Thematic Review III.1

Economic and Financial Issues

Financial, Economic and Distributional Analysis

Part 9: Distributional Analysis

Version 3 – Work in Progress: 7 July 2000

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9. Distributional Analysis

The importance of equity and distributional issues to the dams debate is recounted in the WCD Thematic Review on Social Impacts: Equity and Distributional Issues (Adams 2000). Consideration of the equity and distributional impacts of dam projects should, therefore, logically play a much more prominent and explicit role in decision-making (Klassen 1999 ecoweb002). Unfortunately, neither cost-benefit analysis nor least cost analysis or multi-criteria analysis have the explicit objective of providing decision-makers with information about how different groups fare as a result of projects. This chapter, then, discusses the ways in which such information may be generated and presented to stakeholders and decision-makers.

Typical equity issues that concern decision-makers and society at large are unequal distributions of dam project impacts across the following: (1) income groups and socio-economic classes, (2) time (i.e. between current and future generations of affected groups), and (3) geographic regions. There are numerous other ways of thinking about and describing equity that are equally valid for various types of project (e.g. the relative political influence of affected groups). The diversity of cultural, societal and ethical opinions that make up the debate over the equity of dam projects suggest that it will be difficult to systematically evaluate whether or not the distribution of project outcomes is fair and/or just.

In cases where losses experienced by affected groups appear to be profound, distributional concerns may override the economic efficiency and financial viability results of project assessment. However, it should be emphasised that the purely analytical act of undertaking a distributional analysis should be kept separate from the normative political act of defining the equity objectives of a project (Sancho Marco 1999 ecoweb018). Mixing of the two may lead to a preoccupation with methodological issues at the cost of consideration of equity issues that many feel underlie the dams debate as a whole (Wilks 1999 ecoweb009).

Distributional analysis aims to provide information on how the effects of an activity (be it a development project, a public policy or time) would impact different groups of the society. Note that there could be many different type of effects, how to assess them, and also many ways of dividing society in different groups e.g.: (a) effects that can be priced and therefore assessed as monetary costs and benefits, (b) effects that can be partially priced like environmental impacts, (c) effects that can not be priced but yet can be assessed as a gain or a loss like empowerment changes, and (d) effects for which even the direction of the impact is contestable, for example whether modernisation of traditional societies is a gain or a loss. Likewise there are many ways to group the society, or a smaller set of stakeholders (by income, location, gender, race, economic activity, etc.).

In any event it is likely that information about the distributional consequences of dams should, at minimum, include the information provided by traditional economic tools. Where possible other impacts, whether in economic or non-economic terms, also must be specified to provide a full picture of the distributional impacts of a dam project. Thus, this chapter discusses both quantitative and qualitative approaches to distributional analysis.

9.1 Distributional Impacts and Concerns of Dam Projects

The wealth of a nation is highly dependent on the way it uses and distributes its resources, and dams are a means of transforming a nation’s endowment of these resources – human, technological, natural, physical, financial and cultural capital – into tangible products and services that respond to the needs of its citizens. Because a nation is not homogenous, different groups within society will have differing endowments of man-made capital and differing rights and responsibilities with regard to other members of society and with respect to natural resources and the environment. The construction of a dam requires an investment of man-made capital and, as a result, generates a series of benefits that are then distributed – either through political-administrative means or through markets – to members of society. At the same time, the construction of a large dam will have profound effects (both positive and negative) on the natural and social landscape of the setting in which the dam is located. These changes will affect the de facto entitlements to natural resources and cultural stability and cohesion previously experienced by local communities and resource owners.

In cases where there has been a lack of social acceptance of large dams this is often caused by failures in process and outcomes that relate to the transformation process as characterised above. At one level, the process of investment in, and distribution of, project benefits is criticised. For example, stakeholder meetings for a number of the WCD Case Studies (e.g. Kariba and Tucuruí) demonstrated that there is considerable consensus amongst stakeholders that the benefits of these projects have not been distributed in an equitable manner. However, many dam projects have also failed to acknowledge pre-existing rights and claims of local communities with respect to cultural and natural capital that are to be affected by dams. The result has been the perception on the part of some groups that not only have they not received (a fair share) of the direct project benefits but that installation of the dam has caused them to lose endowments and entitlements that they once enjoyed. In a sense then, rather than investing in the dam these groups have been de-vested by the dam, without garnering a corresponding portion of the benefits generated by the project.

