SUPPLEMENTARY MATERIAL

Challenges and opportunities in coding the Commons: problems, procedures, and potential solutions in large-N comparative case studies

Contents:

Table 1: Matrix of prominent databases containing SES and/or Commons related datasets

Database	Affiliation	Case Studies	Coding Variables	Codebook	Basis
CommonsDB (on long-term dynamics of institutions)[1]	Utrecht University (collective-action.info)	~1000 cases (not currently publicly available)	~100 variables	Codebook available by request	IAD Framework,
Common Pool Resources (CPR) Database	Indiana University & Arizona State University (seslibrary.asu.edu)	87 cases publicly available in the SES Library at ASU	~600 variables	Original codebook developed by Elinor Ostrom et al. (1987)	IAD Framework
Social-Ecological Systems Governance Database (SESGO)	Martin-Luther University Halle-Wittenberg	Currently no data publicly available	~500 variables	No codebook is available[3]	SES Framework
International Forestry Resources and Institutions (IFRI) Database	University of Michigan (ifriresearch.net)	233 case studies (not publicly available)	600+ variables[2]	Coding Manual and Forms are publicly available on website	CPR Database, IAD Framework
Nepal Irrigation Institutions and Systems (NIIS) Database	Indiana University	274 cases (not currently publicly available)	600+ variables[2]	Codebook not currently publicly available	CPR Database, IAD Framework
Social-Ecological Systems (SES) Library	Arizona State University (ASU) (seslibrary.asu.edu)	~130 case studies (not currently publicly available)	CPR variables	Utilizes the original codebook from the CPR database	IAD Framework and Robustness Framework
Social-Ecological Meta-Analysis Database (SESMAD)	Dartmouth University (sesmad.dartmouth.edu)	Currently 9 case studies are publicly available	125 variables[3]	Coding schema and variable definitions are publicly available on website	SES Framework

1. The CommonsDB is focused on the long-term dynamics of commons, guilds, waterboards, and benguinages with some historical data going as far back as the 8th Century.
2. The NIIS and IFRI variables are based on the CPR variables with some modifications.
3. Users of the SESMAD database can propose to add their own cases to the database and can also propose to add and/or combine the SESMAD variables with their own variables within their own case studies.

CENTER FOR BEHAVIOR, INSTITUTIONS & THE ENVIRONMENT

(CBIE)

CODING MANUAL

(Version 2)[1]

NOTE: BASED ON OUR CODING EXPERIENCE, WE BELIEVE THIS CODING MANUAL REPRESENTS AN IMPORTANT FIRST STEP TOWARDS A MORE STANDARDIZED CODING METHODOLOGY FOR THE TEXT ANALYSIS OF SECONDARY DATA. HOWEVER, THIS MANUAL HAS NOT BEEN FULLY REVIEWED OR TESTED AND SHOULD NOT BE CITED OR DISTRIBUTED WITHOUT THE AUTHORS' EXPRESS PERMISSION.

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Acknowledgments: This coding manual has benefited greatly from the intellectual contributions, comments, edits, and support of Marco Janssen, J. Marty Anderies, and the original CBIE[2] project coding team members: Jacopo Baggio, Allain Barnett, Irene Perez Ibarra, David Yu, Cathy Alida Rubiños, Hoon Shin, and Nathan Rollins.

We would also like to acknowledge the Cox, et al. (2010) study from which the revised design principle structure utilized in this manual was borrowed.

Finally, and most importantly, this coding manual aspires to be an extension of Elinor "Lin" Ostrom's (August 7, 1933 - June 12, 2012) work. It is her extraordinary scholarship in common pool resource governance and institutional theories that has provided the foundation, as well as the inspiration, to create this open source codebook. Furthermore, many of the key elements contained in the 1987 Common-Pool Resource Project created by Lin Ostrom, Edella Schlager, and Shui Yan Tang are included in this manual, and we hereby extend our gratitude and appreciation for their work.

The coding manual is a part of the Social-Ecological System (SES) Library at Arizona State University which is funded by National Science Foundation grants *BCS-0527744 and SES-0645789.*

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Original version: March 9, 2015; revised July 8, 2015

[2] Formerly known as the Center for the Study of Institutional Diversity (CSID)

Table of Contents

Introduction

This coding manual is an open source document which can be accessed and used by researchers, students, and practitioners engaged in the analysis of social-ecological or other coupled infrastructure systems (CIS). It builds directly on the work of Elinor Ostrom, Edella Schlager, and Shui Yan Tang who, in 1987, created the common-pool resource (CPR) coding database which has become a part of the Social-Ecological Systems (SES) Library. The original CPR variables, codebook, and case studies are available for review and use at the SES Library's website [https://seslibrary.asu.edu/seslibrary/welcome].

SES Library

The SES Library is located within ASU's Center for Behavior, Institutions & the Environment (CBIE[3]) which was founded in the summer of 2006 by Elinor "Lin" Ostrom (August 7, 1933 - June 12, 2012) as a sister center to the Vincent and Elinor Ostrom Workshop in Political Theory and Policy Analysis at Indiana University.

CBIE, and by extension the SES Library, emerged from the collaborative work between Lin Ostrom, Marty Anderies, and Marco Janssen after their first meeting at a Resilience Alliance workshop in Stockholm in 2000. The core of the SES Library consists of 86 case studies that were initially coded by Lin Ostrom, Edella Schlager and Shui Yan Tang of Indiana State University in the 1980s. The primary goal of the coding analysis project was to gain an understanding of the conditions present in successful social-ecological systems (SES). In 1990, Lin Ostrom utilized the information gleaned from these cases in her seminal work "Governing the Commons" to identify the eight design principles present in successful, long-enduring common pool governance systems and to provide an alternative framework of collective action based on empirical observations. This work was a clear departure from the standard theory of the time which argued that only privatization or governmental regulation could prevent a tragedy of the commons (Hardin 1968).

In "Governing the Commons," Ostrom proved that in many SESs resource users were able to successfully govern their common resources over time. The Institutional Analysis and Development (IAD) Framework was one of the extensions of that work and provided a theoretical basis from which to systematically study institutional arrangements. It was this work that won Lin Ostrom the Nobel Prize for Economics in 2009.

The SES Library continues to be an integral part of the larger innovative cyber-infrastructure of the CBIE. At its core remain the 86 case studies coded by Schlager and Tan under the guidance of Lin Ostrom. These cases can be accessed directly through the SES Library's main page, and the original coding results are available through the SES Library's Common Pool Resource (CPR) database. We encourage users to make use of the SES Library resources, including this coding manual. However, more importantly, we ask that you consider contributing new case studies to the SES Library and provide us with your comments and suggestions to the detailed codebook descriptions provided herein. As we will elaborate further below, we hope that such collaborative efforts will move commons theory towards identifying the universal building blocks underlying the diversity of interactions, institutions, and other linked human-environment interactions that are described within these case studies, as Elinor Ostrom argued would be possible (Ostrom 2005).

[3] Formerly known as Center for the Study of Institutional Diversity (CSID)

Recommended Coding Protocol

This is the recommended Coding Protocol of a team of researchers at Arizona State University following an analysis of the issues raised during a lengthy coding project. For more information on the reasoning behind the establishment of this protocol, please reference "Challenges and opportunities in coding the commons" (Ratajczyk, et al., 2016).

Step One: Preliminary Considerations

There are a number of preliminary considerations which are important prior to content analysis and the coding of texts or other media, including: 1) Formulation of the research questions and agenda; 2) identification of the data set with criteria for case selection and text segmentation; 3) decisions on the use and selection of Qualitative Data Analysis (QDA) software; and 4) coding team formation. Each of these steps can have important impacts on the coding organization and work processes (coding schema).

Formulation of the Research Questions/Agenda

The formulation of research question(s) and agenda are a critical first step in any research design that must come before any data is collected and analyzed (Bernard, 2011). The research question will define the research agenda, including appropriate approaches, hypotheses, data, and methods, etc, which are really the subject matter of research design and beyond the scope of this manual. There are a plethora of available resources on research design for any number of disciplines, which should be consulted prior to commencing with, or even choosing, a content analysis methodology and coding.

Case Selection

Decisions about case selection and subsequent text segmentation are very important steps in the identification of the dataset (Hinds et al., 1997; Stemler, 2001; Weed, 2005). Cases should typically be screened and analyzed for fit based on both their applicability to the research questions and data completeness (Hinds et al. 1997; Stemler, 2001; Weed, 2005). We highly recommend that teams develop a screening process during the identification of the dataset to ensure that cases included in the study have sufficient information to answer the research question. Inclusion and exclusion criteria formally clarify the reasoning behind the selection of cases and segmentation of texts (Hruschka et al., 2004), and should be clearly defined, documented and appropriately reported throughout the research process. It is extremely important for researchers to explicitly consider and document all assumptions and decisions throughout the research process. As Kelder (2005) explains, "these elements soon become familiar and 'disappear' from the researchers' consciousness, and the record provides the context for the collection of data that informs later analysis: (p.6). This information will aid the research team throughout the process, as well as any future consumers of the research.

Text Segmentation

Although data segmentation is largely driven by epistemological considerations, the literature tends to recommend that a text be segmented into smaller units (e.g. a sentence or a paragraph) in order to facilitate better intercoder agreement and reliability (Krippendorff 2013:101), thereby avoiding an increase in the "complexity of coding decisions" (Hruschka, et al. 2004:319) and related coding discrepancies. However, if a researcher is attempting to compare the occurrence

of certain themes or variables across a variety of texts, the whole text can considered the appropriate unit of analysis (Bernard 2011). In either event, text segmentation should be determined and defined prior to proceeding with coding.

Coding Team Formation & Structure

Utilizing two or more coders increases data reliability because coding agreement between different people, who have been given the same instructions and have independently coded the same segments of text, demonstrates a reduction of subjective biases within the study findings and increases trustworthiness (Guest and MacQueen 2008 Chap 10:215).

The question as to how many coders are sufficient to establish data reliability and replicability is an enduring one without a defined answer. We defer to Bernard and Ryan (2010) who encourage researchers to examine their data for two criteria: (1) "the level of inference required to identify themes/coding variables"; and (2) "the prevalence of themes/coding variables" within the texts (p. 306). If coding variables/themes occur frequently, then it is assumed that even inexperienced coders will find at least one supporting example of the variable within the text. However, if coding variables are assumed to be rare and/or difficult to identify due to the high level of inference required to recognize codes within the texts, researchers are encouraged to use more coders to ensure that rare and important themes are not missed.

Since most, although not all, of the data analyzed in the study of the commons is derived from secondary data sources, and the analyses requires examining the texts for the presence and absence of theoretical design principles requiring at times a high level of coder inference, we recommend utilizing 3 coders. However, we also acknowledge that time and budget constraints often drive these considerations. In addition, we recommend that steps be taken, including iterative intercoder reliability spot checks, to monitor and mitigate issues that may arise due to coding team dynamics, such as coder drift and bias. Although each additional coder increases the need for iterative intercoder reliability testing and training to achieve intercoder alignment, two coders per text should be a necessary condition for any meta-analyses.

Qualitative Data Analysis (QDA) Software

Teams should consider the use of QDA software prior to the commencement of the coding process. While QDA software is sometimes expensive and requires training, some studies have found that use of QDA software has been found to aid in increasing rigor and intercoder reliability during the coding process (Denzin and Lincoln, 2000; Rambaree, 2007), allowing coders to identify and tag specific text segments and associate them with a particular category or memo. Although coders can enter their coding results in Excel spreadsheets, such a process is tedious, time-consuming, difficult to verify over time, and subject to entry error. QDA software allows texts coded by individual coders to later be combined and analyzed, thus allowing for easier identification of coding discrepancies (Bernard and Ryan, 2010). Instead, utilizing spreadsheets requires coders to either independently keep track of the segment of text that supports a particular code, and/or manually enter the supporting text passage in a separate column of the spreadsheet. This complicates the coding process and increases coding errors due to issues such as failure to keep track of supporting text, losing documentation, and entering supporting information in the wrong field of the spreadsheet. In contrast, QDA software facilitates the marking and tagging of texts with codes, eliminating the need to manually keep track of supporting text passages. Furthermore, most QDA software facilitates blind-coding by different coders and the subsequent merging of codes from various coders into a final document

for further detailed analysis of coding discrepancies, including intercoder reliability ratings. We do not specifically endorse particular QDA software, but recommend teams take advantage of free trial periods to test individual programs' usefulness prior to commencing coding. The guidelines in this coding protocol should be broad enough to support a variety of code tracking setups, including, if necessary, spreadsheets.

Step Two: Coding Process

Definition of Coding Schema (Categories and Organization)

A coding schema is defined as the coding rules, organization, and work process knowledge used in the coding process. The term "schema" is defined as the organization and structure for a database as often used in computer programming literature. Thorough definition and documentation of the coding schema may be important in mitigating problems of missing data and interpretations of concepts (MacQueen et al., 1998; Medjedović & Witzel, 2005; Stemler, 2001). Initial definition of the coding schema for a comparative or meta-analysis project involves the theoretical interpretation of categories and organization of the relational database (Hruschka et al., 2004; MacQueen et al., 1998; Guest and MacQueen, 2008; Mayring, 2000; Weed, 2005).

The theoretical interpretation of categories refers to a deductive approach to specifying themes, codes, or variables which will be searched for and coded within the texts and which are based on a defined body of theory (Weed, 2005). The organization of the relational database simply refers to the way that the data will be organized in the database. We recommend that coding schema definition include explicit consideration and documentation of the organization and work processes to be used during the coding process, the development of detailed coding variable descriptions, and the iterative and consensus-based definition of theoretical categories by the entire coding team. These steps will help to increase inter-coder reliability ratings as well as the reliability and replicability of the results.

The development of theoretical categories, or themes, is a primary goal of coding (Hruschka et al., 2004). This can be either deductively or inductively. A deductive approach derives from established theories and hypotheses and seeks to confirm or falsify them with empirical observations while an inductive approach seeks to develop theoretical explanations from empirical observations (Bernard, 2011). The coding process described in this manual is focused on the deductive approach, where coding questions are derived from selected theories and hypotheses related to the research agenda. Coding questions are assigned are assigned a variable name and specified answers from which coders may choose, which may be on any type of scale from the simple binary of "yes/no" or "presence/absence" to multiple choices, likkert scales, and more. It is important to consider that more complex answer options lead to increased complexity in the organization of the database and in achieving intercoder alignment, training, intercoder reliability testing, and analysis. We recommend that detailed coding variable descriptions be developed and iteratively tested and refined in order to minimize these challenges in the coding process.

Development of Detailed Coding Variable Descriptions

The development of detailed coding variable descriptions and documentation within a formal codebook can be very helpful to facilitating the coding process and increasing alignment between coders. We recommend that a consensus-based process of codebook development, based on the previous definition of the coding schema, sample coding, and intercoder reliability testing be included in the coding process. This can be considered part of coder training.

Discussions on the development of codes and theoretical categories among the coding team will likely result in increased understanding of key issues and variables to be coded. Training should also include coder instruction in the use of any selected QDA software.

The coding variables provided with this coding manual are a synthesis of coding questions developed by Lin Ostrom, Edella Schlager, and Shui Yang Tan during their CPR coding project in the mid to late 1980s, as well as additional variables created by members of the CBIE team during a large-scale coding project in 2013-2014. We have provided these as an example. Further information on the CBIE coding project, can be found in "Challenges and opportunities in coding the commons" by Ratajczyk, et al. (2016).

In order to describe the coding variables in enough detail so that coders are independently able to identify and tag a code in texts, the methods literature recommends that each coding variable (question) be given a one-page detailed explanation, (MacQueen, et al. 2008 Chap 6:121-122, Bernard & Ryan 2010), with the following ten-component format:

- Code title and name (e.g. Code 13: Equity level over time)
- Variable name: provides the code mnemonic and the coding question it relates to (e.g. BEGCONDP (Question #4a)
- Theory area: identifies the underlying theory to which the variable is linked (e.g., Outcomes – Resource Sustainability).
- Short description: short phrase that communicates to the coder what the coding variable is looking for (e.g., condition of public production infrastructure at beginning of time)
- Detailed description: Detailed explanation as to what information the coding variable is looking for.
- Inclusion criteria: List features or conditions that would automatically require that a text segment be coded with this specific variable.
- Exclusion criteria: List specific features or conditions that would automatically exclude a text segment from being coded with this variable.
- Typical exemplars: Typical examples of instances where a particular code would apply.
- Atypical exemplars: Examples of less common instances where a particular code would apply.
- Close, but no: Examples of ambiguous instances where coders may feel that the code applies, but it does not.

Recommended Sample Coding Procedure

We recommend that the principal investigator and all coding team members independently test code a randomly selected subset of the actual dataset, followed by formal intercoder reliability testing of the results until acceptable levels of intercoder reliability ratings have been reached. We provide the following recommended procedures for sample coding and testing:

- Following MacQueen, et al.'s (2008) recommendation, we encourage research teams to review and discuss their coding variables thoroughly with the involvement of all coders until everyone is familiar with the codes.
- The next step is for the principal investigator and members of the coding team to independently test code the coding questions on a subset of the data (either select case studies or passages of text from within designated case studies).
- Test coding should be followed up with an assessment of intercoder agreement (at minimum simple percent agreement which is then compared to an intercoder reliability

statistic that takes chance into account, such as Krippendorff's alpha or Cohen's/Fleiss' kappa).

- Based on the intercoder reliability ratings and feedback from the coding team, the codebook variables should be revised to address ambiguities and problems.
- Once the coding descriptions have been revised, iterative rounds of test coding are conducted with subsequent intercoder reliability testing and coding variable adjustments until acceptable intercoder agreement has been reached (MacQueen, et al. 2008 Chap 6:130-131; Hruschka 2004:325, Bernard 2011:448). For more information on acceptable intercoder agreement ratings, see the "Intercoder reliability statistics" section below.
- Once acceptable intercoder reliability ratings have been reached, the team commences with coding the entire dataset.
- To ensure continued coding reliability and prevent coder drift, we recommend that the principal investigator continue spot-checking intercoder reliability throughout the entire coding process in order to prevent "coder drift" or "coder bias" (Carey and Gelaude 2008 Chap 11:251). Codebook revisions should also continue throughout the coding process, as necessitated by coder questions and requests for clarification.

