerably more "noise".
14	2360	Refined above: added *(people OR group* OR communit*)*	Similar to set 12, but with larger number of articles.
15	nil	Added terms identifying outcome: *poverty SAME (reduction OR alleviation OR prevention) OR sustainab**	Full sintax exceeded maximum number of terms allowed in a single search in WoK (50 terms, without operators).
15 repeat	31	Simplified above, using only *poverty reduction*	A very small set of results, but apparently of high relevance to the review question.
16	22	Change sintax in above to *"poverty reduction"*	As above. Change to search for exact expression filtered about a third of the results.
17	385	Replaced above with *sustainab**	Similar to set 15, but with considerably larger number of articles.
18	2118	Change sintax in set 14. Without terms identifying pasture land and similar systems, and groundwater. Add terms explicitly identifying "open access" situations.	Search is re-run to consider changes in the focus of the review question.
19	2148	Change enforceab* to enforce*	Allows search also for "enforcement", resulting only in small difference in the number of articles.
20	2148	Add "race fish" (searches for "race for fish", "race for the fish", etc.)	"Race for fish" and similar expressions are commonly used to describe open access conditions in fisheries. Apparently, their inclusion did not add new results.
21	26	Add "poverty alleviation"	As in set 15. Highly relevant studies.
22	27	Add "poverty reduction"	Similar to above, but with specific studies only showing in set 22.
23	2	Add "poverty prevention"	Very small set, both studies relevant.
24	347	Add "sustainab"	Similar to set 17
25	8	Set 24, filtered by "open access" or "open-access"	Small, but relevant set. Checking for use of "open access" as relevant descriptor.

Table 04. **Results of trial searches in the ISI Web of Knowledge (continued)**

Set	No. of articles	Changes to sintax	Comments
26	2148	As set 20	Repeated to preserve the sequence in the search history.
27	21	Set 26, filtered by "open access" or "open-access"	Same as set 25.
28	722	Replace generic terms identifying developing countries and transitional economies by "Sub-saharan Africa" and the complete list of low income countries according to the World Bank classification.	See comments below

(a)
Bene, C.; Hersoug, B. & Allison, E. H. (2010), 'Not by Rent Alone: Analysing the Pro-Poor Functions of Small-Scale Fisheries in Developing Countries', *Development Policy Review* **28**(3), 325—358.
Bongaarts, J; Greenhalgh, S; McNicoll, G. (2010) 'Land Reform in Developing Countries: Property Rights and Property Wrongs', *Population and Development Review* **36**(2), 399-400.
Tole, L. (2010), 'Reforms from the Ground Up: A Review of Community-Based Forest Management in Tropical Developing Countries', *Environmental Management* **45**(6), 1312--1331.

The search set no. 20 seems to have generated the most inclusive and relevant results, and its search terms and sintax are proposed as a starting point for subsequent searches. Nevertheless, the search strategy requires further test in different databases, as well as thorough revision of results. The overall search process will be refined in an iterative process, for example, by checking results for:

> Presence of highly relevant studies identified by advisors and/or other experts. If such studies are not present in search results, the reasons will be identified and the search corrected/refined accordingly.
> Exclusion or problematic terms. For example, identifiers of unrelated studies ("transition state" as used in chemistry as opposed to describe countries classified as transition economies). These terms will be helpful in narrowing the search to more relevant studies.

An important variant in the search strategy is the use of the actual names of developing countries. Set 28 (Table 04) presents the results of the search when the terms identifying countries classified as "low income" by the World Bank were used. "Sub-saharan Africa" (actual sintax: Africa SAME "sub-saharan") was used to substitute individuals names of each country, as a full list would have exceed the maximum number of terms in a single search in the Web of Knowledge.

The number of articles in this limited search is considerably smaller than when generic terms to identify developing countries are used. Even so, when the first 500 articles in sets 20 and 28 were compared (sorted by year of publication, most recent first), only 36 articles were found to be duplicate. Note that set 28 refers only to searches for "low income" countries, and yet the results showed a very large number of articles not found in set 20.

These findings suggest that searches need to include both generic terms to identify the unit of study and actual country names. Moreover, the findings indicate that the final size of an ideal set (combining both types of terms) may be realistically estimated as above 3,000 articles. Even though such set would need to be filtered to exclude spurious search results, it clearly suggests the magnitude of the task ahead and indicates the need for strict selection in further stages of the review.