The case studies commissioned by the WCD give a qualitative overview of the distributional impacts of eight large dams around the world.[46] Together with an analysis of five World Bank dam projects as included in Technical Annex 10 this limited sample provides an indicative list of the potential distribution of the economic impacts of dams:[47]

- benefits accrue to the intermediate and final users of the dam services: power, water, flood protection, tourism and recreation;
- the country taxpayers may shoulder a good portion of the investment and operation costs, to the extent that prices charged for the dam-related services fail to pay back investment and operation costs. This is usually the case for most dam services to the exception of power. These costs tend to be high, but since the group – country taxpayers – is large, per capita costs are usually very small;
- to the extent that some of these dams were financed with international concessional lending (such as IDA loans) part of the costs have been also supported by donor countries' taxpayers;
- displaced populations at the reservoir and people that are curtailed from their traditional access to natural resources elsewhere in the basin incur part of the dam indirect costs, to the extent that they are not properly compensated. These non-compensated costs can go from low to significant from the developer's perspective, but on a per capita base they tend to be substantial for the affected people;
- environmentalists, whether local, national or international, may endure costs arising from changes to the natural environment;
- other distributional effects, like health, gender or regional development are more case specific.

9.2 Historical Approaches and Actual Practice

In the 1960s, economic texts on project appraisal suggested a number of methods for incorporating distributional concerns into project appraisal. These included:

- Proposing the use of different weights for net benefits according to their final use: savings or consumption, in the belief that projects that had a larger portion of their benefits turned into savings, would accelerate the future growth of GDP and therefore should be preferred.

- Proposing the use of different weights (distributional weights) for the net benefits accruing to different income groups in the belief that projects that benefit low-income groups should be preferred.

Note that the distribution exercises (in the first case between consumption and saving, and in the second case among income-level groups) were proposed solely for the purpose of being fed back into the cost-benefit exercise (through a weighted addition).

The use of distributional weights was proposed (primarily by the World Bank) as a way of extending Economic CBA to a Social CBA that would explicitly incorporate equity concerns. For groups that experience project losses under a strict cost-benefit test, distributional weights were to be computed on the basis of estimated values of the marginal utility of consumption for these various groups, and assigned to cost-benefit outcomes in order to more heavily weight the costs and benefits accruing to their accounts. The use of distributional weights is, therefore, not so much a distributional analysis as a mechanism for ensuring that projects result in a progressive redistribution of the benefits of public projects.

A more neutral approach to selecting weighting criteria suggested was to multiply net benefits accruing to each income group by the ratio of the country average income to the groups' average income. In this way the net benefits of a project that has a distribution equal to the current national income distribution, remain unchanged.

The idea of weighting consumption and savings differently was discarded as it was felt that promoting savings or income distribution goals was better handled at an economic policy level rather than at a project by project level (Asian Development Bank 1997). The distributional-weights approach was also subsequently dropped by the World Bank as it was considered that (1) weighting was a subjective judgement in conflict with the (so assumed) objective nature of the economic assessment, (2) the distributional consequences of a project could not be established with accuracy and (3) it was felt that other more efficient means of achieving distributional objectives were available (Devarajan et al. 1996 in Weiss 2000). Related to the latter argument, a further criticism of the distributional-weights approach is that it implicitly sought to mix the methodological and normative aspects of the problem. As pointed out by Wilks (1999 ecoweb009) such a practice might override public discussions about entitlements, social exclusion and different views about development and, therefore, fail to do justice to complex social, historical and political debates.

Weiss (2000) reviews the history of these approaches to distributional analysis at international development agencies and concludes that historically the only effort at operationalising distributional analysis was the case of the Inter-American Development Bank, which developed a series of indicators for determining the impact of projects on poverty in the 1980s.