Step Three: Intercoder Reliability Testing

Intercoder reliability testing is important in the test coding phase to identify and mitigate any coder questions and/or ambiguities in the coding variable descriptions. The methods literature recommends formal intercoder reliability testing on a subset of the dataset, as well as iterative intercoder agreement testing throughout and after the formal coding process (Hruschka et al. 2004; MacQueen et al. 1998; Guest and MacQueen 2008, Mayring, 2000). Spot-checking coder reliability throughout the coding process is necessary to prevent coder bias/drift from setting in and affecting coding results. Once the entire dataset has been coded, formal intercoder reliability ratings should be calculated to determine the overall agreement among coders.

Calculation of Intercoder Agreement

For coding projects involving two or more coders and coding values that are nominal and multiple, Krippendorff's alpha, Fleiss' kappa, and/or percent agreement are recommended (Feng, 2014). Krippendorff's alpha is a generalization of several different reliability indices which is capable of calculating agreement among an infinite number of coders and any number of scale values (Krippendorff, 2013). It is a robust measure that can accommodate missing and/or incomplete data and any sample size from small to large (Krippendorff, 2013; Bernard and Ryan, 2010). Fleiss' kappa is a variant of the Cohen's kappa statistic and allows for more than two coders while also measuring agreement with respect to chance (Bernard and Ryan, 2011; Bernard, 2011). Because it does not account for chance, simple percent agreement tends to overestimate intercoder reliability (Hruschka et al., 2004; Feng, 2014), but is still considered appropriate to use in conjunction with other measures if the variables analyzed are nominal (Feng, 2014) and can help to determine whether intercoder reliability ratings obtained through other statistical techniques may be skewed due to particularly high agreement or missing values.

The open source statistical program R (R Core Team, 2013) has programming scripts to calculate all three of these recommended statistics. We have included modified scripts within this manual which were used to analyze intercoder agreement of all three statistics for the attached variables utilizing the irr-package in R (Gamer, et al. 2012). These scripts are available for download through the SES Library.

Data Preparation

Intercoder reliability testing, as recommended here, requires some data preparation. We provide here an example related to the coding project described in Ratajczyk et al., 2016, as an illustration of the data preparation required for formal intercoder reliability testing.

An informal approach to intercoder agreement was utilized by the CBIE team and no formal intercoder reliability ratings were calculated during the main coding process (Ratajczyk et al., 2016). Because there was a sense among coders that intercoder agreement was not high, however, *post hoc* calculations of intercoder reliability ratings were subsequently performed to examine the overall intercoder agreement by team, but also to determine which coding variables were more difficult to identify within the texts (see Baggio et al., 2016).

In order to unify the coding data and minimize bias due to incompatible comparisons, cases which did not include the standard three-coder-team were eliminated from the intercoder reliability analysis, including five cases reported in Spanish and coded by only two coders. Since intercoder reliability ratings require a comparison of more than one case per team, four groups that only coded one case study together were also removed, leaving a total of thirteen coding groups and sixty cases for intercoder reliability testing. Individual coding results were extracted from the group coding spreadsheets (Fig. 2) for each coder and case in order to create individual spreadsheets for these groups with the group coding results removed.

SECDESC	Cox Case	Group	Coder	1a.BEGQUAL	1b.ENDQUAL	NotesQUAL	2a.BEGCONDA
Rural coastal fishing village 50km south of Mombasa, Kenya	1	AEN	A	-1	-1	It says the stocks decline but does not mention the quality of the fish.	-2
Rural coastal fishing village 50km south of Mombasa, Kenya			E	-1	4	pg. 2773 mentions the decline of fish stocks in the area	-2
Rural coastal fishing village 50km south of Mombasa, Kenya			N	-1	3		-1
Rural coastal fishing village 50km south of Mombasa, Kenya			Group	-1	-1		-1

Figure 2: Excerpt of coding results by case study (column SECDESC) and coding group (AEN). The coding results displayed are the codes for individual coders "A", "E", "N", as well as the agreed-upon "Group" code. This excerpt reveals the coding results for coding variables 1a ("BEGQUAL"), 1b ("ENDQUAL"), as well as notes entered by individual coders in support of their responses ("NotesQUAL"). The blue color of column "1b ENDQUAL" indicates a disagreement between coders which was resolved by group agreement for the resulting group code of -1 MIC, indicating that the group decided that there was not enough information in the text to make a decision.

The coding values utilized in the project were nominal and varied significantly. Although the bulk of the codes were structured in binary format (0/1 – absence/presence), coders could also code a value of (-1) to indicate that the information was "missing in case (MIC)" or (-2) to indicate that the question was not applicable to the examined text. Additionally, many of the variables testing for environmental and social conditions included values that were on a scale

from 1 (extremely good) to 5 (extremely poor), To address this coding value complexity, the following steps were necessary:

- Coding values of (-2) were converted to (-1) values. While distinctions between information missing in text (-1) or not applicable (-2) may be important to the overall analysis, both code values indicate an absence of enough information to answer the question. Removing the distinction between (-1) and (-2) prior to testing for intercoder reliability, therefore, does not result in a data bias, but does serve to reduce variability in intercoder reliability testing due to coder subjectiveness and/or coding mistakes, e.g., two coders believe there is not enough information to answer the question, but one uses code (-1) and the other (-2) resulting in a lack of agreement where, for intercoder testing purposes, there really is none.
- In instances where coding values were given as range of values (e.g. (4,5) or (1,2), the comma was removed from the coding values, thereby converting the coding results to simple numbers, i.e. (4,5) was converted to 45 and (1,2) to 12. This modification is justified because the coded values are not changed but merely converted into a format that can be interpreted by the software. Such alteration does not result in data bias and prevents programming errors during intercoder reliability testing.

The coding variables were then grouped into broad categories (environmental, social, success, and one for each of the eight original design principles = 11 categories), generally following the sections outlined in Table 3, except that variables testing for collective choice and equity were combined in the "social" category, and DPs 1a/1b, 2a/2b, and 4a/4b were combined into DP categories 1, 2, and 4, respectively. This was done to simplify the intercoder testing process and did not result in a bias, since the statistics still tested each variable by coding team. However, the preparation time for the data sets was greatly reduced, since now only 11 spreadsheets per coding team had to be created, instead of the 15 outlined in Table 3. Each spreadsheet so created contained the coding value by coder for each variable in the data set for each of the case studies assigned to a particular team (Fig. 3).

Var147 = Variable 14 (Success) + Case Study #7

A	B	C	D	E	F	G
VarCase	Var142	Var143	Var144	Var145	Var146	Var147
A	1	1	1	0	0	0
C	1	1	1	0	0	0
H	1	1	1	0	0	0

Figure 3: Example of coding team results by variable and case study. Column A ("VarCase") lists the coders ("A", "C", and "H"). Column B ("Var142") reflects each coder's answer for variable 14 ("Success") for case study number 2. Column C ("Var143") reflects each coder's answer for variable 14 ("Success") for case study number 3, etc. A code of "1" indicates the coders deemed the case study to be a "success", whereas a code value of "0" indicates no success.

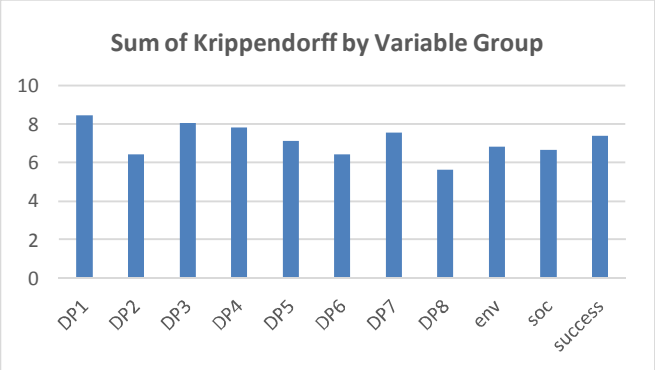
Determining Acceptable Intercoder Reliability Ratings

Krippendorff (2013) recommends drawing study conclusions only from coded variables with reliabilities above 0.800, although variables with reported reliabilities in the range of 0.667 to 0.800 could be used to draw tentative conclusions. Landis and Koch (1977) outlined a set of values that mark different agreement levels based on the value of Fleiss' kappa: <0.00 Poor;

0.00-0.20 slight; 0.21-0.40 fair, 0.41-0.60 moderate, 0.61-0.80 substantial, and 0.81-1.00 almost perfect. Generally, researchers consider kappa values of >0.80 as evidence of high reliability, and values in the range of 0.70 to 0.79 are deemed acceptable, however, these standards are "ad hoc" and still evolving (Bernard and Ryan, 2010). The desired range of value for simple percent agreement is ≥ 85% (MacQueen et al., 2008). As previously outlined, in our study, simple percent agreement values were used solely to assess the robustness of the other two coder agreement statistics.

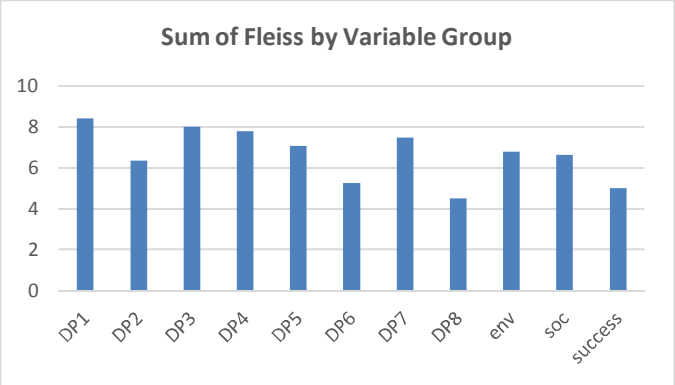
Before evaluating whether coding agreement reached high (>0.80) or acceptable (0.70 to 0.79) levels of reliability, simply adding the Krippendorff and Fleiss values by variable group and coding team provided a first insight into those variable groups/teams with high/low scores. Figures 4 through 7, for example, reveal DP1 (clearly defined boundaries) and coding team "AEN" as those with the highest intercoder agreement. In contrast, DP8 (nested governance) and team "ACH" had the lowest intercoder agreement. For codebook and coding protocol development purposes, such initial high/low values can be important bellwethers of particularly well or poorly functioning coding questions/teams which require further investigation in order to strengthen intercoder agreement across all variables and teams.

Evaluating the mean and median values of the intercoder agreement scores (Krippendorff and Fleiss statistics only) further confirmed the findings from the simple summary calculations. However, the mean/median values also revealed skewing of the data for variables success (only Krippendorff), DP5, DP6, and less so for DP2 and DP3 (Fig. 8) as well as for many of the coding teams (Fig. 9). This skewing in variable groups is likely due to the influence of missing values on the mean value which is more easily influenced by outliers. The skewing of mean/median values in the coding teams may also be indicative of coding team dynamics. An in-depth discussion of these issues goes beyond the scope of this paper and will be addressed at a later time.



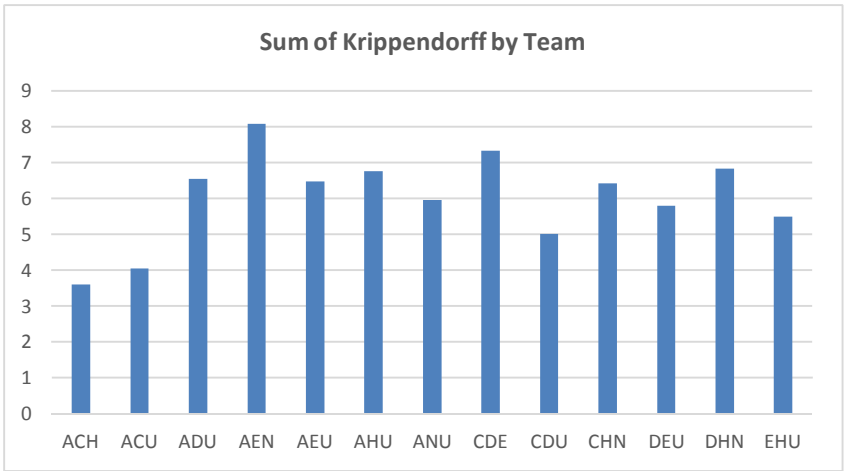
Variable Group	Sum of Krippendorff
DP1	8.462
DP2	6.431
DP3	8.043
DP4	7.813
DP5	7.136
DP6	6.416
DP7	7.543
DP8	5.626
env	6.812
soc	6.662
success	7.370

Figure 4: Sum of Krippendorff values by variable group for all coded cases. Results indicate that generally Design Principle 1(DP1) had the highest overall intercoder agreement and Design Principle 8 (DP8) the lowest.



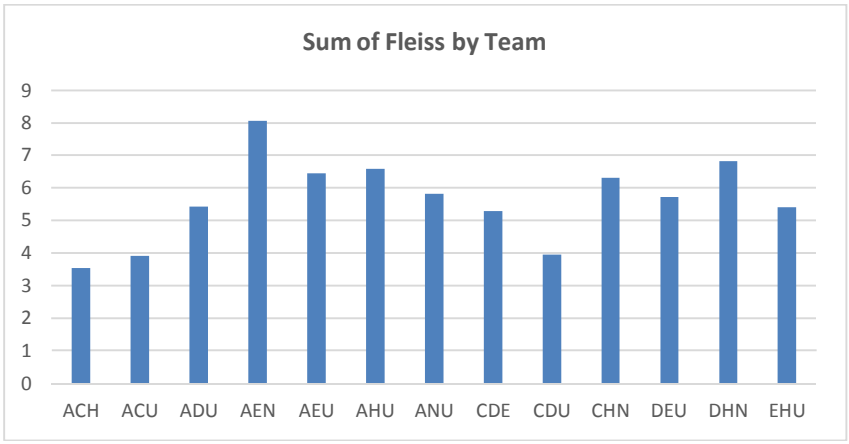
Variable Group	Sum of Fleiss
DP1	8.409
DP2	6.352
DP3	8.008
DP4	7.784
DP5	7.065
DP6	5.258
DP7	7.474
DP8	4.519
env	6.785
soc	6.621
success	5.003

Figure 5: Sum of Fleiss values by variable group for all coded cases. Results are similar to Krippendorff values further confirming Design Principle 1 (DP1) as the variable with the highest intercoder agreement and Design Principle 8 (DP8) with the lowest.



Team	Sum of Krippendorff
ACH	3.598
ACU	4.055
ADU	6.545
AEN	8.078
AEU	6.473
AHU	6.749
ANU	5.947
CDE	7.324
CDU	5.006
CHN	6.416
DEU	5.792
DHN	6.831
EHU	5.500

Figure 6: Sum of Krippendorff values by coding team/all cases coded. Results reflect highest coder agreement for team AEN and lowest coder agreement for team ACH.



Team	Sum of Fleiss
ACH	3.538
ACU	3.910
ADU	5.422
AEN	8.059
AEU	6.443
AHU	6.592
ANU	5.827
CDE	5.292
CDU	3.949
CHN	6.307
DEU	5.722
DHN	6.816
EHU	5.401

Figure 7: Sum of Fleiss values by coding team/all cases coded. Results are similar to Krippendorff values confirming highest coder agreement for team AEN and lowest for team ACH.

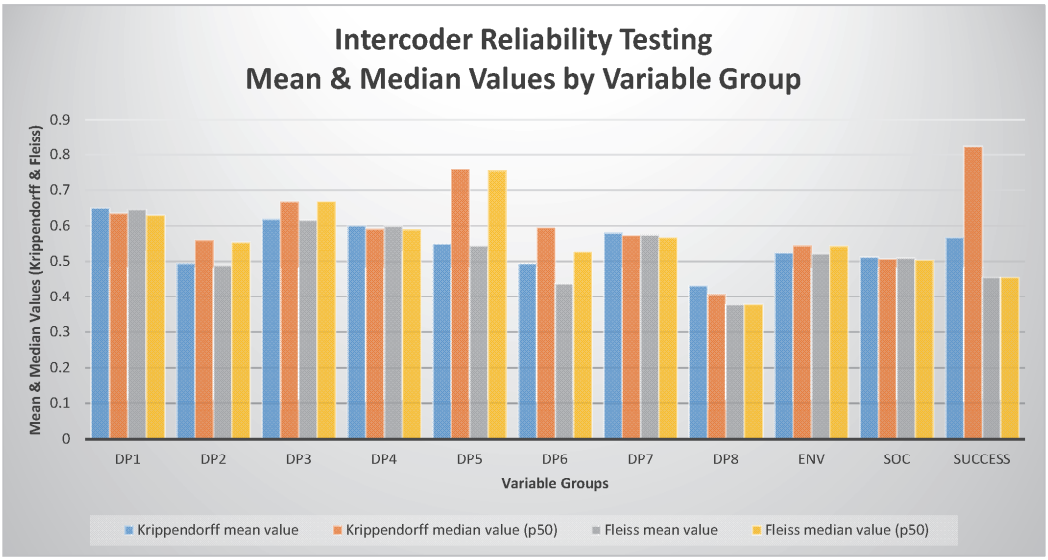


Figure 8: Mean and median values by variable group for Krippendorff and Fleiss intercoder statistics

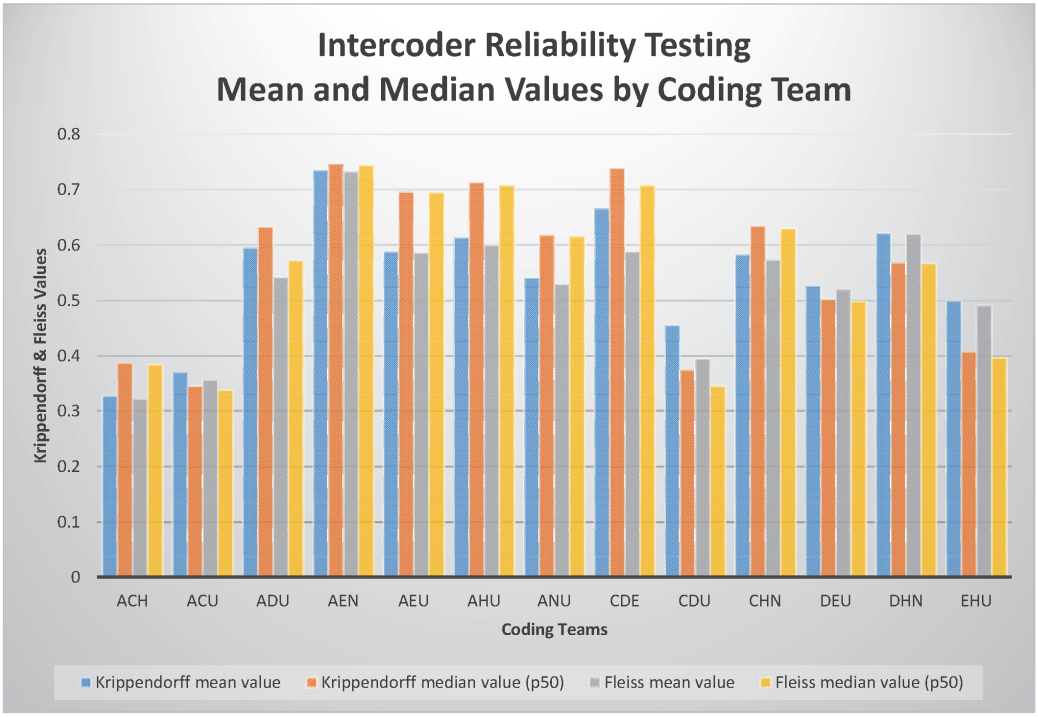


Figure 9: Mean and median values by coding team for Krippendorff and Fleiss intercoder statistics

Reporting of Results

The results of the intercoder reliability testing should be reported within the overall study reports, along with explicit disclosure of assumptions made during the preliminary steps of the project, coding schema development, and throughout the coding process. These materials may be included in the supplementary materials, in the interest of page space, but should not be omitted. These materials are extremely important for establishing the validity of the study and facilitating future replicability and further research efforts.