(2) Eldis

Eldis databases are organised in two categories "Resource Guides" and "Dossiers" (for details see <http://www.eldis.org/go/topics>) which include a "searchable library of documents" covering a wide range of sources such as working papers, reports, guidelines, websites and reference lists (recommended readings). These documents may be either relevant documents in themselves or point to relevant studies, thus the search in on Eldis may be useful, although it is expected to be a painstaking task as each category of documents requires dedicated exploration. Eldis offers a "Google custom search" (see <http://community.eldis.org/googlesearch/index.htm>), which "enables [the search of] the full content of over 4000 development focused websites, as selected by Eldis editors".

A comparison of results of the Eldis custom search and of direct search on Google.co.uk (Table 05) shows differences in terms of the documents retrieved and order of relevance assigned by the search engine. These differences might be due to the "editor selection" mentioned on Eldis website, and deserve further attention. As the scoping exercise is concerned, search results show potential for identifying relevant studies – although, due to the nature of the Eldis database and the type documents it is not yet possible to fully assess the relevance and quality of the results. Such assessment will involve cross-checking search results from different databases and search engines(eg. Eldis vs Google), as well as taking into account the algorithms and/or indexing and editing system used to select and retrieve results in each database.

Table 05. Link titles of the first ten documents retrieved by searching Eldis and Google (*)**.**

Eldis (Google custom search)	Google.co.uk
1. Chapter 7. Managing the commons: International Development ... 2. GRAIN | BIO-IPR | 20 February 2003 3. SD: Institutions : Emerging trends in land tenure reform: Progress ... 4. Chapter 7. Managing the commons: International Development ... 5. The Future of Agriculture and Water: Market and Policy-Based ... 6. Chapter 7. Managing the commons: International Development ... 7. Development Indicators - IRIS Center at the University of Maryland 8. Chapter 6: use rights and responsible fisheries: limiting access ... 9. High Level Commission on Legal Empowerment of the Poor (HLCLEP): 10. Proceedings of the workshop on coastal area planning	1. Chapter 7. Managing the commons: International Development ... 2. Wetland ownership and management in a common property resource ... 3. SD: Institutions : Emerging trends in land tenure reform: Progress ... 4. The Future of Agriculture and Water: Market and Policy-Based ... 5. High Level Commission on Legal Empowerment of the Poor (HLCLEP): 6. Collective Action & Property Rights News: October 2006 7. Reconciling Property Rights in Plants 8. GRAIN | BIO-IPR | 20 February 2003 9. Science Academy of Political and Social The ANNALS of the American 10. Community, Farmers' and Breeders' Rights in Africa

(*) Search terms and sintax: ("developing countries" AND "developing country" AND "common property" AND "property rights" AND "commons" AND "individual rights")

Table 06. SEARCH TERMS - Provisional list. (*) is a wildcard. (AND, OR, ADJ/SAME) are boolean operators (see text for details).

Question element	Search terms		
Unit of study	(developing or industrializing or industrialising or transition*) ADJ/SAME (countr* or region* or state* or area*) Poor* Vulnerable* Marginal* Excluded	List developing country names , truncated to include the name of the people eg 'Ghana* (to cover Ghanaians) or Zimbabw* or Colombia*' etc	
Focus	forest* wood* OR woodland* fisherfolk fisherm* fisher* fishing	timber* tree ADJ/SAME plantation forest dweller* fish ADJ/SAME (stock* or resource* or population*)	
Intervention/ comparison	open-access commons common-pool group-property customary transferab* enforceab*	roperty private collective individual allocation rights quota*	tenure land (title ADJ/SAME deed) reform governance market ownership share* free-rid*
Outcome	sustainab* biodiversity ecosystem service* resilience (ecosystem OR environment*) ADJ/SAME (restoration OR conservation) degradation overexploitation over-exploitation collapse poverty reduction poverty-reduction	poverty alleviation poverty prevention safety net welfare pro-poor pro-poor growth development AND (economic OR human) rent-maximisation wealth-based approach poverty vulnerability food security	well-being wellbeing income profit consumption wealth overfish* illegal ADJ/SAME (logging OR fish*) loss ADJ/SAME (forest OR biodiversity) land grabbing

Appendix 2. INCLUSION/EXCLUSION FORM

Inclusion / Exclusion form
"controlled vs. open access"

Study details - Author(s):   Year: Journal ref:

Reviewer:

	Issue	Reviewer decision (circle)
1	**Subject**: Use of renewable natural resources (RNR) in developing countries.	Yes / No / ?
2	**Subject**: RNR limited to forests and/or fisheries.	Yes / No / ?
3	**Exposure or intervention**: comparison between **controlled** (existence and enforcement of mechanisms limiting access) and **open access** (absence or lack enforcement of such mechanisms) conditions OR between **common property (**locally shared use of RNR combined with presence of collective use regulations) and **private ownership** (individual, transferable and long-term rights to RNRs)	Yes / No / ?
4	**Methodologies**: primary research, at least one of the following - intervention studies (before/after change in property regime), controlled studies (assessment of outcomes of different regimes), and observational or qualitative designs (comparison of areas with both regimes). (circle which)	Yes / No / ?
5	**Outcomes -** at least one the following is mentioned: (a) Sustainable use of RNR (ability to extend use of RNR into the future); (b) Pro-poorness of use (ability of local poor to benefit from use of RNR) (c) Profitability (described in either the formal or informal sense – eg. as in profit of a cooperative or net income of a household)	Yes / No / ?
6	**Report language:** English, French, German, Spanish or Portuguese/Brazilian.	Yes / No / ?

If all 'yes's are circled the study is 'in'. If any 'no' is circled the study is 'out'.
If all 'yes's or '?'s are circled the study is 'pending'.

Decision (circle)**:**   **in**   **out**   **pending**

Please note comparison for included studies:
❑   Open access vs controlled access (private ownership)
❑   Open access vs controlled access (common ownership)
❑   Private vs common ownership

Other notes:

Appendix 3. DATA EXTRACTION FORM

Draft data extraction and validity assessment form
"controlled vs. open access"

Study details - Author(s):   Year: Journal ref:

Reviewer:

1	**Study and subject information**	
1a	Research question as expressed in study	
1b	Clarity of question	Done Not done
1c	Type of RNR assessed	Forests fisheries
1d	Country of study plus level of development and geographic region	Country: Low income Middle income Africa Central & East Asia South Asia Latin America
1e	Design – temporal	Concurrent Before-after
1f	Design –methodology	Quantitative Qualitative
1g	Funder	
1h	Researcher bias	Done Partial Not done

	Subjects	**Open access**	**Controlled access (Common or private ownership)**
1i	Number of participants		
1j	Ethnicity		
1k	Gender mix		
1l	Level of poverty		
1m	Degree of reliance on RNR in question		
1n	Other information on participants:		

2	Access structure	Open access		Controlled access (Common or private ownership)	
2a	Description of conditions (describe conditions of access or ownership)	Withdrawal rights Management rights Exclusion rights Alienation rights		Withdrawal rights Management rights Exclusion rights Alienation rights	
2b	Similarity of the geographical areas*				
2c	Ecosystem information				
2d	Context				
2e	Migration info				
2f	Market integration				
2g	Infrastructure access				
2h	Resource abundance				
2i	Effectiveness of RNR use regulation				
2j	Scale of shared use (no. of people/villages)				
2k	Ecosystem services supported				
2l	Ecosystem services not supported				
2m	Duration of rights (infinite/finite)				
2n	Alienability of right				
2o	Year(s) of study				
2p	Time since start of regimen (years)				
2q	RNR Description	Done	Partial	Not done	
2r	Similarity of RNRs	Done	Partial	Not done	Unclear
2s	Temporality	Done		Not done	Unclear
2t	Confounding	Done	Partial	Not done	

For 3 provide quantitative data as feasible, including measures of mean and variance or median and IQ range at baseline and study end, as well as units and descriptions of tools for assessment. For complex and qualitative data use highlighter pen in the original document and state page numbers below.

3	Outcomes	Open access	Controlled access (Common or private ownership)
3a	Sustainable use of RNRs (ability to extend use of RNR into the future)		
3b	Pro-poorness of use (ability of local poor to benefit from use of RNRs, including description of which poor)		
3c	Profitability of use (define types of measures here)		
3d	Measures taken to verify the extent and type of controlled and open access		
3f	Description of conditions	Done Partial	Not done
3g	Outcome ascertainment	Done Partial	Not done Unclear

4	**Additional information and summary**	
4a	Additional validity problems:	
_4b_	Any other validity problems?	Done Not done
4c	Further information	
_4d_	Summary of validity	Risk of bias: Low Moderate High

Appendix 4. DEFINITIONS OF RENEWABLE NATURAL RESOURCES

Standard definitions regarding "fisheries" and "forest" adopted by FAO

(1) FISHERY
"Generally, a **fishery is an activity leading to harvesting of fish. It may involve capture of wild fish or raising of fish through aquaculture.** Other definitions*: A unit determined by an authority or other entity that is engaged in raising and/or harvesting fish. Typically, the unit is defined in terms of some or all of the following: people involved, species or type of fish, area of water or seabed, method of fishing, class of boats and purpose of the activities."