The WCD review of MDB appraisals shows that not only was the social weighting technique not applied but that no explicit analysis of distributional impacts is included in these appraisals. In addition, a distributional analysis was not conducted as part of project preparation for any of the WCD

Case Study dams. In the last twenty years distributional analysis has been used more in the assessment of fiscal or price change assessment than in the assessment of development projects assessment (Weiss 2000). This is because census and survey information on family income and budgets, makes it very easy to track what would be the impact among different income groups of, say a change in taxes, expenditure on health or a change in the price of oil. Where distribution of project impacts are considered it has typically been that of the identification of a few large groups of potential beneficiaries, usually as part of the project preparation (because it helps sell the project).

9.3 Current Guidelines

Distributional analysis has recently come back to the assessment of international development projects as the result of two trends: (a) an increased focus on poverty (either as poverty reduction or eradication) and (b) a widening of the decision making process that now needs to take into consideration the interest of a larger group of stakeholders.

The Asian Development Bank, in its Guidelines for Economic Analysis published in 1997 recommends a distributional analysis as part of the economic analysis of projects. This analysis is a straightforward application of cost-benefit data (and presented later in this Chapter) as developed by UNIDO in the 1970s (Weiss 2000). Given the Bank's policies on poverty, the Guidelines also demonstrate how a poverty dimension may be incorporated into this analysis by determining the net economic benefit accruing to poor households (below the poverty line) according to the proportion of each group that is poor; and calculating a poverty impact ratio by comparing the net economic benefits to the poor with the net economic benefits to the project as a whole.

The World Bank's Operational Policy on Economic Evaluation of Investment Operations (OP 10.04, September 1994) clearly reflects the focus on poverty as it states that the economic analysis examines the project's consistency with the Bank's poverty reduction strategy. Other than that, distributional or equity impacts do not impinge on project acceptability in the OP. The Operational Manual Statement on Economic Analysis of Projects (No. 2.21, May 1980) still discusses the use of distributional weights. The new, yet still unapproved Handbook on Economic Analysis of Investment Operations recognises the importance of identifying those who gain and lose from a project, as well as the need for special attention to impacts on the "poor" or "very poor" (Belli et al. 1998). The Handbook provides a series of tables indicating the ways in which costs and benefits can be broken down and presented so as to indicate who gains and who loses from a project.

The multilateral development bank position can be compared with that of federal water resource projects in the United States where two types of accounts are listed as part of the planning process for water resources: the Regional Economic Development (RED) and Other Social Effects (OSE) accounts. The RED accounts examine the distribution of regional economic activity resulting from a plan or project. Regional income and regional employment are the measures employed for RED. The OSE accounts are defined as a means of displaying and integrating information not reflected in the other accounts (i.e. in NED, EQ and RED). The categories of effects included in OSE include urban and community impacts; life, health, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation (US Water Resources Council 1983). Neither the RED nor the OSE accounts is required as part of the decision process itself. Only the NED accounts (the CBA) is employed for this purpose. The RED is discussed and an example provided in the previous Chapter of this paper. An example of a social impact analysis is provided later in this Chapter in Box 20. These accounts do not explicitly define a "distributional analysis" although they may provide the space for such.

9.4 Good Practice Toolchest

As indicated above relatively less effort has gone into the application of distributional analysis as a methodology of project appraisal per se so that the methodological options that are available in good practice today are either offshoots of other forms of analysis or represent initial efforts to develop new approaches. As noted at the outset of the paper, from an economic perspective, distributional analysis may be interpreted in its broadest sense as the distribution of the impacts of a project, whether they are purely financial in nature or can be valued in economic terms is not material. What is relevant is that the impacts cause a change in welfare for the affected or interested party. For this reason, the good practice toolchest discusses qualitative as well as quantitative approaches.

Distributional analysis is increasingly viewed not as an add-on to a CBA but as an independent piece of information useful in the planning and design process. Therefore the need to weight and compare different distributions is left to the participants in the decision making process and the distributional analysis focuses simply on understanding the distribution of impacts per se. Also, the sense in which distributional analysis is a “summing up” exercise (and therefore applicable as a decision criterion as with CBA), and not a measurement technique itself, is reflected in the nature of the available approaches.