Concluding Remarks

By providing this coding protocol, we hope to create a collective action forum in which scholars, students, and practitioners can come together and collaboratively develop a more unified methodological approach to the analysis of complex SES/CIS. We believe that the tendency to not disclose supplementary coding information and the reluctance to perform intercoder reliability ratings creates a positive feedback loop that inhibits a deeper examination of the study findings across institutions and fields of study, including the replication and cross-comparison of data. It was one of Lin Ostrom's deep convictions that beneath the vast diversity of regularized coupled human-built and natural infrastructure processes lies a set of universal building blocks which can be tapped to create adaptive and long-enduring governance systems (Ostrom 2005:5-6). As admirers of her teachings and followers of her theories, we at CBIE owe it to her to work towards creating a methodology that will foster cooperation and cross-comparison of the data we collect and analyze. By sharing our coding protocol, we are sharing what we believe is a useful tool for others to utilize, criticize, improve upon, but above all as a means of collaboration. In doing so, we hope to move the field forward to tackle some of the world's most intractable problems. We invite you to join us in this endeavor.

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Glossary of Terms

Action arena: An action arena is a key component of the IAD framework that connects participants to an action situation (Anderies and Janssen 2013). The action arena is the sphere in which participants and an action situation interact with each other and where they are affected by exogenous variables to produce outcomes that in turn affect the participants and the action situation (Ostrom 2005). The concept of an arena can include formal settings, such as legislatures and courts, but it can also simply represent a situation in which a particular type of action occurs (Ostrom 1990).

Appropriation: The process of withdrawing resources from a resource unit (Ostrom 1990). Appropriation is (1) the allocation (e.g. harvesting) or (2) setting aside (e.g. non-use, conserving,

preservation like a water tank or marine reserve) of the flow of resource units from the resource system and the conflict of this process that arises between appropriators. Originally,

Appropriation problems are one of two broad classes of CPR problems (provisioning problems is the other). Appropriation problems are time-independent (Ostrom, Schlager, Tang & Anderson 1987).

The actual structure of appropriation problems depends on the particular configuration of the physical world, the rules in use, and the attributes of appropriators (Ostrom, Schlager, Tang & Anderson 1987).

When appropriation problems are not solved, individuals tend to invest more inputs than are economically needed to earn the highest return on the effort or to have substantial interference as among the efforts of different appropriators. In either case, the net yield that could have been returned (called rents by natural resource economists) is dissipated. In an open access CPR, over-appropriation is likely to be endemic (Gordon, 1954; Scott, 1955). In a limited access CPR, over-appropriation may be less severe, depending on the appropriation rules, monitoring, and enforcement. If the spatial and temporal distribution of resource units is heterogeneous and uncertain, there exists conflict in the assignment of appropriation rights (Ostrom, Schlager, Tang & Anderson 1987).

Appropriation infrastructure: Hard or soft infrastructure that facilitates the allocation (e.g. harvesting) or setting aside (e.g., non-use, conserving, preservation) of common pool resources. Resource units are appropriated from resource systems (e.g. the tons of fish harvested from a fishing ground or the acre feet of water withdrawn from a groundwater basin or an irrigation canal). The appropriation process can be simultaneous or sequential (Ostrom, Schlager, Tang & Anderson 1987). [Note (ub): I included soft infrastructure (rules), as well as non-use in my draft definition of appropriation because I believe non-use of a resource (foregoing appropriation/setting aside resources) is an important aspect of resource governance currently not covered in the coding variables testing for initial conditions.]

Arena: An "arena" is defined as a particular place, time, or occasion for appropriators to gather to communicate CPR conditions with each other. An arena does not have to be an official venue, such as a meeting hall. Arenas can be venues to deal with conflict-resolution matters, but do not have to be.

Collective action: A group of individuals who voluntarily organize themselves to retain the residuals of their own efforts (e.g., fishing/agricultural cooperative) (Ostrom 1990).

Common pool resource (CPR): A sufficiently large natural or human-constructed resource (water, trees, fish, the Internet) from which it is (1) difficult and costly (but not impossible) to exclude or limit users/potential beneficiaries from obtaining the benefits of its use (non-excludable); and (2) the consumption of resource units by one user yields less units available to other users (subtractable) (Ostrom, et al. 1987, Anderies & Janssen 2013).

Coupled infrastructure system (CIS): In contrast to social-ecological systems, the term CIS suggests that there are only infrastructure systems (e.g., genomes, legal systems, knowledge systems, natural systems, etc.) that provide affordances when combined with each other and produce the mass and information flows humans value. Generally, the examination of CIS entails analyzing the interactions between natural (e.g. ecosystems), hard human-made (e.g.

technology), and soft human-made (institutions) infrastructures and related outcomes that create social dilemmas related to public good provisioning and resource governance (Anderies and Janssen 2015).

Collective-choice rules: Collective-choice rules affect operational activities and results through their effects in determining who is eligible to be a participant and the specific rules to be used in changing operational rules (Ostrom 2005, 58).

Constitutional-choice rules: Constitutional-choice rules first affect collective-choice activities by determining who is eligible to be a participant and the rules to be used in crafting the set of collective-choice rules that, in turn, affect the set of operation rules (Ostrom 2005, 58)

De facto: In fact, in deed, actually. This phrase is used to characterize an officer, a government, a past action, or a state of affairs which exists actually and must be accepted for all practical purposes, but which is illegal or illegitimate. In this sense it is the contrary of de jure, which means rightful, legitimate, just, or constitutional (Black's Law Dictionary 2015a). De facto means a state of affairs that is true in fact, but that is not officially sanctioned. De facto refers to situations that are true for practical reasons (Washington University School of Law 2015).

De jure: Legitimate; by right and just title. In this sense it is the contrary of "de facto" (Black's Law Dictionary 2015b). De jure rights are often written down, but do not have to be. De jure means a state of affairs that is in accordance with law (i.e. a formal matter that is officially sanctioned) (Washington University School of Law 2015).

Nested enterprises: When CPRs are larger, robust systems are often characterized by the presence of governance activities organized in multiple layers of nested enterprises (Ostrom 2005).

Operational rules: Operational rules directly affect day-to-day decision-making by the participants/resource users in any setting. Operational rules can change rapidly and be different from day to day (Anderies and Janssen 2013). Operational rules are rules-in-use dealing with the regulation of resource extraction/appropriation.

Rules-in-use: In training researchers to identify and measure institutions, we stress the concept of rules-in-use rather than focusing on rules-in-form. Rules-in-use are referred to whenever someone new (such as a new employee or a child) is being socialized into an existing rule-ordered system of behavior. They are the dos and don'ts that one learns on the ground that may not exist in any written document. In some instances, they may actually be contrary to the dos and don'ts that are written in formal documents. Being armed with a set of questions concerning how X is done here and why Y is not done here is a very useful way of identifying rules-in-use, shared norms, and operational strategies (Ostrom 2010)

Social-ecological system (SES): The interaction of two distinct domains/complex systems (the social and the ecological system) that operate by their own logic but can also interact with each other (Anderies and Janssen 2015). In the past the term SES was used to refer to a subset of social systems in which some of the interdependent anthropogenic relationships are mediated through interactions with biophysical and non-human biological units (Anderies, Janssen and Ostrom 2004).

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Coding Questions

OUTCOMES: Resource sustainability

1. As of the beginning and end of this period, characterize the quality of the units being withdrawn:

1a. BEGQUAL	1b. ENDQUAL
(1) Extremely high quality	(1) Extremely high quality
(2) High quality	(2) High quality
(1,2) Extremely high or high quality	(1,2) Extremely high or high quality
(3) Passable	(3) Passable
(4) Poor quality	(4) Poor quality
(5) Extremely poor quality	(5) Extremely poor quality
(4,5) Poor or extremely poor quality	(4,5) Poor or extremely poor quality
(-1) MIC	(-1) MIC
(-2) NA	(-2) NA

2. As of the beginning and end of this period, how well-maintained is the appropriation resource?

2a. BEGCONDA	2b. ENDCONDA
(1) Well maintained - excellent working order	(1) Well maintained - excellent working order
(2) Moderately well maintained - good working order	(2) Moderately well maintained - good working order
(1,2) From well to moderately well maintained	(1,2) From well to moderately well maintained
(3) Some-resource deterioration occurring due to insufficient maintenance	(3) Some-resource deterioration occurring due to insufficient maintenance
(4) Considerable resource deterioration occurring due to poor maintenance	(4) Considerable resource deterioration occurring due to poor maintenance
(3,4) Some or considerable resource deterioration, insufficient or poor maintenance	(3,4) Some or considerable resource deterioration, insufficient or poor maintenance
(5) Considerable resource deterioration, but due to a natural disaster	(5) Considerable resource deterioration, but due to a natural disaster
(-1) MIC	(-1) MIC
(-2) NA	(-2) NA

3. As of the beginning and end of this period, how well-maintained is the distribution resource (if this is different from the appropriation resource)?

3a. BEGCONDD	3b. ENDCONDD
(1) Well maintained - excellent working order	(1) Well maintained - excellent working order
(2) Moderately well maintained - good working order	(2) Moderately well maintained - good working order
(1,2) From well to moderately well maintained	(1,2) From well to moderately well maintained
(3) Some-resource deterioration occurring due to insufficient maintenance	(3) Some-resource deterioration occurring due to insufficient maintenance
(4) Considerable resource deterioration occurring due to poor maintenance	(4) Considerable resource deterioration occurring due to poor maintenance
(3,4) Some or considerable resource deterioration, insufficient or poor maintenance	(3,4) Some or considerable resource deterioration, insufficient or poor maintenance
(5) Considerable resource deterioration, but due to a natural disaster	(5) Considerable resource deterioration, but due to a natural disaster

(-1) MIC
(-2) NA

(-1) MIC
(-2) NA

4. As of the beginning and end of this period, how well-maintained is the production resource (if this is different from the appropriation or distribution resource)?

4a. BEGCONDP
(1) Well maintained - excellent working order
(2) Moderately well maintained - good working order
(1,2) From well to moderately well maintained
(3) Some-resource deterioration occurring due to insufficient maintenance
(4) Considerable resource deterioration occurring due to poor maintenance
(3,4) Some or considerable resource deterioration, insufficient or poor maintenance
(5) Considerable resource deterioration, but due to a natural disaster
(-1) MIC
(-2) NA

4b. ENDCONDP
(1) Well maintained - excellent working order
(2) Moderately well maintained - good working order
(1,2) From well to moderately well maintained
(3) Some-resource deterioration occurring due to insufficient maintenance
(4) Considerable resource deterioration occurring due to poor maintenance
(3,4) Some or considerable resource deterioration, insufficient or poor maintenance
(5) Considerable resource deterioration, but due to a natural disaster
(-1) MIC
(-2) NA

5. For biological resources at the beginning and end of this period, the balance between the quantity of units withdrawn and the number of units available is*:

5a. BEGBLNC
(1) Extreme shortage
(2) Moderate shortage
(1,2) Shortage
(3) Apparently balanced
(4) Moderately abundant
(5) Quite abundant
(4,5) Abundant
(-1) MIC
(-2) NA

5b. ENDBLNC
(1) Extreme shortage
(2) Moderate shortage
(1,2) Shortage
(3) Apparently balanced
(4) Moderately abundant
(5) Quite abundant
(4,5) Abundant
(-1) MIC
(-2) NA

*In fisheries and other biological systems, this is the maximum sustainable number of units.

6. During this period, has the condition of this resource improved, remained the same, or worsen due to the appropriators' use? <RESCOND>
(1) Improved
(2) Remained the same
(3) Worsen
(-1) MIC

OUTCOMES: Process of collective choice arrangements

7. As of the beginning and end of this period, how would you characterize the levels of mutual trust described among appropriators?

7a. BEGTRUST
(1) Moderate to high level of trust (e.g. oral promises given high credence)
(2) Modest levels of trust (e.g. oral promises are used but appropriators may be uncertain about performance)
(1,2) From moderate to modest levels of

7b. ENDTRUST
(1) Moderate to high level of trust (e.g. oral promises given high credence)
(2) Modest levels of trust (e.g. oral promises are used but appropriators may be uncertain about performance)
(1,2) From moderate to modest levels of

trust
(3) Low levels of trust (e.g. oral promises rarely used)
(-1) MIC
(-2) NA

trust
(3) Low levels of trust (e.g. oral promises rarely used)
(-1) MIC
(-2) NA

8. During this period, has the level of trust among appropriators improved, remained the same, or worsen? <TRUSTLEVEL>
   (1) Improved
   (2) Remained the same
   (3) Worsen
   (-1) MIC

9. Characterize the usual of the appropriators with respect to local operational level rules-in-use related to the appropriation process from this resource in years other than extreme shortage: <RULEFOLI>
   (1) Almost all members follow the rules
   (2) Most members follow the rules
   (1,2) More than half of the members follow the rules
   (3) About half of the members follow the rules
   (4) Most members do not follow the rules
   (5) Almost all members do not follow the rules
   (4,5) Less than half of the members follow the rules
   (-1) MIC
   (-2) NA

OUTCOMES: Equity among users

10. Are there any appropriators who have been consistently disadvantaged in this period? <REALOSER>
    (1) Yes
    (0) No
    (-1) MIC
    (-2) NA

11. Have the relatively worst off been cut out of their benefits from this resource or substantially harmed? <WORSTOFF>
    (1) Yes
    (0) No
    (-1) MIC
    (-2) NA

12. By the end of the situation, would you characterize the distance between those who are the least advantaged and those who are the most advantaged as increasing, constant, or decreasing? <RELEQUTY>
    (1) Increasing over time
    (2) Remaining relatively constant over time
    (3) Decreasing over time
    (-1) MIC
    (-2) NA

13. During this period, has the level of equity among appropriators increased, remained the same, or decreased? <EQUITYLEVEL>
    (1) Increased
    (2) Remained the same
    (3) Decreased
    (-1) MIC

DESIGN PRINCIPLES: 1A User boundaries

14. Is the set of individuals who have rights to withdraw from this resource well-defined? <WELLDEFN>:
    (1) Yes
    (0) No
    (-1) MIC
    (-2) NA

DESIGN PRINCIPLES: 1B Resource boundaries

15. The boundary of the resource is primarily a result of: <BOUNDAR2>
    (1) Natural/constructed attributes which limit entry
    (2) Natural/constructed attributes which do not limit entry
    (3) Institutional arrangements
    (4) Natural/constructed and institutional arrangements which limit entry
    (5) Natural/constructed and institutional arrangements which do not limit entry

DESIGN PRINCIPLES: 2A Congruence with local conditions

16. In your estimation, are the rules-in-use flexible in dealing with times of emergency or unusual problems facing particular members of the group of appropriators? <FLEXIBLE>
    (1) Yes
    (0) No
    (-1) Don't Know

DESIGN PRINCIPLES: 2B Appropriation and provision

17. In your estimation, are the rules-in-use perceived by members of this group of appropriators as fair? <FAIR>
    (1) Yes
    (0) No
    (-1) Don't Know

DESIGN PRINCIPLES: 3 Collective-choice arrangements

18. Do the group of appropriators have options* to express their needs and concerns to those official of the group's organization who make collective choice decision in relation to the resource? <EXPOWN>
    (1) Yes, at least one of these activities are used
    (0) No, none of these activities are used
    (-1) MIC
    (-2) NA

    *Options may include: elections, formal petitions, formal hearings, advice and consent on nominations to non-elected positions, demonstrations, general meetings, illegal exchange with officials or other activities.