(2) FISHERY RESOURCE
Aquatic Resource: Biotic element of the aquatic ecosystem, including genetic resources, organisms or parts thereof, populations, etc. with actual or potential use or value (sensu lato) for humanity. **Fishery resources are those aquatic resources of value to fisheries**.

IN: FAO Fisheries Glossary- online only
<http://www.fao.org/fi/glossary/>

* Source of "Other definitions" in the FAO Fisheries Glossary: Fletcher, W.J., Chesson, J. Fisher, M., Sainsbury K.J., Hundloe, T. Smith A.D.M., and B. Whitworth (2002): National ESD reporting framework for Australian fisheries: The "How To" guide for wild capture fisheries. FRDC Project 2000/145. Canberra, Australia. p. 119-120.

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(3) FOREST
"Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use." (See also explanatory notes).

(4) OTHER WOODED LAND
"Land not classified as Forest, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds in situ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use."

IN: FAO (2004) Global forest resources assessment update 2005 - Terms and definitions - (Final version). *Forest Resources Assessment Working Paper 83*. p.17.
<http://www.fao.org/docrep/007/ae156e/ae156e00.htm>
<http://www.fao.org/forestry/fra/2005/terms/en/>

Forest definition – FAO FRA "Explanatory notes":

1. Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters in situ. Areas under reforestation that have not yet reached but are expected to reach a canopy cover of 10 percent and a tree height of 5 m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, which are expected to regenerate.

2. Includes areas with bamboo and palms provided that height and canopy cover criteria are met.

3. Includes forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest.

4. Includes windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 ha and width of more than 20 m.

5. Includes plantations primarily used for forestry or protection purposes, such as rubber-wood plantations and cork oak stands.

6. Excludes tree stands in agricultural production systems, for example in fruit plantations and agroforestry systems. The term also excludes trees in urban parks and gardens.

Appendix 5. LIST OF DEVELOPING COUNTRIES

Income groups correspond to 2009 gross national income (GNI) per capita (World Bank Atlas method).
Source: http://data.worldbank.org/about/country-classifications/country-and-lending-groups

Low income	Lower middle income		Upper middle income
Afghanistan	Angola	Sri Lanka	Albania
Bangladesh	Armenia	Sudan	Algeria
Benin	Belize	Swaziland	American Samoa
Burkina Faso	Bhutan	Syrian Arab Rep.	Antigua and Barbuda
Burundi	Bolivia	Thailand	Argentina
Cambodia	Cameroon	Timor-Leste	Azerbaijan
Central African Republic	Cape Verde	Tonga	Belarus
Chad	China	Tunisia	Bosnia and Herzegovina
Comoros	Congo, Rep.	Turkmenistan	Botswana
Congo, Dem. Rep.	Côte d'Ivoire	Tuvalu	Brazil
Eritrea	Djibouti	Ukraine	Bulgaria
Ethiopia	Ecuador	Uzbekistan	Chile
Gambia, The	Egypt, Arab Rep.	Vanuatu	Colombia
Ghana	El Salvador	Vietnam	Costa Rica
Guinea	Georgia	West Bank and Gaza	Cuba
Guinea-Bissau	Guatemala	Yemen, Rep.	Dominica
Haiti	Guyana		Dominican Republic
Kenya	Honduras		Fiji
Korea, Dem. Rep.	India		Gabon
Kyrgyz Republic	Indonesia		Grenada
Lao PDR	Iraq		Iran, Islamic Rep.
Liberia	Jordan		Jamaica
Madagascar	Kiribati		Kazakhstan
Malawi	Kosovo		Lebanon
Mali	Lesotho		Libya
Mauritania	Maldives		Lithuania
Mozambique	Marshall Islands		Macedonia, FYR
Myanmar	Micronesia, Fed. Sts.		Malaysia
Nepal	Moldova		Mauritius
Niger	Mongolia		Mayotte
Rwanda	Morocco		Mexico
Sierra Leone	Nicaragua		Montenegro
Solomon Islands	Nigeria		Namibia
Somalia	Pakistan		Palau
Tajikistan	Papua New Guinea		Panama
Tanzania	Paraguay		Peru
Togo	Philippines		Romania
Uganda	Samoa		Russian Federation
Zambia	São Tomé and Principe		Serbia
Zimbabwe	Senegal		Seychelles
			South Africa
			St. Kitts and Nevis
			St. Lucia
			St. Vincent and Grenadines
			Suriname
			Turkey
			Uruguay
			Venezuela, RB