Following this logic, five approaches to distributional analysis can be identified moving from the most direct and “economic” approach to the broadest assessment:

- **Economic Distributional Analysis (EDA)** – i.e. the distribution of economic costs and benefits of a project as measured in DCF and CBA;
- **Economic Impact Analysis** – i.e. analysis of economic impacts of a project using a regional or macroeconomic model;
- **Environmental and Social Impact Assessment (EIA and SIA)** – these techniques can serve to identify project impacts that fall outside the scope of CBA and macroeconomic models, but that have important distributional consequences;
- **Equity (or Poverty) Assessment** – assessment of the impacts (in economic or non-economic terms) of projects on specific sub-populations/groups of concern; and
- **Distributional Analysis** – consideration of the full range of distributional impacts, regardless of whether they are financial, social, environmental or economic and whether they are assessed in a qualitative fashion, quantified in non-monetary terms, or valued in financial/economic terms.

The first two methods are purely concerned with the quantitative analysis of economic costs, benefits and impacts. EDA is the basic approach developed in the 1970s by UNIDO and currently being taken up by agencies such as the Asian Development Bank. Further examples of how this may be implemented in practice are provided in the next sub-section. The approach to distributional analysis using regional or macroeconomic models is already covered in Chapter 8 and, thus, is not repeated here.

The remaining methods are either qualitative in nature or serve to combine quantitative and qualitative information. At least in part this results from the emphasis in these methods on covering not just “economic” costs, benefits and impacts but more indirect social and environmental impacts which are more difficult to value in economic terms. EIA and SIA are not so much distributional analyses per se as a standard process in project appraisal that may be used to yield information on the distribution of project impacts. For more on the EIA and SIA process and methods, readers are referred to the WCD Thematic Review on this topic. For the purposes of illustration an example of a social impact assessment from the US is presented in Box 20. It is from the same Snake River Study as that used in the previous section on regional economic impacts so as to draw out the distinction between the two types of analysis as currently practised in the US.

Equity Assessments analyse the distribution of costs and benefits for specific sub-populations of concern. Examples of sub-populations that are often the focal point in dam decisions include: indigenous groups and other ethnic minorities, women and children, the rural poor, and small economic entities (e.g., small-scale agriculture). These groups are considered at higher risk of suffering disproportionate impacts because they exhibit one or more or the following:

- heightened vulnerability or physical proximity to adverse ecological impacts;
- politically disadvantaged, i.e., less able to represent their own interests; and
- economically disadvantaged.

To get a finer sense of impacts on disadvantaged groups, an equity assessment may draw on results of both cost-benefit analysis (i.e., social costs and benefits) and economic impact analysis, and then extend these by disaggregating results according to the sub-populations of interest. For example, decision-makers concerned with the long-term outlook for small business owners such as artisans would first define groups of artisans and then disaggregate and consider the net benefits experienced by these groups. Again, this is not so much a method as an approach. Any of the first three methods and approaches mentioned above may be used to identify the nature and magnitude of impacts on these groups. The actual assessment of the vulnerability to the risks engendered by a dam project can also be analysed through a social risk assessment as described in the WCD Thematic Review on Displacement, Relocation, Reparations and Development.

The final approach, Distributional Analysis is labelled as such as it is simply a holistic approach to summing up and presenting information that may be generated by one or all of the other methods. A Distributional Analysis may be used to systematise the presentation of information on the distribution of economic, environmental and social impacts of a project across the full range of project stakeholders. Since this may involve the presentation of information on impacts expressed in different units (or numeraires) the interpretation of such model does not lend itself to numerical, expert-driven solutions. Rather it is a decision support tool that can inform decision-making, particularly where decision processes require a high level of transparency, consultation and/or involve a negotiated solution amongst affected and interested parties. Considerations in undertaking such a comprehensive approach, as well as a practical example from the experience of the WCD Case Studies are covered in a separate sub-section below.

Box 20. Actual Practice: Social Impact Analysis in the Lower Snake River, USA

Four projects to improve juvenile salmon migration are being considered in the Snake River: Alternative 1 (base case or existing condition), Alternative 2 (existing conditions with maximum transport), Alternative 3 (major system improvements), and Alternative 4 (natural river draw-down or dam breaching). A social impact analysis was undertaken to examine the range of potential social impacts that may occur as a result of implementing one of the 4 alternatives. The analysis attempts to outline the distributional and equity effects on specific communities within the broader regional context. The study has been designed to meet the requirements specified in the P&G for Federal water projects (WRC, 1983).