19. Is the chief executive(s) or administrator(s) position(s) filled by appropriators? <EXECAPR>

(1) Yes
(0) No
(-1) MIC
(-2) NA (no executive positions)

19.1 If yes, how?
(1) Through direct or indirect elections by appropriators
(2) Appointed by external government
(3) Through inheritance
(4) Others: _____
(-1) MIC

19.2 If appointed by external government, do appropriators participate in the election?
(1) The chief executive(s) or administrator(s) position(s) is appointed by external government with active advice by appropriators
(2) The chief executive(s) or administrator(s) position(s) is appointed by external government without active advice by appropriators
(-1) MIC

20. Has this group of appropriators proposed action in a collective-choice or constitutional-choice arena to alter the operational or collective choice rules affecting the appropriation from this resource? <PRONURUL>
(1) Yes
(0) No
(-1) MIC
(-2) NA

20.1 If yes, collective choice, constitutional choice or both?
(1) Collective choice arena
(2) Constitutional-choice arena
(3) Both
(-1) MIC
(-2) NA

DESIGN PRINCIPLES: 4A Monitoring users and the resource

21. Are records of the withdrawals from this resource kept in any systematic way? <RECORDWI>
(1) Yes
(0) No
(-1) MIC

21.1 If yes, how often?
(1) Always
(2) Most times
(3) Sometimes
(-1) MIC

22. Are records of the condition of the resource kept in any systematic way? <RECORDCO>
(1) Yes
(0) No
(-1) MIC

22.1 If yes, how often?
(1) Always
(2) Most times
(3) Sometimes

(-1) MIC

DESIGN PRINCIPLES: 4B Monitors accountability

23. Do appropriators monitor the appropriation activities of each other apart from the monitoring of any "official" guards? <SELFMON>
(1) Yes
(0) No
(-1) MIC
(-2) NA

24. Does an "official" position of monitor exist (apart from the willingness of all appropriators to monitor)? <GUARD>
(1) Yes
(0) No
(-1) MIC
(-2) NA

24.1 If yes, how is this position selected?
(1) Appropriators (not necessarily all) rotate into this position
(2) Appropriators are selected by appropriators for this position
(3) Local non-appropriators are selected by appropriators for this position
(4) Local non-appropriators are selected by a local general purpose government
(5) Monitors are employees of an external governmental authority
(6) Some are selected by appropriators and some are selected by a local general purpose government
(7) Some are selected by appropriators and some are employees of an external government authority
(8) Some are selected by a local general purpose government and some are employees of an external government authority
(9) Some are selected by appropriators, some are selected by a local general purpose government, and some are employees of an external government authority
(10) Others:_____
(-1) MIC
(-2) NA

DESIGN PRINCIPLES: 5 Graduated sanctions

25. Is there a gradation of social, physical, and official sanctions that varies with the severity of rule violations? <VARSANCT>
(1) Yes
(0) No, little or no variation on sanction
(-1) MIC
(-2) NA

25.1 If yes, at which range?
(1) Considerable range of sanctions are imposed depending on type of rule infractions
(2) Moderate range of sanctions are imposed depending on type of rule infractions
(3) Limited range of sanctions are imposed depending on type of rule infractions
(-1) MIC
(-2) NA

DESIGN PRINCIPLES: 6 Conflict-resolution mechanisms

26. Are there arenas being used for the exchange of information about conditions of the resource? <ARENAS>
    (1) Yes
    (0) No
    (-1) MIC

DESIGN PRINCIPLES: 7 Minimal recognition of rights to organize

27. Do members of this group of appropriators have the right to participate in the management of this resource? <MANAGE>
    (1) Yes
    (0) No
    (-1) MIC

27.1 If yes, the jure or the facto?
    (1) De juro
    (2) De facto
    (-1) MIC
    (-2) NA

27.2 If not, are the jure rights present?
    (1) Yes
    (0) No
    (-1) MIC
    (-2) NA

DESIGN PRINCIPLES: 8 Nested enterprises

28. Does the chief executive(s) or administrator(s) report to any external or higher level authority? <EXTREP>
    (1) Yes
    (0) No
    (-1) MIC
    (-2) NA

29. Are the appropriators of this resource part of more than one organization*? <ORGTYPE>
    (1) Yes
    (0) No
    (-1) MIC
    (-2) NA

*The types of organizations are:

General Purpose Government and Communal Enterprises
A = a regular agency of the national government
B = a regular agency of a regional government
C = a regular agency of a local government
D = a local communal enterprise

Sector Specific Government
E = a specially created national enterprise
F = a specially created regional governmental enterprise
G = a specially created local governmental enterprise

Special Organizations Related to Resource
I = an AGO organized as a cooperative
J = an AGO not organized as a cooperative
K = a group that has achieved coordination without formal organization

General Voluntary and Private Associations
L = private for profit

M = co-ops with broader jurisdiction than resource
N = unions
Others

Coding Variable Descriptions

Code 1a: Resource quality – initial condition	
Variable Name	BEGQUAL (Question #1a)
Theory Area	Outcomes – Resource Sustainability
Short Description	Quality of units withdrawn at the beginning of the time period examined.
Detailed Description	Characterize the **quality** of common pool resource units withdrawn at the **beginning** of the time period examined in the text. Quality is defined as the amount of effort involved in resource extraction. Considering the way in which the units are used, how would you evaluate the resource quality? (1) Extremely high quality (2) High quality (12) Extremely high or high quality (3) Passable (4) Poor quality (5) Extremely poor quality (45) Poor or extremely poor quality (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the quality of the resource units being withdrawn at the beginning of the time period examined. If the author does not outline a historical time period for resource quality, code "99" in answer to this question, and then evaluate the contemporary quality of the resource unit as described by the author in answer to #1b.
Exclusion criteria (when not to use)	These variables generally do not apply to irrigation cases, unless the text specifically provides information regarding water pollution, including increasing turbidity and/or salinity levels. [**Took this from our coding sheet, but I am not sure this is accurate?**]
Typical exemplars	Fishermen are able to easily fish target species with minimal effort. Fodder is readily available in sufficient quantities to forest community members.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 1b: Resource quality – end condition	
Variable Name	ENDQUAL (Question #1b)
Theory Area	Outcomes – Resource Sustainability
Short Description	Quality of units withdrawn at the end of the described time period.
Detailed Description	Characterize the **quality** of common pool resource units withdrawn at the **end** of the time period examined in the text. Quality is defined as the amount of effort involved in resource extraction. Considering the way in which the units are used, how would you evaluate the resource quality? (1) Extremely high quality (2) High quality (12) Extremely high or high quality (3) Passable (4) Poor quality (5) Extremely poor quality (45) Poor or extremely poor quality (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the quality of the resource units being withdrawn at the end of the time period examined. If the author does not outline a historical time period for resource quality, evaluate the contemporary quality of the resource unit as described by the author in answer to this question.
Exclusion criteria (when not to use)	These variables generally do not apply to irrigation cases, unless the text specifically provides information regarding water pollution, including increasing turbidity and/or salinity levels. [**Took this from our coding sheet, but I am not sure this is accurate?**]
Typical exemplars	Fishermen are able to easily fish target species with minimal effort. Fodder is readily available in sufficient quantities to forest community members.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 2a: Appropriation infrastructure – initial condition	
Variable Name	BEGCONDA (Question #2a)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition and maintenance of public appropriation infrastructure at the beginning of the described time period.
Detailed Description	Characterize the **condition** of the public appropriation infrastructure at the **beginning** of the time period examined in the text. Consider the construction and physical environment of the public appropriation infrastructure and the financial and technological capabilities of the appropriators, how well maintained is the appropriation infrastructure? Appropriation is defined as harvesting/extraction activities. Public appropriation infrastructure is defined as the infrastructure within which the allocation of the flow of resource units from the resource system to the appropriators takes place. Public appropriation infrastructure can be natural, human-made (physical), or a combination of natural and human-made infrastructures. (1) Well maintained - excellent working (2) Moderately well maintained - good working order (12) From well to moderately well maintained (3) Some- infrastructure deterioration occurring due to insufficient maintenance (4) Considerable infrastructure deterioration occurring due to poor maintenance (34) Some or considerable infrastructure deterioration, insufficient or poor maintenance (5) Considerable infrastructure deterioration, but due to a natural disaster (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the condition of the public appropriation infrastructure at the beginning of the time period examined. Assess the allocation of the flow of resource units from the resource system and the described allocation conflict between appropriators. If the author does not outline a historical time period for the appropriation infrastructure, code "99" for this question, and then evaluate the contemporary condition of the appropriation infrastructure as described by the author in answer to #2b. In cases where a major natural disaster occurs and damages the resource beyond the appropriators' or responsible agents' capability to prevent and repair, immediately code "5".
Exclusion criteria (when not to use)	Institutional arrangements (soft infrastructure) governing resource extraction, such as catch limits, seasonal closure rules, size and age limits, etc. Private appropriation infrastructure.
Typical exemplars	Weir or gate used in an irrigation system to direct water from the canal/river to the agricultural field. Public auction halls and markets provided at ports.
Atypical exemplars	Kicking a hole in the side of a dirt canal to direct water onto field.
Close but no	NEED EXAMPLE

Code 2b: Appropriation infrastructure – end condition	
Variable Name	ENDCONDA (Question #2b)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition and maintenance of public appropriation infrastructure at the end of the described time period.
Detailed Description	Characterize the **condition** of the public appropriation infrastructure at the **end** of the time period examined in the text. In consideration of the construction and physical environment of the public appropriation infrastructure and the financial and technological capabilities of the appropriators, how well maintained is the appropriation infrastructure? Appropriation is defined as harvesting/extraction activities. Public appropriation infrastructure is defined as the infrastructure within which the allocation of the flow of resource units from the resource system to the appropriators takes place. Public appropriation infrastructure can be natural, human-made (physical), or a combination of natural and human-made infrastructures. (1) Well maintained - excellent working (2) Moderately well maintained - good working order (12) From well to moderately well maintained (3) Some- infrastructure deterioration occurring due to insufficient maintenance (4) Considerable infrastructure deterioration occurring due to poor maintenance (34) Some or considerable infrastructure deterioration, insufficient or poor maintenance (5) Considerable infrastructure deterioration, but due to a natural disaster (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the condition of the public appropriation infrastructure at the end of the time period examined. Assess the allocation of the flow of resource units from the resource system and the described allocation conflict between appropriators. If the author does not outline a historical time period for the appropriation infrastructure, then evaluate the contemporary condition of the appropriation infrastructure as described by the author in answer to #2b. In cases where a major natural disaster occurs and damages the resource beyond the appropriators' or responsible agents' capability to prevent and repair, immediately code "5".
Exclusion criteria (when not to use)	Institutional arrangements (soft infrastructure) governing resource extraction, such as catch limits, seasonal closure rules, size and age limits, etc. Private appropriation infrastructure.
Typical exemplars	Weir or gate used in an irrigation system to direct water from the canal/river to the agricultural field. Public auction halls and markets provided at ports.
Atypical exemplars	Kicking a hole in the side of a dirt canal to direct water onto field.
Close but no	NEED EXAMPLE

Code 3a: Distribution infrastructure condition – initial condition	
Variable Name	BEGCONDD (Questions #3a)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition and maintenance of public distribution infrastructure at the beginning of the described time period.
Detailed Description	Characterize the **condition** of the public distribution infrastructure at the **beginning** of the time period examined in the text. In consideration of the initial construction and physical environment of the public distribution infrastructure and the financial and technological capabilities of the appropriators, how well maintained is the distribution infrastructure? Distribution is defined as the spatial and temporal distribution of resource units among appropriators. Public distribution infrastructure is defined as the infrastructure within which the resource unit flow is distributed among appropriators. The public distribution infrastructure can be natural, human-made (physical), or a combination of natural and human-made infrastructures. (1) Well maintained - excellent working order (2) Moderately well maintained - good working order (12) From well to moderately well maintained (3) Some- infrastructure deterioration occurring due to insufficient maintenance (4) Considerable infrastructure deterioration occurring due to poor maintenance (34) Some or considerable infrastructure deterioration, insufficient or poor maintenance (5) Considerable infrastructure deterioration, but due to a natural disaster (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the condition of the public distribution infrastructure at the beginning of the time period examined. Assess the spatial and temporal distribution of and access to resource units among appropriators and the described heterogeneity and uncertainty of the same. If the author does not outline a historical time period for the distribution infrastructure, code "99" for this question, and then evaluate the contemporary condition of the distribution infrastructure as described by the author in answer to #3b. In cases where a major natural disaster occurs and damages the resource beyond the appropriators' or responsible agents' capability to prevent and repair, immediately code "5".
Exclusion criteria (when not to use)	Institutional arrangements (soft infrastructure) governing resource distribution, such as [NEED EXAMPLE]. Private distribution infrastructure.
Typical exemplars	Logging roads, irrigation canals, community saw mill, public refrigeration storage unit for marine catch, etc.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 3b: Distribution infrastructure – end condition	
Variable Name	ENDCONDD (Questions # 3b)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition and maintenance of public distribution infrastructure at the end of the described time period.
Detailed Description	Characterize the **condition** of the public distribution infrastructure at the **end** of the time period examined in the text. In consideration of the construction and physical environment of the public distribution infrastructure and the financial and technological capabilities of the appropriators, how well maintained is the distribution infrastructure? Distribution is defined as the spatial and temporal distribution of resource units among appropriators. Public distribution infrastructure is defined as the infrastructure within which the resource unit flow is distributed among appropriators. The public distribution infrastructure can be natural, human-made (physical), or a combination of natural and human-made infrastructures.
Inclusion criteria (when to use)	Discussion by the author as to the condition of the public distribution infrastructure at the end of the time period examined. Assess the spatial and temporal distribution of and access to resource units among appropriators and the described heterogeneity and uncertainty of the same. If the author does not outline a historical time period for the distribution infrastructure, then evaluate the contemporary condition of the distribution infrastructure as described by the author in answer to this question. In cases where a major natural disaster occurs and damages the resource beyond the appropriators' or responsible agents' capability to prevent and repair, immediately code "5". (1) Well maintained - excellent working order (2) Moderately well maintained - good working order (12) From well to moderately well maintained (3) Some- infrastructure deterioration occurring due to insufficient maintenance (4) Considerable infrastructure deterioration occurring due to poor maintenance (34) Some or considerable infrastructure deterioration, insufficient or poor maintenance (5) Considerable infrastructure deterioration, but due to a natural disaster (99) MIC (98) NA
Exclusion criteria (when not to use)	Institutional arrangements (soft infrastructure) governing resource distribution, such as [NEED EXAMPLE]. Private distribution infrastructure.
Typical exemplars	Logging roads, irrigation canals, community saw mill, public refrigeration storage unit for marine catch, etc.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 4a: Production infrastructure – initial condition	
Variable Name	BEGCONDP (Question #4a)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition and maintenance of public production infrastructure at the beginning of the time period described.
Detailed Description	Characterize the **condition** of the public production infrastructure at the **beginning** of the time period examined in the text (if the production infrastructure is different from the appropriation or distribution infrastructure). In consideration of the construction and physical environment of the public production infrastructure and the financial and technological capabilities of the appropriators, how well maintained is the production infrastructure? Production is defined as the spatial and temporal distribution of resource units among appropriators. Public production infrastructure is defined as the infrastructure within which the resource unit flow is produced. The public production infrastructure can be natural, human-made (physical), or a combination of natural and human-made infrastructures. (1) Well maintained - excellent working order (2) Moderately well maintained - good working order (12) From well to moderately well maintained (3) Some- infrastructure deterioration occurring due to insufficient maintenance (4) Considerable infrastructure deterioration occurring due to poor maintenance (34) Some or considerable infrastructure deterioration, insufficient or poor maintenance (5) Considerable infrastructure deterioration, but due to a natural disaster (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the condition of the public production infrastructure at the beginning of the time period examined. Assess the production of resource units by the appropriators and the described heterogeneity and uncertainty of the same. If the author does not outline a historical time period for the production infrastructure, code "99" in answer to this question, and then evaluate the contemporary condition of the production infrastructure as described by the author in answer to #4b. In cases where a major natural disaster occurs and damages the resource beyond the appropriators' or responsible agents' capability to prevent and repair, immediately code "5".
Exclusion criteria (when not to use)	Institutional arrangements (soft infrastructure) governing production infrastructure, such as monitoring and sanctioning. Private production infrastructure.
Typical exemplars	River dam, well, pump, water tank
Atypical exemplars	Planting trees in a forest
Close but no	NEED EXAMPLE

Code 4b: Production infrastructure – end condition	
Variable Name	ENDCONDP (Question #4b)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition and maintenance of public production infrastructure at the end of the time period described.
Detailed Description	Characterize the **condition** of the public production infrastructure at the **end** of the time period examined in the text (if the production infrastructure is different from the appropriation or distribution infrastructure). In consideration of the construction and physical environment of the public production infrastructure and the financial and technological capabilities of the appropriators, how well maintained is the production infrastructure? Production is defined as the spatial and temporal distribution of resource units among appropriators. Public production infrastructure is defined as the infrastructure within which the resource unit flow is produced. The public production infrastructure can be natural, human-made (physical), or a combination of natural and human-made infrastructures. (1) Well maintained - excellent working order (2) Moderately well maintained - good working order (12) From well to moderately well maintained (3) Some- infrastructure deterioration occurring due to insufficient maintenance (4) Considerable infrastructure deterioration occurring due to poor maintenance (34) Some or considerable infrastructure deterioration, insufficient or poor maintenance (5) Considerable infrastructure deterioration, but due to a natural disaster (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the condition of the public production infrastructure at the end of the time period examined. Assess the production of resource units by the appropriators and the described heterogeneity and uncertainty of the same. If the author does not outline a historical time period for the production infrastructure, then evaluate the contemporary condition of the production infrastructure as described by the author in answer to this question. In cases where a major natural disaster occurs and damages the resource beyond the appropriators' or responsible agents' capability to prevent and repair, immediately code "5".
Exclusion criteria (when not to use)	Institutional arrangements (soft infrastructure) governing production infrastructure, such as monitoring and sanctioning. Private production infrastructure.
Typical exemplars	River dam, well, pump, water tank
Atypical exemplars	Planting trees in a forest
Close but no	NEED EXAMPLE

Code 5a: Resource beginning condition	
Variable Name	BEGBLNC (Question #5a)
Theory Area	Outcomes – Resource Sustainability
Short Description	Balance between quantity of units withdrawn and units available at the beginning of the time period described.
Detailed Description	This is an assessment of the **beginning** balance of the common pool resource utilized within the action arena during the time period examined in the text. What is the balance between the quantity of units withdrawn and the quantity of units needed given the usual patterns of use for these units? (In fisheries and other biological systems, this is the maximum sustainable yield (MSY)). (1) Extreme shortage (2) Moderate shortage (12) Shortage (3) Apparently balanced (4) Moderately abundant (5) Quite abundant (45) Abundant (99) MIC (98) NA *In fisheries and other biological systems, this is the maximum sustainable number of units.
Inclusion criteria (when to use)	Discussion by the author as to the beginning rate of resource withdrawal. Does the text provide information as to: (1) rate of withdrawal; and (2) quantity of units needed. If the author does not outline a historical time period of resource withdrawal, code "99" in answer to this question, and then evaluate the current resource withdrawal rate in answer to #5b.
Exclusion criteria (when not to use)	These variables generally do not apply to irrigation cases, unless the text specifically provides information regarding water pollution, including increasing turbidity and/or salinity levels. [**Took this from our coding sheet, but I am not sure this is accurate?**]
Typical exemplars	"… [the forest was] in a degraded state when NGO started…" "…although the forest has retained high value timber trees, it exhibits limited regeneration due to the community's inability to limit damage from grazing and fire.…"
Atypical exemplars	Irrigation system is experiencing increased salinity levels due to marine salt water intrusion caused by excessive groundwater extraction and decreasing groundwater levels.
Close but no	Irrigation case: "…Water distribution involves breaching one of the shallow ditches to allow water to run down cultivated slopes… 30 to 40 percent of the flow is wasted through inefficient distribution, but there is enough water to meet most needs in most years…"

Code 5b: Resource end condition	
Variable Name	ENDBLNC (Question #5b)
Theory Area	Outcomes – Resource Sustainability
Short Description	Balance between quantity of units withdrawn and units available at the end of the time period described.
Detailed Description	This is an assessment of the **end** balance of the common pool resource utilized within the action arena during the time period examined in the text. What is the balance between the quantity of units withdrawn and the quantity of units needed given the usual patterns of use for these units? (In fisheries and other biological systems, this is the maximum sustainable yield (MSY)). (1) Extreme shortage (2) Moderate shortage (12) Shortage (3) Apparently balanced (4) Moderately abundant (5) Quite abundant (45) Abundant (99) MIC (98) NA *In fisheries and other biological systems, this is the maximum sustainable number of units.
Inclusion criteria (when to use)	Discussion by the author as to the end rate of resource withdrawal. Does the text provide information as to: (1) rate of withdrawal; and (2) quantity of units needed. If the author does not outline a historical time period of resource withdrawal, then evaluate the current resource withdrawal rate in answer to this question.
Exclusion criteria (when not to use)	These variables generally do not apply to irrigation cases, unless the text specifically provides information regarding water pollution, including increasing turbidity and/or salinity levels. [**Took this from our coding sheet, but I am not sure this is accurate?**]
Typical exemplars	"… [the forest was] in a degraded state when NGO started…" "…although the forest has retained high value timber trees, it exhibits limited regeneration due to the community's inability to limit damage from grazing and fire.…"
Atypical exemplars	Irrigation system is experiencing increased salinity levels due to marine salt water intrusion caused by excessive groundwater extraction and decreasing groundwater levels.
Close but no	Irrigation case: "…Water distribution involves breaching one of the shallow ditches to allow water to run down cultivated slopes… 30 to 40 percent of the flow is wasted through inefficient distribution, but there is enough water to meet most needs in most years…"

Code 6a: Natural infrastructure condition over time	
Variable Name	NATINFRACOND (Question #6a)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition of natural infrastructure over time
Detailed Description	This is a temporal assessment of the condition of the natural infrastructure of the common pool resource. Assess whether the condition of the natural infrastructure over time has improved, remained the same, or worsened due to the appropriators' behavior. (1) Improved (2) Remained the same (3) Worsen (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the condition of the natural infrastructure over time.
Exclusion criteria (when not to use)	This variable does not apply to non-biological common pool resources, such as knowledge commons.
Typical exemplars	Depletion of fishery and forestry resources. Increasing drought conditions due to over-allocation of water resources by appropriators.
Atypical exemplars	Fish stock depletion due to commercial activities in international waters.
Close but no	Drought conditions due to conditions beyond the appropriators or responsible agents' control and capability to prevent (global climate change).

Code 6b: Human-made infrastructure condition over time	
Variable Name	HUINFRACOND (Question #6b)
Theory Area	Outcomes – Resource Sustainability
Short Description	Condition of human-made infrastructure over time
Detailed Description	This is a temporal assessment of the condition of the human-made hard (physical) infrastructure of the common pool resource. Assess whether the condition of the human-made physical infrastructure has improved, remained the same, or worsened over time due to the appropriators' behavior. (1) Improved (2) Remained the same (3) Worsen (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the condition of the human-made hard (physical) infrastructure over time.
Exclusion criteria (when not to use)	This variable does not apply to soft human-made infrastructure, such as laws, rules, regulations, etc.
Typical exemplars	Deterioration of irrigation canal.
Atypical exemplars	NEED EXAMPLE.
Close but no	NEED EXAMPLE.

Code 7a: Mutual trust among appropriators – initial condition	
Variable Name	BEGTRUST (Question #7a)
Theory Area	Outcomes – Process of collective choice arrangements
Short Description	Level of mutual trust among appropriators at the beginning of the time period described.
Detailed Description	Characterize the described level of mutual trust among appropriators at the **beginning** of the time period examined in the text. Mutual trust is defined as a level of community cohesion that fosters certainty about the actions of other community members. (1) Moderate to high level of trust (e.g. oral promises given high credence) (2) Modest levels of trust (e.g. oral promises are used but appropriators may be uncertain about performance) (12) From moderate to modest levels of trust (3) Low levels of trust (e.g. oral promises rarely used) (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the level of trust among appropriators at the beginning of the time period examined. If the author does not outline a historical time period for trust among appropriators, code "99" in answer to this question, and then evaluate the contemporary level of trust among appropriators as described by the author in answer to #7b.
Exclusion criteria (when not to use)	Distrust of appropriators towards others, such as overarching governing or administrative bodies, NGO representatives, and people from outside communities.
Typical exemplars	Descriptions of community cohesion, high levels of cooperation, etc.
Atypical exemplars	Low frequency of rule infractions
Close but no	NEED EXAMPLE

Code 7b: Mutual trust among appropriators – end condition	
Variable Name	ENDTRUST (Question #7b)
Theory Area	Outcomes – Process of collective choice arrangements
Short Description	Level of mutual trust among appropriators at the end of the time period described.
Detailed Description	Characterize the described level of mutual trust among appropriators at the **end** of the time period examined in the text. Mutual trust is defined as a level of community cohesion that fosters certainty about the actions of other community members. (1) Moderate to high level of trust (e.g. oral promises given high credence) (2) Modest levels of trust (e.g. oral promises are used but appropriators may be uncertain about performance) (12) From moderate to modest levels of trust (3) Low levels of trust (e.g. oral promises rarely used) (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author as to the level of trust among appropriators at the end of the time period examined. If the author does not outline a historical time period for trust among appropriators, then evaluate the contemporary level of trust among appropriators as described by the author in answer to this question.
Exclusion criteria (when not to use)	Distrust of appropriators towards others, such as overarching governing or administrative bodies, NGO representatives, and people from outside communities.
Typical exemplars	Descriptions of community cohesion, high levels of cooperation, etc.
Atypical exemplars	Low frequency of rule infractions
Close but no	NEED EXAMPLE

Code 8: Trust level among appropriators over time	
Variable Name	TRUSTLEVEL (Question #8)
Theory Area	Outcomes – Process of collective choice arrangements
Short Description	Level of mutual trust among appropriators over time.
Detailed Description	This is a temporal assessment of the trust level among appropriators. Assess whether the level of trust among appropriators has improved, remained the same, or worsened over time. (1) Improved (2) Remained the same (3) Worsen (99) MIC
Inclusion criteria (when to use)	Discussion by the author as to the evolution of trust among appropriators over time.
Exclusion criteria (when not to use)	Increased animosity towards actors outside the action arena, such as people from overarching governing or administrative bodies, NGO representatives.
Typical exemplars	Descriptions of persistent community cohesion, high levels of cooperation over a period of time.
Atypical exemplars	Low frequency of rule infractions.
Close but no	NEED EXAMPLE

Code 9: Rule following	
Variable Name	RULEFOLI (Question #9)
Theory Area	Outcomes – Process of collective choice arrangements
Short Description	Do the appropriators generally follow the local rules-in-use related to the resource appropriation process?
Detailed Description	Characterize the usual behavior of the appropriators with respect to local operational level rules-in-use related to the appropriation process from this resource. (1) Almost all members follow the rules (2) Most members follow the rules (12) More than half of the members follow the rules (3) About half of the members follow the rules (4) Most members do not follow the rules (5) Almost all members do not follow the rules (35) Half or less of the members follow the rules (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion by the author with regard to any rule-following behavior related to resource extraction.
Exclusion criteria (when not to use)	Appropriator behavior that is not related to common pool resource extraction, e.g., NEED EXAMPLE
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	Rule following behavior in years of extreme resource shortage.

Code 10: Disadvantaged appropriators	
Variable Name	REALOSER (Question #10)
Theory Area	Equity among users
Short Description	Disadvantaged appropriators
Detailed Description	Describe whether the author identifies any appropriators who have been consistently disadvantaged during the time period examined in the text? (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	This question refers only to appropriators/users. An appropriator is disadvantaged if he or she is always assigned a smaller amount of units, a bad time slot, lower priority in withdrawing units, etc. When evaluating this question, consider the physical and governance structure boundaries of the CPR analyzed. Appropriators that may be peripherally affected but are not directly examined are not to be included.
Exclusion criteria (when not to use)	A group that has consistently been disadvantaged but is outside the action arena.
Typical exemplars	"…Gitsan law requires equitable access to fishing sites within houses and distribution of resources to those who cannot fish…" [Code: "0"]
Atypical exemplars	"The establishment of community forestry in 1980 did not change the basic power imbalance between an elite from the central village and the predominantly Mixtec villagers from the out-lying settlements, nor did it correct an inequitable distribution of forestry benefits..." [Code: "1"]
Close but no	Neighboring villagers who used to have access rights to community forest resources, but who have been excluded from those resources due to the implementation of Joint Forest Management (JFM) policies. (Neighboring villagers are not considered appropriators in the sense of this question. Their equity concerns would be addressed under question #11 [WORSTOFF]).

Code 11: Loss of benefits or harm	
Variable Name	WORSTOFF (Question #11)
Theory Area	Equity among users
Short Description	Appropriators who have lost access to resource benefits or sustained other harm.
Detailed Description	Characterize any evidence within the text that indicates that there is inequity among appropriators. Have the relatively worst off been cut out of their benefits from this resource or otherwise substantially harmed? (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	This question refers to individuals who used to be or are currently appropriators.
Exclusion criteria (when not to use)	Individuals outside the described action arena who are cut out of benefits or otherwise harmed. People who are not appropriators.
Typical exemplars	Village elites restructure resource benefits to their advantage by taking over resources previously allocated to poor community members.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 12: Equity gap among appropriators	
Variable Name	RELEQUTY (Question #12)
Theory Area	Equity among users
Short Description	Disparity in equity level among appropriators.
Detailed Description	Think about the relationship between those who are the least advantaged (e.g., the poor) and those who are the most advantaged (e.g., elites) during the time period described and the distance between them. By the end of the situation identified in the text, would you characterize the distance between those who are the least advantaged and those who are the most advantaged as increasing, constant, or decreasing? (1) Increasing over time (2) Remaining relatively constant over time (3) Decreasing over time (99) MIC (98) NA
Inclusion criteria (when to use)	This question refers to individuals who used to be or are currently appropriators. Evaluate the level of fairness within the rules (written and/or rules-in-use) – is there disparity in rule application between those that are most advantaged and those who are least advantaged at the end of the time period? What is the level of fairness in the governance structure/institutional arrangement?
Exclusion criteria (when not to use)	Individuals outside the described action arena. People who are not appropriators. Do not evaluate the social equity within the system. Do not evaluate the level of fairness in CPR inputs or outputs.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 13: Equity level over time	
Variable Name	EQUITYLEVEL (Question #13)
Theory Area	Equity among users
Short Description	Level of equity among appropriators/users over time.
Detailed Description	Think about the relationship between those who are the least advantaged (e.g., the poor) and those who are the most advantaged (e.g., elites) during the time period described and the level of equity between them. Over the entire time period identified in the text, has the level of equity among appropriators increased, remained the same, or decreased? (1) Increased (2) Remained the same (3) Decreased (99) MIC
Inclusion criteria (when to use)	This question refers to individuals who used to be or are currently appropriators. Evaluate the level of fairness within the rules (written and/or rules-in-use) – has the level of disparity in rule application between those that are most advantaged and those who are the least advantaged changed over time? How has the level of fairness in the governance structure/institutional arrangement changed during the time period described?
Exclusion criteria (when not to use)	Individuals outside the described action arena. People who are not appropriators. Do not evaluate the social equity within the system. Do not evaluate the level of fairness in CPR inputs or outputs.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 14: CPR governance evaluation	
Variable Name	SUCCESS (Question #14)
Theory Area	Outcomes: Conclusion
Short Description	Evaluate whether the CPR is governed successfully or unsuccessfully.
Detailed Description	Based on the information provided in the text, determine if this case is a success or failure in governing the CPR. Briefly explain your answer (e.g., due to resource overexploitation, inequality, cross-scale interactions). **A successful case is defined as one in which the common pool resource was used sustainably *and* the social system was productive and conflict-free**. (1) Success (0) Failure (99) Unknown or Unsure
Inclusion criteria (when to use)	This question needs to be answered for all cases analyzed.
Exclusion criteria (when not to use)	If the case study does not include enough information to assess success or failure in CPR governance. Code [99].
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 15: User boundaries	
Variable Name	WELLDEFN (Question #15)
Theory Area	Design Principles: 1a – User Boundaries
Short Description	Appropriator withdrawal rights boundary
Detailed Description	Characterize whether the set of individuals who have rights to withdraw from the resource is well defined? (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion within the text with regard to user boundaries (hard or soft), i.e., defined user access to the resource.
Exclusion criteria (when not to use)	If the set of rules about withdrawal rights is ambiguous or it is practically difficult to determine from the text who has the rights, answer "no" [0]. Evaluate only the presence or absence of rules. Ignore whether the rules are implemented or enforced.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 16: Design principle 1a	
Variable Name	DP1A (Question #16)
Theory Area	Design Principles: 1a – User Boundaries
Short Description	Determine the presence or absence of design principle 1a.
Detailed Description	The presence of design principle 1a means that individuals or households who have rights to withdraw resource units from the CPR must be clearly defined. Determine whether design principle 1a is present [1] or absent [0]. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text confirming the existence of user boundaries (hard or soft).
Exclusion criteria (when not to use)	If the set of rules about withdrawal rights is ambiguous or it is practically difficult to determine from the text who has the rights, answer "no" [0]. Evaluate only the presence or absence of rules. Ignore whether the rules are implemented or enforced.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 17: Resource boundaries	
Variable Name	BOUNDAR2 (Question #17)
Theory Area	Design Principles: 1b – Resource Boundaries
Short Description	Resource withdrawal rights boundary
Detailed Description	Determine whether the boundary of the resource is primarily a result of one of the following conditions: (1) Natural/constructed attributes which limit entry (2) Natural/constructed attributes which do not limit entry (3) Institutional arrangements (4) Natural/constructed and institutional arrangements which limit entry (5) Natural/constructed and institutional arrangements which do not limit entry Natural/constructed attributes are those which limit entry if the topology of the resource is such as to focus entry to the resource on one or a few places. These attributes can be natural (e.g., geological) or human-made (e.g., physical infrastructure or technological).
Inclusion criteria (when to use)	Discussion within the text with regard to resource boundaries (natural, human-built, institutional).
Exclusion criteria (when not to use)	Evaluate only the presence or absence of boundaries. Ignore whether the boundaries are implemented or enforced.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 18: Design principle 1b	
Variable Name	DP1B (Question #18)
Theory Area	Design Principles: 1b – Resource boundaries
Short Description	Determine the presence or absence of design principle 1b.
Detailed Description	The presence of design principle 1b means that the boundaries of the CPR must be well defined. Determine whether design principle 1b is present [1] or absent [0]. Definition of well defined: resource boundary is successfully limiting entry to the CPR. [**IS THIS CORRECT?**] (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text confirming the existence of resource boundaries (hard or soft).
Exclusion criteria (when not to use)	Evaluate only the presence or absence of boundaries. Ignore whether the boundaries are implemented or enforced.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 19: Flexible rules-in-use	
Variable Name	FLEXIBLE (Question #19)
Theory Area	Design Principles: 2a – Congruence with local conditions
Short Description	Flexibility of rules-in-use
Detailed Description	Determine whether the rules-in-use are flexible in dealing with times of emergency or unusual problems facing particular members of the group of appropriators/users? (1) Yes (0) No (99) Don't Know
Inclusion criteria (when to use)	Discussion within the text regarding the flexibility of the rules-in-use governing common pool resources to accommodate emergency situations faced by individual appropriators/users/community members. Are the rules responsive and adaptive?
Exclusion criteria (when not to use)	Evaluate only the flexibility of rule-in-use to respond to individual/household emergencies/special circumstances. Does not apply to emergency situations that involve the entire community (e.g., a natural disaster that affects the entire community). Does not apply to private strategies of individuals to adjust to emergency situations (e.g., digging a private well).
Typical exemplars	Water rights within the Ait Sidi Musa Clan are tied to the land and rigidly based on kinship ties to the founders of the irrigation system. These water rights cannot be transferred to another community member who is in need under any circumstances. Code no [0].
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 20: Design principle 2a	
Variable Name	DP2A (Question #20)
Theory Area	Design Principles: 2a – Congruence with local conditions
Short Description	Determine the presence or absence of design principle 2a.
Detailed Description	The presence of design principle 2a means that the appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions. Is this design principle present within the examined CPR? Do the appropriation rules match local conditions? Appropriation is defined as harvesting/extraction activities. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text confirming that appropriation rules exist which limit access to the CPR to allow the system to persist over time without significant depletion of resources.
Exclusion criteria (when not to use)	Evaluate only the presence or absence of appropriation rules. Ignore whether these rules are implemented or enforced.
Typical exemplars	Annual seasonal closures in fisheries limit the extraction of commercially valuable species and allow the species time to recover from exploitation. In an irrigation system, access to water rights is dependent on the effort individuals invest in maintaining the irrigation infrastructure.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 21: Perceived fairness of rules	
Variable Name	DP2B (Question #21)
Theory Area	Design Principles: 2b – Appropriation and Provision
Short Description	Perceived fairness of the rules-in-use.
Detailed Description	Based on the information in the text, determine whether the appropriators/users perceive the rules-in-use as fair. (1) Yes (0) No (99) Don't Know
Inclusion criteria (when to use)	Discussion within the text indicating whether users accept the rules-in-use as fair/legitimate or not. Rules-in-use can be written laws/regulations or accepted/traditional norms.
Exclusion criteria (when not to use)	The presence of aggregation rules that specify constraints/requirements on user actions and/or the extraction process is not enough to deduce perceived fairness.
Typical exemplars	A majority of resource users follow the rules-in-use.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 22: Design principle 2b	
Variable Name	DP2B (Question #22)
Theory Area	Design Principles: 2b – Appropriation and Provision
Short Description	Determine the presence or absence of design principle 2b.
Detailed Description	The presence of design principle 2b means that the benefits obtained by users from a CPR, as determined by the appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by the provision rules. Determine whether the text indicates the presence or absence of this design principle. Appropriation rules are defined as those rules governing resource extraction. They are *time independent.* Provision rules assign responsibility to users for building, restoring, or maintaining the CPR. They are *time dependent*. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text confirming a congruence between appropriation and provision rules and local conditions.
Exclusion criteria (when not to use)	Evaluate only the presence or absence of appropriation rules. Ignore whether these rules are implemented or enforced.
Typical exemplars	NEED EXAMPLE.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 23: Users' ability to express needs and concerns	
Variable Name	EXPOWN (Question #23)
Theory Area	Design Principles: 3 – Collective choice arrangements
Short Description	Users'/appropriators' ability to communicate needs and concerns.
Detailed Description	Based on the information in the text, determine whether the appropriators/users as a group have options to express their needs and concerns to officials in the group's organization who make collective choice decision in relation to the CPR. Can most individuals affected by the operational rules participate in modifying the operational rules? Are there activities that the users can use to express their needs and concerns to officials who make collective choice decisions, and do users find these activities useful, i.e., are officials responsive to their needs? (1) Yes, at least one of these activities are used (0) No, none of these activities are used (99) MIC (98) NA *Options may include: elections, formal petitions, formal hearings, advice and consent on nominations to non-elected positions, demonstrations, general meetings, illegal exchange with officials or other activities.
Inclusion criteria (when to use)	Discussion within the text outlining collective choice arrangements that are open to all users and in which users can participate and express needs and concerns (e.g., forums, hearings, community meetings, etc.).
Exclusion criteria (when not to use)	Instances in which users express needs and concerns to officials who do not make collective choice decisions. Forums to which users are invited but where they cannot express their needs and concerns. There has to be some evidence that users *actually participate* in these activities. Very often there are general meetings and options for petitioning may exist on paper but are not actually used.
Typical exemplars	Monthly meetings of village Van Panchayat to which all community members are invited and in which concerns and needs can be addressed to leaders of the Van Panchayat. Other options include: elections, formal petitions, formal hearings, advice and consent on nominations to non-elected positions, demonstrations, general meetings, or other activities.
Atypical exemplars	Illegal exchange with officials. Bribery(?)
Close but no	NEED EXAMPLE

Code 24: Chief executive position	
Variable Name	EXECAPR (Question #24)
Theory Area	Design Principles: 3 – Collective choice arrangements
Short Description	Is the chief executive a CPR user/appropriator?
Detailed Description	Based on the information in the text, determine whether the chief executive/administrator position(s) are filled by appropriators/users. (1) Yes (0) No (99) MIC (98) NA (no executive positions) If answer is yes or MIC, answer Code 24.1 next. If answer is no, skip Code 24.1 and proceed to Code 24.2.
Inclusion criteria (when to use)	Discussion within the text about the accountability of chief executives/administrators to the appropriators.
Exclusion criteria (when not to use)	Chief executive is appointed by the government and not a community member.
Typical exemplars	Chief executive of an irrigation system is a farmer within the same irrigation system.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 24.1: Election of chief executive	
Variable Name	EXECAPR (Question #24.1)
Theory Area	Design Principles: 3 – Collective choice arrangements
Short Description	If the chief executive/administrator position is filled by appropriator/user, how is that position filled?
Detailed Description	If the chief executive/administrator position is filled by appropriator/user, what is the procedure to fill that position? What are the position rules? How does someone move from being just a "member" of a group of appropriators to someone who has a specialized task, such as the chair of a management committee or a water distributor-guard? (1) Through direct or indirect elections by appropriators (2) Appointed by external government (3) Through inheritance (4) Other: _____
Inclusion criteria (when to use)	Discussion in the text with regard to how an appropriator/user can position themselves in a chief executive/administrator position within the CPR system.
Exclusion criteria (when not to use)	Chief executive is appointed by the government and not a community member.
Typical exemplars	The president of a fisheries cooperative is a fisherman in the community.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 24.2: Appointment of chief executive	
Variable Name	EXECAPR (Question #24.2)
Theory Area	Design Principles: 3 – Collective choice arrangements
Short Description	If the chief executive/administrator position is appointed by an external government, do appropriators participate in the election?
Detailed Description	If the chief executive/administrator position is appointed by an external government, what is the level of involvement of appropriators in that appointment process? (1) The chief executive(s) or administrator(s) position(s) is appointed by external government with active advice by appropriators (2) The chief executive(s) or administrator(s) position(s) is appointed by external government without active advice by appropriators (99) MIC (98) NA
Inclusion criteria (when to use)	Discussion in the text with regard to the appointment process of chief executives/administrators within a CPR system.
Exclusion criteria (when not to use)	Chief executive is elected by the community.
Typical exemplars	Under the Joint Forest Management scheme in India, the chief executive of a forest community is directly appointed by the government.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 25: Action by users/appropriators	
Variable Name	PRONURUL (Question #25)
Theory Area	Design Principles: 3 – Collective choice arrangements
Short Description	Evidence of proposed group action by appropriators/users.
Detailed Description	Based on the information in the text, determine whether the group of appropriators has proposed action in a collective-choice or constitutional choice arena to alter the operational or collective choice rules affecting the operation of the CPR. Definition of collective choice: [NEED TO SUPPLEMENT] Definition of constitutional choice: [NEED TO SUPPLEMENT] (1) Yes (0) No (99) MIC (98) NA If answer is yes or MIC, answer Code 25.1 next. If answer is no, skip Code 25.1 and proceed to Code 26.
Inclusion criteria (when to use)	Any appropriator/user activity in which an alteration to the institutional arrangements or rules-in-use are discussed, proposed, or taken.
Exclusion criteria (when not to use)	Any activity in which the alteration of the physical components of the CPR are discussed, proposed, or taken. [IS THIS CORRECT?] Any activity to change the operational and/or collective choice rules affecting CPR operation that is taken by an individual within the community, not the group of appropriators.
Typical exemplars	Group of water users petitions the water users' association to implement water saving measures.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 25.1: Type of action taken by users/appropriators	
Variable Name	PRONURUL (Question #25.1)
Theory Area	Design Principles: 3 – Collective choice arrangements
Short Description	Type of group action taken by appropriators/users.
Detailed Description	Based on the information in the text, determine what type of action the group of appropriators/users has proposed or taken: (1) Collective choice arena (2) Constitutional-choice arena (3) Both (99) MIC (98) NA
Inclusion criteria (when to use)	Any appropriator/user group action to alter the institutional arrangements or rules-in-use within the collective choice and/or constitutional choice arena.
Exclusion criteria (when not to use)	Any appropriator/user group action to alter the institutional arrangements or rules-in-use that does not take place within the collective choice and/or constitutional choice arena. Any action to alter the institutional arrangements or rules-in-use taken by individual users/appropriators.
Typical exemplars	NEED EXAMPLE.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 26: Design principle 3	
Variable Name	DP3 (Question #26)
Theory Area	Design Principles: 3 – Collective choice arrangements
Short Description	Determine the presence or absence of design principle 3.
Detailed Description	The presence of design principle 3 means that most individuals affected by the operational rules can participate in modifying these rules. Determine whether the text indicates the presence or absence of this design principle. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text indicating that most individuals affected by the CPR governance rules can participate in modifying them.
Exclusion criteria (when not to use)	Evaluate only the presence or absence of collective choice arrangement. Ignore whether users choose to utilize them or not.
Typical exemplars	NEED EXAMPLE.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 27: Resource withdrawal records	
Variable Name	RECORDWI (Question #27)
Theory Area	Design Principles: 4a – Monitoring users and the resource
Short Description	Are records of withdrawals from the CPR kept in any systematic way?
Detailed Description	Based on the information in the text, determine whether there is evidence that withdrawal records from the CPR are kept in any systematic way. Systematic way implies that the records are kept in a way that allows for easy inspection by users/appropriators. Systematic records are defined as any form of collective memory that becomes a public good of information. That public good of information may be written, oral, or otherwise. Analyzing the text, is there evidence that someone within the group of users/appropriators knows who to ask to obtain CPR withdrawal information. (1) Yes (0) No (99) MIC If answer is yes or MIC, answer Code 27.1 next. If answer is no, skip Code 27.1 and proceed to Code 28.
Inclusion criteria (when to use)	Discussion within the text about record-keeping of CPR withdrawals. Records of withdrawals may include the amount of units withdrawn by each appropriator/user or the total amount withdrawn by all appropriators/users.
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	Fishing logs.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 27.1: Frequency of tallying withdrawal records	
Variable Name	RECORDWI (Question #27.1)
Theory Area	Design Principles: 4a – Monitoring users and the resource
Short Description	How often are records of withdrawals from the CPR logged?
Detailed Description	Based on the information in the text, determine how often the withdrawal records from the CPR were kept in any systematic way. (1) Always (2) Most times (3) Sometimes (99) MIC
Inclusion criteria (when to use)	Any evidence about the frequency of systematic record-keeping of CPR withdrawals.
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	Monthly harvesting data reported to forest council.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 28: Resource condition records	
Variable Name	RECORDCO (Question #28)
Theory Area	Design Principles: 4a – Monitoring users and the resource
Short Description	Are records of the CPR condition kept in any systematic way?
Detailed Description	Based on the information in the text, determine whether there is evidence that records of the condition of the CPR are kept in any systematic way. Systematic way implies that the records are kept in a way that allows for easy inspection by users/appropriators. Systematic records are defined as any form of collective memory that becomes a public good of information. That public good of information may be written, oral, or otherwise. Analyzing the text, is there evidence that someone within the group of users/appropriators knows who to ask to obtain information on the condition of the CPR. (1) Yes (0) No (99) MIC If answer is yes or MIC, answer Code 28.1 next. If answer is no, skip Code 28.1 and proceed to Code 29.
Inclusion criteria (when to use)	Discussion within the text about record-keeping of CPR condition, including records about the level of pollution of the resource, the amount of units available, etc..
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 28.1: Frequency of tallying CPR conditions	
Variable Name	RECORDCO (Question #28.1)
Theory Area	Design Principles: 4a – Monitoring users and the resource
Short Description	How often are records of the condition of the CPR logged?
Detailed Description	Based on the information in the text, determine how often the CPR conditions are logged in any systematic way. (1) Always (2) Most times (3) Sometimes (99) MIC
Inclusion criteria (when to use)	Any evidence about the frequency of systematic record-keeping of CPR conditions.
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	NEED EXAMPLE.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 29: Design principle 4a	
Variable Name	DP4A (Question #29)
Theory Area	Design Principles: 4a – Monitoring users and the resource
Short Description	Determine the presence or absence of design principle 4a.
Detailed Description	The presence of design principle 4a means that monitors are present **and** actively audit CPR conditions and appropriator/user behavior. Determine whether the text indicates the presence or absence of this design principle. "Audit" is defined as measuring or assessing a condition or behavior in some way. To meet this design principle, evidence of both user monitoring and resource monitoring should be present. However, the presence of CPR monitoring has greater weight, since it can imply and/or capture some level of user monitoring as well. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text indicating that monitors are present in the system who systematically tally resource conditions and appropriator behavior. Evidence that appropriators/users are utilizing information on the resource condition and/or their collective behavior.
Exclusion criteria (when not to use)	Evaluate only the presence or absence of systematic record-keeping. Ignore whether users choose to inspect or otherwise utilize the records. Emphasis on collective behavior patterns, not individual ones.
Typical exemplars	NEED EXAMPLE.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 30: Appropriator/user self-monitoring	
Variable Name	SELFMON (Question #30)
Theory Area	Design Principles: 4b – Monitors accountability
Short Description	Determine whether users monitor the activities of each other.
Detailed Description	Determine whether appropriators/users monitor the appropriation activities of each other apart from the monitoring of any "official" guards? (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text indicating that users/appropriators are monitoring the extraction activities of other users.
Exclusion criteria (when not to use)	Monitoring activities by a designated and/or elected guard.
Typical exemplars	NEED EXAMPLE.
Atypical exemplars	NEED EXAMPLE
Close but no	Monitoring of outsiders' use of CPR by users/appropriators.

Code 31: Official monitoring	
Variable Name	GUARD (Question #31)
Theory Area	Design Principles: 4b – Monitors accountability
Short Description	Determine whether an "official" position of CPR monitor exists.
Detailed Description	Determine whether an "official" position of monitor exists (apart from the willingness of all appropriators/users to monitor the CPR)? (1) Yes (0) No (99) MIC (98) NA If answer is yes or MIC, answer Code 31.1 next. If answer is no, skip Code 31.1 and proceed to Code 32.
Inclusion criteria (when to use)	Evidence of a monitor/guard position occupied by a person or person acting on behalf of some organization or authority.
Exclusion criteria (when not to use)	Appropriators/users who monitor others by their own initiation.
Typical exemplars	Forest guard in an Indian Van Panchayat who is elected by the local forest council and who may also be a member of that forest community.
Atypical exemplars	NEED EXAMPLE
Close but no	Fishery official who is appointed by the national government but is not accountable to local appropriators.

Code 31.1: Official monitoring	
Variable Name	GUARD (Question #31.1)
Theory Area	Design Principles: 4b – Monitors accountability
Short Description	Determine whether an "official" position of CPR monitor exists.
Detailed Description	If an "official" position of monitor exists (apart from the willingness of all appropriators/users to monitor the CPR), how is that position selected? (1) Appropriators (not necessarily all) rotate into this position (2) Appropriators are selected by appropriators for this position (3) Local non-appropriators are selected by appropriators for this position (4) Local non-appropriators are selected by a local general purpose government (5) Monitors are employees of an external governmental authority (6) Some are selected by appropriators and some are selected by a local general purpose government (7) Some are selected by appropriators and some are employees of an external government authority (8) Some are selected by a local general purpose government and some are employees of an external government authority (9) Some are selected by appropriators, some are selected by a local general purpose government, and some are employees of an external government authority (10) Others:_____
Inclusion criteria (when to use)	Evidence of a formal or informal selection process for the position of CPR monitor/guard.
Exclusion criteria (when not to use)	Appropriators/users who monitor others on their own initiation.
Typical exemplars	NEED EXAMPLE.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 32: Design principle 4b	
Variable Name	DP4b (Question #32)
Theory Area	Design Principles: 4b – Monitors accountability
Short Description	Determine the presence or absence of design principle 4b.
Detailed Description	The presence of design principle 4b means that monitors are accountable to the appropriators/users or they are themselves appropriators/users. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text indicating the presence of monitors. The position of monitor can be self-organized with community members voluntarily taking turns monitoring the CPR, or the position of monitor can be "official", i.e., elected or appointed by an internal or external governance body.
Exclusion criteria (when not to use)	Monitor/guard who is not accountable to the appropriators/users (e.g., guard appointed by an external government who exerts power with impunity and without local oversight).
Typical exemplars	Forest guard in an Indian Van Panchayat who is elected by the local forest council and who may also be a member of that forest community. Fishermen who monitor the fishing activity of other fishermen in their cooperative.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 33: Graduated sanctions	
Variable Name	VARSANCT (Question #33)
Theory Area	Design Principles: 5 – Graduated sanctions
Short Description	Evidence of graduated social, physical, and official sanctions.
Detailed Description	Determine whether there is a graduation of social, physical, and official sanctions that varies with the severity of rule violations? Considering the possible social, physical and official sanctions described in the text, is the severity of the sanctions dependent on the type of rule infraction? (1) Yes (0) No, little or no variation on sanction (99) MIC (98) NA If answer is yes or MIC, answer Code 33.1 next. If answer is no, skip Code 33.1 and proceed to Code 34.
Inclusion criteria (when to use)	Evidence within the text indicating the presence of social, physical, and/or other official sanctions that are applied at different scales depending on the type of violation committed.
Exclusion criteria (when not to use)	Any type of sanction that is fixed (e.g., set monetary fine regardless of level of infraction).
Typical exemplars	Sanctions that range from warnings to small monetary fines for minor infractions to legal prosecution and revocation of CPR access rights for severe violations.
Atypical exemplars	Social shunning that varies from public shaming for minor infractions to exclusion from community council meetings for major violations.
Close but no	NEED EXAMPLE

Code 33.1: Graduated sanctions	
Variable Name	VARSANCT (Question #33.1)
Theory Area	Design Principles: 5 – Graduated sanctions
Short Description	Evidence of graduated social, physical, and official sanctions.
Detailed Description	If there is evidence of a graduation of social, physical, and official sanctions that vary with the severity of rule violations, what is the range of the same? (1) Considerable range of sanctions are imposed depending on type of rule infractions (2) Moderate range of sanctions are imposed depending on type of rule infractions (12) Considerable or moderate range of sanctions are imposed depending on type of rule infractions (3) Limited range of sanctions are imposed depending on type of rule infractions (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text of the level of social, physical, and/or other official sanctions that are applied at different scales depending on the type of violation committed.
Exclusion criteria (when not to use)	Any type of sanction that is fixed (e.g., set monetary fine regardless of level of infraction).
Typical exemplars	Sanctions that range from warnings to small monetary fines for minor infractions to legal prosecution and revocation of CPR access rights for severe violations.
Atypical exemplars	Social shunning that varies from public shaming for minor infractions to exclusion from community council meetings for major violations.
Close but no	NEED EXAMPLE

Code 34: Design principle 5	
Variable Name	DP5 (Question #34)
Theory Area	Design Principles: 5 – Graduated sanctions
Short Description	Determine the presence or absence of design principle 5.
Detailed Description	The presence of design principle 5 means that appropriators who violate operation rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, officials accountable to these appropriators, or both. Is there evidence that this design principle is present? Operation rules are rules-in-use dealing with the regulation of resource extraction/appropriation. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence within the text indicating a range of sanctions are applied to violators of operation rules. These sanctions are assessed by other appropriators or officials accountable to those appropriators (e.g. monitors, guards). Code for the presence or absence of graduated sanctions. Ignore whether these sanctions are actually levied/imposed or not.
Exclusion criteria (when not to use)	Sanctioning scheme that is not graduated (e.g., fixed fines regardless of level of violation). No evidence of sanctions at all.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 35: Information arenas	
Variable Name	ARENAS (Question #35)
Theory Area	Design Principles: 6 – Conflict resolution mechanisms
Short Description	Determine the existence of arenas to exchange information about CPR conditions.
Detailed Description	Determine whether there are arenas that are being used by appropriators/users to exchange information about the conditions of the resource? An "arena" is defined as a particular place, time, or occasion for appropriators to gather to communicate CPR conditions with each other. An arena does not have to be an official venue, such as a meeting hall. Arenas can be venues to deal with conflict-resolution matters, but do not have to be. (1) Yes (0) No (99) MIC
Inclusion criteria (when to use)	Evidence within the text indicating that appropriators are communicating the CPR conditions with each other. Appropriators who utilize particular places, times, or occasions to discuss CPR conditions.
Exclusion criteria (when not to use)	Appropriators discussing CPR conditions during casual encounters. The existence of "arenas" that are not being used.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	Farmers gathering at an irrigation canal to discuss the annual repair schedule.
Close but no	NEED EXAMPLE

Code 36: Design principle 6	
Variable Name	DP6 (Question #36)
Theory Area	Design Principles: 6 – Conflict resolution mechanisms
Short Description	Determine the presence or absence of design principle 6.
Detailed Description	The presence of design principle 6 means that appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials AND/OR That appropriators have access to local arenas of information exchange. [THIS NEEDS TO BE FURTHER DISCUSSED] (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Evidence of the existence and use of formal and informal arenas/venues for appropriators and their officials to exchange information about CPR conditions. Evidence of the existence of and low-cost, rapid-access local arenas/venues (e.g., courts, judiciary, elder/tribal council) to resolve conflicts among appropriators/users or between appropriators/users and officials.
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 37: Appropriator right to manage	
Variable Name	MANAGE (Question #37)
Theory Area	Design Principles: 7 – Minimal recognition of rights to organize
Short Description	Determine whether users/appropriators have the right to manage CPR.
Detailed Description	Determine whether members of the group of appropriators/users have the right to participate in the management of the CPR? Do appropriators/users have the capability to make decisions over the use of the CPR? (1) Yes (0) No (99) MIC If answer is yes or MIC, answer Code 37.1 next. If answer is no, skip Code 37.1 and proceed to Code 37.2.
Inclusion criteria (when to use)	Evidence within the text that the appropriators/users have the capability to make decisions over resource use and exercise that capability.
Exclusion criteria (when not to use)	This question does *not* ask you to evaluate the level of management capability that users have (great deal of authority or little authority). Users who have de jure rights but are unable to or do not exercise them. Code no (0). Users who have de facto rights but are unable to or do not exercist them.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 37.1: De jure or de facto right to manage	
Variable Name	MANAGE (Question #37.1)
Theory Area	Design Principles: 7 – Minimal recognition of rights to organize
Short Description	Determine whether users/appropriators have de jure or de facto rights to manage CPR.
Detailed Description	If members of the group of appropriators/users have the right to participate in the management of the CPR are those rights de jure (legal) or de facto (actual)? (1) De jure (2) De facto (99) MIC (98) NA If answer is de jure or de facto, skip Code 37.2 and proceed to Code 38. If answer is MIC or NA, proceed to Code 37.2.
Inclusion criteria (when to use)	Evidence within the text that the appropriators/users have de jure or de facto rights to manage the CPR **and** exercise those rights.
Exclusion criteria (when not to use)	This question does *not* ask you to evaluate the level of management capability that users have (great deal of authority or little authority). If users/appropriators do not have the right to participate in the management of the CPR. Do not code both de jure and de facto. It can only be one or the other.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 37.2: Presence of de jure rights	
Variable Name	MANAGE (Question #37.2)
Theory Area	Design Principles: 7 – Minimal recognition of rights to organize
Short Description	Are de jure rights present?
Detailed Description	If appropriators/users do not have the right to participate in the management of the CPR, determine whether de jure rights are present/exist? (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Users who do not have rights to manage the CPR even though de jure rights exist.
Exclusion criteria (when not to use)	Users who do not have rights to manage the CPR and no de jure rights exist.
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 38: Design principle 7	
Variable Name	DP7 (Question #38)
Theory Area	Design Principles: 7 – Minimal recognition of rights to organize
Short Description	Determine the presence or absence of design principle 7.
Detailed Description	The presence of design principle 7 means that the rights of appropriators to devise their own institutions are not challenged by external governmental authorities. There exists a minimal recognition of appropriators' rights to organize. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Appropriators who have de jure rights to manage CPR and are exercising those rights. Appropriators who have de facto rights to manage CPR and are exercising those rights.
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 39: Reporting to external authority	
Variable Name	EXTREP (Question #39)
Theory Area	Design Principles: 8 – Nested enterprises
Short Description	Does the chief executive/administrator report to external authority?
Detailed Description	Determine whether the chief executive or administrator of the users' group reports to any external/higher level authority? (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	Hierarchical flow of reporting. Horizontal information sharing. Look for evidence of any form of regular reporting conducted by the chief executive or administrator to a higher level authority that is part of his/her regular responsibilities.
Exclusion criteria (when not to use)	Special reports provided to higher governance structures that are not part of the usual responsibilities of the chief executive (e.g., reports made in the event of a natural disaster or accident).
Typical exemplars	Annual reporting of catch by head of the fishery cooperative to the regional cooperative and/or national fishery department.
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 40: Embeddedness in other organizations	
Variable Name	ORGTYPE (Question #40)
Theory Area	Design Principles: 8 – Nested enterprises
Short Description	Are the appropriators of the CPR part of more than one organization?
Detailed Description	Determine whether the appropriators of the CPR are embedded in more than one organization? * (1) Yes (0) No (99) MIC (98) NA *The types of organizations are: General Purpose Government and Communal Enterprises A = a regular agency of the national government B = a regular agency of a regional government C = a regular agency of a local government D = a local communal enterprise Sector Specific Government E = a specially created national enterprise F = a specially created regional governmental enterprise G = a specially created local governmental enterprise Special Organizations Related to Resource I = an AGO organized as a cooperative J = an AGO not organized as a cooperative K = a group that has achieved coordination without formal organization General Voluntary and Private Associations L = private for profit M = co-ops with broader jurisdiction than resource N = unions Others
Inclusion criteria (when to use)	Look for any evidence of a degree of modularity or autonomy in the system in which individual units have power to make decisions but there are also some higher level coordination and/or conflict resolution mechanisms present for mediating between units.
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

Code 41: Design principle 8	
Variable Name	DP8 (Question #41)
Theory Area	Design Principles: 8 – Nested enterprises
Short Description	Determine the presence or absence of design principle 8.
Detailed Description	The presence of design principle 8 means that the appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises. (1) Yes (0) No (99) MIC (98) NA
Inclusion criteria (when to use)	CPR governance structure is connected horizontally and/or vertically with other independent parts of the governance structure. Information about the CPR flows within the system. Look for the capacity for conflict resolution beyond the local level. Look for any evidence of a degree of modularity or autonomy in the system in which individual units have power to make decisions but there are also some higher level coordination and/or conflict resolution mechanisms present for mediating between units.
Exclusion criteria (when not to use)	NEED EXAMPLE
Typical exemplars	NEED EXAMPLE
Atypical exemplars	NEED EXAMPLE
Close but no	NEED EXAMPLE

CENTER FOR BEHAVIOR, INSTITUTIONS & THE ENVIRONMENT (CBIE)

Intercoder Reliabilty Testing
Coding Project 2013-2014

For questions please contact Ute Brady at ute.brady@asu.edu

CENTER FOR BEHAVIOR, INSTITUTIONS & THE ENVIRONMENT (CBIE)

Intercoder Reliability Testing: Detailed results for all teams
Coding Project 2013-2014

Our post hoc intercoder reliability testing began with data preparation. In order to unify the coding data and minimize bias due to incompatible comparisons, five cases which did not include the standard three-coder-team were eliminated from the analysis. Since intercoder reliability ratings require a comparison of more than one case per team, four groups that only coded one case study together were removed, leaving a total of 13 coding groups and 60 cases for intercoder reliability testing. Individual coding results were organized by group, coder and case. The coding values utilized in the project were nominal and varied significantly. Although the bulk of the codes were structured in binary format (0/1 – absence/presence), coders could also code a value of (-1) to indicate that the information was "missing in case (MIC)" or (-2) to indicate that the question was not applicable to the examined text. Additionally, many of the variables testing for environmental and social conditions included values that were on a scale from 1 (extremely good) to 5 (extremely poor).

To address this complexity coding values of (-1,-2) were combined into a single negative value (-1). While distinctions between information missing in text (-1) or not applicable (-2) may be important to the overall analysis, both code values indicate an absence of information. Removing the distinction between (-1) and (-2) prior to testing for intercoder reliability, therefore, does not result in a data bias, but serves to reduce variability due to coder subjectiveness and/or coding mistakes (e.g., two coders believe there is not enough information to answer the question, but one uses code (-1) and the other (-2) resulting in a lack of agreement) where, for intercoder testing purposes, there really is none. Similarly, in instances where coded answers included a range of values (e.g. (4,5) or (1,2), the comma was removed and the value was converted to a simple number (45 or 12). This modification is justified because the coded values are not changed but merely converted into a format that can be interpreted by the software. Such alteration does not result in data bias and prevents programming errors during intercoder reliability testing. The coding variables were then grouped into broad categories (environmental, social, success, and one for each of the eight original design principles = 11 categories), generally following the sections outlined in Table 3, except that variables testing for resource sustainability (variables 1-6) were combined into one category (environmental variables), and those evaluating collective choice and equity (variables 7-13) were combined into a "social" category. This was done to simplify the intercoder testing process and did not result in a bias, since the statistics still tested each variable by coding team.

CENTER FOR BEHAVIOR, INSTITUTIONS & THE ENVIRONMENT (CBIE)

Intercoder Reliability Testing: Summary split by groups and variables
Coding Project 2013-2014

Team	vargroup	Krippendorff	Fleiss	Percent Agree
ACH	env	0.603	0.602	80.60
ACH	soc	0.693	0.692	68.80
ACH	success	1.000	1.000	100.00
ACH	DP1	0.261	0.256	33.30
ACH	DP2	0.327	0.322	37.50
ACH	DP3	0.387	0.384	64.30
ACH	DP4	0.591	0.590	59.30
ACH	DP5	-0.138	-0.149	50.00
ACH	DP6	-0.241	-0.258	16.70
ACH	DP7	0.389	0.385	50.00
ACH	DP8	-0.274	-0.286	33.30
ACU	env	0.435	0.432	52.80
ACU	soc	0.270	0.265	58.30
ACU	success	-0.240	-0.312	0.00
ACU	DP1	0.536	0.530	66.70
ACU	DP2	0.116	0.103	50.00
ACU	DP3	0.342	0.337	47.60
ACU	DP4	0.341	0.337	51.90
ACU	DP5	0.759	0.755	88.90
ACU	DP6	0.344	0.325	50.00
ACU	DP7	0.696	0.692	75.00
ACU	DP8	0.456	0.446	55.60
ADU	env	0.156	0.150	54.20
ADU	soc	0.221	0.213	31.20
ADU	success	0.312	0.250	50.00
ADU	DP1	0.325	0.311	25.00
ADU	DP2	0.877	0.874	87.50
ADU	DP3	0.525	0.519	64.30
ADU	DP4	0.921	0.921	94.40
ADU	DP5	0.836	0.832	83.30
ADU	DP6	0.739	0.727	75.00
ADU	DP7	0.633	0.625	75.00
ADU	DP8	1.000		100.00
AEN	env	0.824	0.823	91.70
AEN	soc	0.701	0.701	75.00
AEN	success	0.823	0.819	85.70
AEN	DP1	0.477	0.474	64.30
AEN	DP2	0.784	0.782	82.10
AEN	DP3	0.674	0.673	69.40
AEN	DP4	0.591	0.590	66.70
AEN	DP5	0.715	0.712	76.20
AEN	DP6	0.829	0.827	85.70

Team	vargroup	Krippendorff	Fleiss	Percent Agree
AEN	DP7	0.914	0.914	92.90
AEN	DP8	0.746	0.744	81.00
AEU	env	0.548	0.547	72.60
AEU	soc	0.457	0.455	51.80
AEU	success	1.000	1.000	100.00
AEU	DP1	0.696	0.694	71.40
AEU	DP2	0.784	0.782	78.60
AEU	DP3	0.767	0.766	81.60
AEU	DP4	0.706	0.705	74.60
AEU	DP5	-0.030	-0.039	85.70
AEU	DP6	0.595	0.590	64.30
AEU	DP7	0.712	0.710	71.40
AEU	DP8	0.238	0.232	33.30
AHU	env	0.349	0.345	70.80
AHU	soc	0.838	0.836	81.20
AHU	success	-0.100	-0.200	50.00
AHU	DP1	0.879	0.876	87.50
AHU	DP2	0.713	0.707	75.00
AHU	DP3	0.792	0.789	85.70
AHU	DP4	0.450	0.445	61.10
AHU	DP5	0.803	0.798	83.30
AHU	DP6	0.671	0.657	75.00
AHU	DP7	0.573	0.564	62.50
AHU	DP8	0.781	0.775	83.30
ANU	env	0.618	0.615	75.00
ANU	soc	0.378	0.371	31.20
ANU	success	1.000	1.000	100.00
ANU	DP1	0.873	0.870	87.50
ANU	DP2	0.386	0.373	50.00
ANU	DP3	0.800	0.798	85.70
ANU	DP4	0.657	0.654	66.70
ANU	DP5	0.836	0.832	83.30
ANU	DP6	-0.150	-0.200	50.00
ANU	DP7	0.174	0.157	25.00
ANU	DP8	0.375	0.357	66.70
CDE	env	0.544	0.543	66.70
CDE	soc	0.762	0.761	75.00
CDE	success	1.000		100.00
CDE	DP1	1.000	1.000	100.00
CDE	DP2	-0.188	-0.200	50.00
CDE	DP3	0.391	0.387	42.90
CDE	DP4	0.739	0.737	77.80

Team	vargroup	Krippendorff	Fleiss	Percent Agree
CDE	DP5	1.000	1.000	100.00
CDE	DP6	1.000		100.00
CDE	DP7	0.710	0.707	75.00
CDE	DP8	0.366	0.357	66.70
CDU	env	0.747	0.747	75.00
CDU	soc	0.322	0.319	32.50
CDU	success	1.000		100.00
CDU	DP1	0.914	0.913	95.00
CDU	DP2	0.375	0.370	80.00
CDU	DP3	0.668	0.667	77.10
CDU	DP4	0.714	0.713	73.30
CDU	DP5	-0.110	-0.122	0.00
CDU	DP6	-0.017	-0.035	90.00
CDU	DP7	0.280	0.273	50.00
CDU	DP8	0.113	0.103	20.00
CHN	env	0.636	0.634	66.70
CHN	soc	0.507	0.503	45.80
CHN	success	-0.063	-0.125	66.70
CHN	DP1	0.635	0.630	83.30
CHN	DP2	0.584	0.578	66.70
CHN	DP3	0.657	0.654	71.40
CHN	DP4	0.551	0.548	63.00
CHN	DP5	0.802	0.799	88.90
CHN	DP6	0.773	0.766	83.30
CHN	DP7	0.895	0.893	91.70
CHN	DP8	0.438	0.427	55.60
DHN	env	0.473	0.473	69.40
DHN	soc	0.657	0.656	77.10
DHN	success	0.868	0.866	91.70
DHN	DP1	0.550	0.549	64.60
DHN	DP2	0.535	0.533	58.30
DHN	DP3	0.798	0.798	79.80
DHN	DP4	0.731	0.730	74.10
DHN	DP5	0.496	0.494	55.60
DHN	DP6	0.398	0.394	58.30
DHN	DP7	0.568	0.567	58.30
DHN	DP8	0.757	0.756	80.60
DEU	env	0.495	0.493	77.10
DEU	soc	0.571	0.569	53.10
DEU	success	0.477	0.455	50.00
DEU	DP1	0.692	0.688	75.00
DEU	DP2	0.578	0.574	62.50

Team	vargroup	Krippendorff	Fleiss	Percent Agree
DEU	DP3	0.529	0.526	64.30
DEU	DP4	0.433	0.430	61.10
DEU	DP5	0.817	0.814	83.30
DEU	DP6	0.475	0.464	50.00
DEU	DP7	0.503	0.498	56.20
DEU	DP8	0.222	0.211	33.30
EHU	env	0.384	0.381	75.00
EHU	soc	0.285	0.280	54.20
EHU	success	0.292	0.250	33.30
EHU	DP1	0.624	0.618	75.00
EHU	DP2	0.560	0.554	66.70
EHU	DP3	0.713	0.710	71.40
EHU	DP4	0.388	0.384	51.90
EHU	DP5	0.350	0.338	33.30
EHU	DP6	1.000	1.000	100.00
EHU	DP7	0.496	0.489	66.70
EHU	DP8	0.408	0.397	44.40

CENTER FOR BEHAVIOR, INSTITUTIONS & THE ENVIRONMENT (CBIE)

Intercoder Reliability Testing: Detailed Results
Coding Project 2013-2014

Team ACH:

```
Env-var:

Krippendorff's alpha
 Subjects = 72
   Raters = 3
    alpha = 0.603


Fleiss' Kappa for m Raters
 Subjects = 72
   Raters = 3
    Kappa = 0.602
        z = 15.5
  p-value = 0


Percentage agreement (Tolerance=0)
 Subjects = 72
   Raters = 3
  %-agree = 80.6


Soc-var:

Krippendorff's alpha
 Subjects = 48
   Raters = 3
    alpha = 0.693


Fleiss' Kappa for m Raters
 Subjects = 48
   Raters = 3
    Kappa = 0.692
        z = 15.4
  p-value = 0


Percentage agreement (Tolerance=0)
 Subjects = 48
   Raters = 3
  %-agree = 68.8
```

Success:

```
Krippendorff's alpha
 Subjects = 6
   Raters = 3
    alpha = 1


Fleiss' Kappa for m Raters
 Subjects = 6
   Raters = 3
```

```
    Kappa = 1
        z = 4.24
  p-value = 2.21e-05


Percentage agreement (Tolerance=0)

 Subjects = 6
   Raters = 3
  %-agree = 100


DP1:

Krippendorff's alpha
 Subjects = 24
   Raters = 3
    alpha = 0.261


Fleiss' Kappa for m Raters
 Subjects = 24
   Raters = 3
    Kappa = 0.256
        z = 3.54
  p-value = 0.000399


Percentage agreement (Tolerance=0)
 Subjects = 24
   Raters = 3
  %-agree = 33.3


DP-2:

Krippendorff's alpha
 Subjects = 24
   Raters = 3
    alpha = 0.327


Fleiss' Kappa for m Raters
 Subjects = 24
   Raters = 3
    Kappa = 0.322
        z = 3.83
  p-value = 0.000129


Percentage agreement (Tolerance=0)
 Subjects = 24
   Raters = 3
  %-agree = 37.5


DP-3:

Krippendorff's alpha
 Subjects = 42
   Raters = 3
    alpha = 0.387
```

```
Fleiss' Kappa for m Raters
 Subjects = 42
   Raters = 3
    Kappa = 0.384
        z = 4.31
  p-value = 1.62e-05


Percentage agreement (Tolerance=0)
 Subjects = 42
   Raters = 3
  %-agree = 64.3


DP-4:

Krippendorff's alpha
 Subjects = 54
   Raters = 3
    alpha = 0.591


Fleiss' Kappa for m Raters
 Subjects = 54
   Raters = 3
    Kappa = 0.59
        z = 11.3
  p-value = 0


Percentage agreement (Tolerance=0)
 Subjects = 54
   Raters = 3
  %-agree = 59.3


DP-5:

Krippendorff's alpha
 Subjects = 18
   Raters = 3
    alpha = -0.138


Fleiss' Kappa for m Raters
 Subjects = 18
   Raters = 3
    Kappa = -0.149
        z = -1.38
  p-value = 0.169


Percentage agreement (Tolerance=0)
 Subjects = 18
   Raters = 3
  %-agree = 50


DP-6:

Krippendorff's alpha
 Subjects = 12
   Raters = 3
    alpha = -0.241
```

```
Fleiss' Kappa for m Raters
 Subjects = 12
   Raters = 3
    Kappa = -0.258

        z = -1.91
  p-value = 0.0556


Percentage agreement (Tolerance=0)
 Subjects = 12
   Raters = 3
  %-agree = 16.7


DP-7:

Krippendorff's alpha
 Subjects = 24
   Raters = 3
    alpha = 0.389


Fleiss' Kappa for m Raters
 Subjects = 24
   Raters = 3
    Kappa = 0.385
        z = 3.99
  p-value = 6.58e-05


Percentage agreement (Tolerance=0)
 Subjects = 24
   Raters = 3
  %-agree = 50


DP-8:

Krippendorff's alpha
 Subjects = 18
   Raters = 3
    alpha = -0.274


Fleiss' Kappa for m Raters
 Subjects = 18
   Raters = 3
    Kappa = -0.286
        z = -2.1
  p-value = 0.0358


Percentage agreement (Tolerance=0)

 Subjects = 18
   Raters = 3
  %-agree = 33.3
```

Team ACU:

Env-var:

```
Krippendorff's alpha
 Subjects = 36
   Raters = 3
    alpha = 0.435


Fleiss' Kappa for m Raters
 Subjects = 36
   Raters = 3
    Kappa = 0.432
        z = 8.3
  p-value = 0


Percentage agreement (Tolerance=0)
 Subjects = 36
   Raters = 3
  %-agree = 52.8
```

Soc-var:

```
Krippendorff's alpha
 Subjects = 24
   Raters = 3
    alpha = 0.27


Fleiss' Kappa for m Raters
 Subjects = 24
   Raters = 3
    Kappa = 0.265
        z = 3.57
  p-value = 0.000357


Percentage agreement (Tolerance=0)
 Subjects = 24
   Raters = 3
  %-agree = 58.3
```

Success:

```
Krippendorff's alpha
 Subjects = 3
   Raters = 3
    alpha = -0.24


Fleiss' Kappa for m Raters
 Subjects = 3
   Raters = 3
    Kappa = -0.312
        z = -1.19
  p-value = 0.236


Percentage agreement (Tolerance=0)
 Subjects = 3
```

```
   Raters = 3
  %-agree = 0


DP1:

Krippendorff's alpha
 Subjects = 12
   Raters = 3
    alpha = 0.536


Fleiss' Kappa for m Raters
 Subjects = 12
   Raters = 3
    Kappa = 0.53
        z = 4.94
  p-value = 7.65e-07


Percentage agreement (Tolerance=0)
 Subjects = 12
   Raters = 3
  %-agree = 66.7


DP2:

Krippendorff's alpha
 Subjects = 12
   Raters = 3
    alpha = 0.116


Fleiss' Kappa for m Raters
 Subjects = 12
   Raters = 3
    Kappa = 0.103
        z = 0.792
  p-value = 0.429


Percentage agreement (Tolerance=0)
 Subjects = 12
   Raters = 3
  %-agree = 50


DP3:

Krippendorff's alpha
 Subjects = 21
   Raters = 3
    alpha = 0.342


Fleiss' Kappa for m Raters
 Subjects = 21
   Raters = 3
    Kappa = 0.337
        z = 3.57
  p-value = 0.000356
```

```
Percentage agreement (Tolerance=0)
 Subjects = 21
   Raters = 3
  %-agree = 47.6


DP4:

Krippendorff's alpha
 Subjects = 27
   Raters = 3
    alpha = 0.341


Fleiss' Kappa for m Raters
 Subjects = 27
   Raters = 3
    Kappa = 0.337
        z = 3.68
  p-value = 0.000236


Percentage agreement (Tolerance=0)
 Subjects = 27
   Raters = 3
  %-agree = 51.9


DP5:

Krippendorff's alpha
 Subjects = 9
   Raters = 3
    alpha = 0.759


Fleiss' Kappa for m Raters
 Subjects = 9
   Raters = 3
    Kappa = 0.755
        z = 3.92
  p-value = 8.83e-05


Percentage agreement (Tolerance=0)
 Subjects = 9
   Raters = 3
  %-agree = 88.9


DP6:

Krippendorff's alpha
 Subjects = 6
   Raters = 3
    alpha = 0.344


Fleiss' Kappa for m Raters
 Subjects = 6
   Raters = 3
    Kappa = 0.325
        z = 1.38
  p-value = 0.168
```

```
Percentage agreement (Tolerance=0)
 Subjects = 6
   Raters = 3
  %-agree = 50


DP7:

Krippendorff's alpha
 Subjects = 12
   Raters = 3
    alpha = 0.696


Fleiss' Kappa for m Raters
 Subjects = 12
   Raters = 3
    Kappa = 0.692
        z = 6.82
  p-value = 9.01e-12


Percentage agreement (Tolerance=0)
 Subjects = 12
   Raters = 3
  %-agree = 75


DP8:

Krippendorff's alpha
 Subjects = 9
   Raters = 3
    alpha = 0.456


Fleiss' Kappa for m Raters
 Subjects = 9
   Raters = 3
    Kappa = 0.446
        z = 3.13
  p-value = 0.00173


Percentage agreement (Tolerance=0)
 Subjects = 9
   Raters = 3
  %-agree = 55.6
```

Team ADU:

```
Env-var:

Krippendorff's alpha
 Subjects = 24
   Raters = 3
    alpha = 0.156


Fleiss' Kappa for m Raters
 Subjects = 24
   Raters = 3
    Kappa = 0.15
        z = 1.94
  p-value = 0.0528


Percentage agreement (Tolerance=0)
 Subjects = 24
   Raters = 3
  %-agree = 54.2


Soc-var:

Krippendorff's alpha
 Subjects = 16
   Raters = 3
    alpha = 0.221


Fleiss' Kappa for m Raters
 Subjects = 16
   Raters = 3
    Kappa = 0.213
        z = 2.76
  p-value = 0.00586


Percentage agreement (Tolerance=0)
 Subjects = 16
   Raters = 3
  %-agree = 31.2


Success:

Krippendorff's alpha
 Subjects = 2
   Raters = 3
    alpha = 0.312


Fleiss' Kappa for m Raters
 Subjects = 2
   Raters = 3
    Kappa = 0.25
        z = 0.612
  p-value = 0.54


Percentage agreement (Tolerance=0)
 Subjects = 2
```

```
   Raters = 3
  %-agree = 50


DP1:

Krippendorff's alpha
 Subjects = 8
   Raters = 3
    alpha = 0.325


Fleiss' Kappa for m Raters
 Subjects = 8
   Raters = 3
    Kappa = 0.311
        z = 2.74
  p-value = 0.00616


Percentage agreement (Tolerance=0)
 Subjects = 8
   Raters = 3
  %-agree = 25


DP2:

Krippendorff's alpha
 Subjects = 8
   Raters = 3
    alpha = 0.877


Fleiss' Kappa for m Raters
 Subjects = 8
   Raters = 3
    Kappa = 0.874
        z = 6.04
  p-value = 1.53e-09


Percentage agreement (Tolerance=0)
 Subjects = 8
   Raters = 3
  %-agree = 87.5


DP3:

Krippendorff's alpha
 Subjects = 14
   Raters = 3
    alpha = 0.525


Fleiss' Kappa for m Raters
 Subjects = 14
   Raters = 3
    Kappa = 0.519
        z = 4.4
  p-value = 1.06e-05
```

```
Percentage agreement (Tolerance=0)
 Subjects = 14
   Raters = 3
  %-agree = 64.3


DP4:

Krippendorff's alpha
 Subjects = 18
   Raters = 3
    alpha = 0.921


Fleiss' Kappa for m Raters
 Subjects = 18
   Raters = 3
    Kappa = 0.921
        z = 7.57
  p-value = 3.69e-14


Percentage agreement (Tolerance=0)
 Subjects = 18
   Raters = 3
  %-agree = 94.4


DP5:

Krippendorff's alpha
 Subjects = 6
   Raters = 3
    alpha = 0.836


Fleiss' Kappa for m Raters
 Subjects = 6
   Raters = 3
    Kappa = 0.832
        z = 4.97
  p-value = 6.8e-07


Percentage agreement (Tolerance=0)
 Subjects = 6
   Raters = 3
  %-agree = 83.3


DP6:

Krippendorff's alpha
 Subjects = 4
   Raters = 3
    alpha = 0.739


Fleiss' Kappa for m Raters
 Subjects = 4
   Raters = 3
    Kappa = 0.727
        z = 3.39
  p-value = 0.00071
```

```
Percentage agreement (Tolerance=0)
 Subjects = 4
   Raters = 3
  %-agree = 75


DP7:

Krippendorff's alpha
 Subjects = 8
   Raters = 3
    alpha = 0.633


Fleiss' Kappa for m Raters
 Subjects = 8
   Raters = 3
    Kappa = 0.625
        z = 3.06
  p-value = 0.0022


Percentage agreement (Tolerance=0)
 Subjects = 8
   Raters = 3
  %-agree = 75


DP8:

Krippendorff's alpha
 Subjects = 6
   Raters = 3
    alpha = 1


Fleiss' Kappa for m Raters
 Subjects = 6
   Raters = 3
    Kappa = NaN
        z = NaN
  p-value = NaN               NOTE:  all coded values 2 cases/3 var = -1


Percentage agreement (Tolerance=0)
 Subjects = 6
   Raters = 3
  %-agree = 100
```

CENTER FOR BEHAVIOR, INSTITUTIONS & THE ENVIRONMENT (CBIE)

Intercoder Reliability Testing: R Scripts
Coding Project 2013-2014

```
##Read in environmental coding variable data
Environ<-read.table("EHUenv-var-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
Environ  ##R will display all the data
names(Environ)  ##R will display column headers of data
dim(Environ) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(Environ, as.numeric))
Environ1<-as.matrix(Environ)
Environ1

# Exclude columns with NA values
Environ1.exclude<-Environ1[ , colSums(is.na(Environ1)) == 0]
Environ1.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(Environ1.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
Environ2<-t(Environ1.exclude)
Environ2
kappam.fleiss(as.matrix(Environ2,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(Environ2) # Simple percentage agreement

################################################################################
##Read in social coding variable data
Social<-read.table("EHUsoc-var-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
Social  ##R will display all the data
names(Social)  ##R will display column headers of data
dim(Social) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(Social, as.numeric))
Social1<-as.matrix(Social)
Social1

# Exclude columns with NA values
Social1.exclude<-Social1[ , colSums(is.na(Social1)) == 0]
Social1.exclude

##Load irr library
library(irr)
library(lpSolve)
```

```
##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(Social1.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
Social2<-t(Social1.exclude)
Social2
kappam.fleiss(as.matrix(Social2,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(Social2) # Simple percentage agreement

################################################################################
##Read in success variable coding data
Success<-read.table("EHUsuccess-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
Success  ##R will display all the data
names(Success)  ##R will display column headers of data
dim(Success) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(Success, as.numeric))
Success1<-as.matrix(Success)
Success1

# Exclude columns with NA values
Success1.exclude<-Success1[ , colSums(is.na(Success1)) == 0]
Success1.exclude
##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(Success1.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
Success2<-t(Success1.exclude)
Success2
kappam.fleiss(as.matrix(Success2,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(Success2) # Simple percentage agreement

################################################################################

##Read in DP1 coding variable data
DP1<-read.table("EHU-DP1-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP1  ##R will display all the data
names(DP1)  ##R will display column headers of data
dim(DP1) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP1, as.numeric))
DP11<-as.matrix(DP1)
DP11
```

```
# Exclude columns with NA values
DP11.exclude<-DP11[ , colSums(is.na(DP11)) == 0]
DP11.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP11.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
DP12<-t(DP11.exclude)
DP12
kappam.fleiss(as.matrix(DP12,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(DP12) # Simple percentage agreement

################################################################################

##Read in DP2 variable coding data
DP2<-read.table("EHU-DP2-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP2  ##R will display all the data
names(DP2)  ##R will display column headers of data
dim(DP2) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP2, as.numeric))
DP21<-as.matrix(DP2)
DP21

# Exclude columns with NA values
DP21.exclude<-DP21[ , colSums(is.na(DP21)) == 0]
DP21.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP21.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
DP22<-t(DP21.exclude)
DP22
kappam.fleiss(as.matrix(DP22,exact=FALSE,detail=FALSE))
```

```
##############################################################################################
##Read in DP3 coding variable data
DP3<-read.table("EHU-DP3-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP3  ##R will display all the data
names(DP3)  ##R will display column headers of data
dim(DP3) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP3, as.numeric))
DP31<-as.matrix(DP3)
DP31

# Exclude columns with NA values
DP31.exclude<-DP31[ , colSums(is.na(DP31)) == 0]
DP31.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP31.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
DP32<-t(DP31.exclude)
DP32
kappam.fleiss(as.matrix(DP32,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(DP32) # Simple percentage agreement

##############################################################################################

##Read in DP4 coding variable data
DP4<-read.table("EHU-DP4-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP4  ##R will display all the data
names(DP4)  ##R will display column headers of data
dim(DP4) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP4, as.numeric))
DP41<-as.matrix(DP4)
DP41
# Exclude columns with NA values
DP41.exclude<-DP41[ , colSums(is.na(DP41)) == 0]
DP41.exclude

##Load irr library
library(irr)
library(lpSolve)
```

```
##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP41.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
DP42<-t(DP41.exclude)
DP42
kappam.fleiss(as.matrix(DP42,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(DP42) # Simple percentage agreement

################################################################################

##Read in DP5 coding variable data
DP5<-read.table("EHU-DP5-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP5  ##R will display all the data
names(DP5)  ##R will display column headers of data
dim(DP5) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP5, as.numeric))
DP51<-as.matrix(DP5)
# Exclude columns with NA values
DP51.exclude<-DP51[ , colSums(is.na(DP51)) == 0]
DP51.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP51.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
DP52<-t(DP51.exclude)
DP52
kappam.fleiss(as.matrix(DP52,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(DP52) # Simple percentage agreement

################################################################################
##Read in DP6 coding variable data
DP6<-read.table("EHU-DP6-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP6  ##R will display all the data
names(DP6)  ##R will display column headers of data
dim(DP6) ## R will display the number of rows & the number of columns
```

```
###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP6, as.numeric))
DP61<-as.matrix(DP6)
DP61

# Exclude columns with NA values
DP61.exclude<-DP61[ , colSums(is.na(DP61)) == 0]
DP61.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP61.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
DP62<-t(DP61.exclude)
DP62
kappam.fleiss(as.matrix(DP62,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(DP62) # Simple percentage agreement

################################################################################
##Read in DP7 coding variable data
DP7<-read.table("EHU-DP7-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP7  ##R will display all the data
names(DP7)  ##R will display column headers of data
dim(DP7) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP7, as.numeric))
DP71<-as.matrix(DP7)
DP71

# Exclude columns with NA values
DP71.exclude<-DP71[ , colSums(is.na(DP71)) == 0]
DP71.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP71.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
```

```
DP72<-t(DP71.exclude)
DP72
kappam.fleiss(as.matrix(DP72,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(DP72) # Simple percentage agreement

#############################################################################################

##Read in DP8 coding variable data
DP8<-read.table("EHU-DP8-NA.csv",header=TRUE,sep=",",row.names=1)

##Explore data
DP8  ##R will display all the data
names(DP8)  ##R will display column headers of data
dim(DP8) ## R will display the number of rows & the number of columns

###Turn dataframe into matrix format and exclude NA values
as.matrix(sapply(DP8, as.numeric))
DP81<-as.matrix(DP8)
DP81

# Exclude columns with NA values
DP81.exclude<-DP81[ , colSums(is.na(DP81)) == 0]
DP81.exclude

##Load irr library
library(irr)
library(lpSolve)

##Calculate Krippendorff's alpha on binary values (0/1)
## first assume the default nominal classification
kripp.alpha(DP81.exclude,method="nominal")

##Calculate Fleiss' kappa (need to transpose matrix to perform this calculation)
DP82<-t(DP81.exclude)
DP82
kappam.fleiss(as.matrix(DP82,exact=FALSE,detail=FALSE))

##Calculate simple percent agreement
agree(DP82) # Simple percentage agreement
```

CENTER FOR BEHAVIOR, INSTITUTIONS & THE ENVIRONMENT (CBIE)

Coding Team Dynamics – Social Network Analysis
Coding Project 2013-2014

For questions please contact Elicia Ratajczyk at elicia.ratajczyk@asu.edu

Since there was no established written coding protocol or detailed codebook descriptions for each of the variables in the CBIE coding project, and no qualitative data analysis (QDA) software used, the use of text segments as evidence to support coding results developed organically as teams met to compare their coding results and was not a consistent methodology among all coders. The conversational group decision process arguably resulted in advantages for coders who were able to more forcefully argue their positions, as well as for those who were better at documenting all instances of text that led them to code a variable in a certain way. The discovery of these differences in coding approach between individual members of the coding team supports the need for explicit rules of coding to increase intercoder agreement and replicability (Stemler, 2001; MacQueen et al., 1998). As a preliminary step in examining these issues, select social network analyses was performed with the SNA package in R (Butts, 2007), showing that some coders agreed with the final group code more than others (Table 4). In addition, the dichotomized matrix in Table 5 shows which coders influenced other coders overall, and it is clear that some coders (such as "D") influenced all other coders while some coders (such as "B") were influenced more often.

Coding Group	Total Cases
ACH	6
ACU	2
ADU	1
AEN	7
AEU	7
AHN	1
AHU	1
ANU	2
CDE	4
CDH	1
CDU	6
CHN	3
CNU	2
DEN	1
DEU	4
DHN	12
EHN	1
EHU	3
Total	64

Table 1: Coder agreement with group code

	A	B	C	D	E	F	G
Agreement	273	215	288	298	293	314	302
Total Possible	336	264	348	324	336	324	336
Percentage	0.8125	0.8144	0.8276	0.9198	0.8720	0.9691	0.8988

Table 2: Coder to coder influence matrix: A code of "1" indicates that the coder indicated within the row influenced the coder indicated in the column more often than vice versa.

	A	**B**	**C**	**D**	**E**	**F**	**G**
A	-	1	0	0	1	0	0
B	0	-	1	0	0	0	0
C	0	0	-	0	0	1	1
D	1	1	1	-	1	1	1
E	0	1	1	0	-	0	0
F	1	0	0	0	1	-	1
G	1	1	0	0	1	0	-