Scope. The potentially affected lower Snake River region was divided into three subregions to explore the differential effects of the proposed alternatives: downstream, reservoir, and upstream. The study analysed the social impacts of the alternatives on 9 communities or case studies, taking into account the phases of project development. The communities were chosen to capture a range of direct positive and negative impacts across types of communities and the geographic scope of the study area. There are 3 distinct phases to the analysis with an overall study period of 20 years. The first phase includes the planning and decision-making period from the initiation of the feasibility study and environmental impact statement scoping to the final selection of the preferred alternative. The second phase includes the implementation phase. The third phase includes the post-implementation social effects.

Methodology. The following steps were taken to obtain reliable information on potential social impacts: (i) develop an understanding of the issues raised in the original scoping and the public information meetings conducted during the study, (ii) select key focus communities to capture the range of possible direct impacts, (iii) select appropriate indicators for the types of anticipated social impacts, (iv) describe the trends and history of the region and case study communities, and (v) develop estimates of potential impacts, the magnitude of these impacts, and the range of community responses using information various information, including secondary data analysis, key informant interviews, and a thorough literature review.

The key issues addressed include: (i) what the social impacts will be and when (timing), (ii) who will be affected, (iii) how they will be affected (beneficial/adverse), (iv) how much they will be affected, and (v) how the communities may respond. The analysis is supplemented by information obtained through a series of interactive community forums, which included each of the focus communities. The community forum information includes each community’s perceptions of its history, an assessment of its current situation, and a projection of potential social impacts under each of the proposed alternatives.

The significance of the impacts in the 9 focus communities was evaluated based on 42 indicators/impact measures classified into: (i) power, (ii) recreation, (iii) transportation, (iv) water supply, (v) implementation/avoided costs, (vi) anadromous fish recovery, and (vii) other social effects. For each of the indicators, relevant evaluation criteria such as increase in employment > 1%, or increase in highway safety, or loss of bridges within 50 miles, etc were applied.

Overall Results. The results show that changes in the physical, biological, and economic human environment would have both adverse and beneficial impacts on communities throughout the study region. Each of the alternatives would create winners and losers, both social and economically, within and between communities and the subregions.

Mitigation Analysis. The study identified compensation potential for those affected in consideration of the impacts on employment, net farm income, community-level impacts, and economic activities. Potential mitigation expenditures for 3,500 dislocated workers have been estimated in the range of $45.1 million and $48.1 million to address employment losses through job retraining, income support, and academic training. Potential mitigation for 82 affected communities has been estimated at between $4.3 million and $12.9 million, based on previous Federal and state mitigation expenditures used to address the impacts of free trade, old-growth forest conservation, and dislocated workers.

Source: US Army Corps of Engineers. 1999. Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement.

9.5 Economic Distributional Analysis (EDA)

While the above discussion underlines that there are many types of distributional analysis, and a comprehensive distributional analysis should be regarded as a multidisciplinary undertaking, the EDA approach involves distributional analysis of the financial plus the economic costs and benefits of a project. This reduced distributional analysis takes into account cost and benefits that can be expressed in monetary terms. There is a close conceptual relation between an economic distributional analysis (EDA), the discounted cash flow analysis (DCF), and the cost-benefit analysis (CBA) of a project as follows:

- the distribution of monetary costs and benefits across groups is similar to performing financial analysis from the perspective of each one of these groups; and
- when adding up the economic distribution through all participant groups, the initial overall project's cost-benefit figures are obtained, since the only monetary costs and benefits that can be distributed are either true cost, true benefits, or transfer payments, and adding up all transfer payments will result in their cancellation (since by definition what is a transfer gain to one party must be a transfer loss to another).

Conceptually an EDA is a very simple exercise that goes as follows: (1) list the costs and benefits to be considered; (2) asses them in monetary terms; (3) list the groups among which costs an benefits would be distributed; and (4) use factual allocation criteria (or acceptable proxies) to allocate "2" among "3." Moreover if the EDA follows the DCF and CBA of a project, the latter two will provide the information on costs and benefits, so that the EDA exercise would need to complete only steps "3" and "4." The ADB Guidelines summarise the steps as follows:

- estimate the present value of net financial benefits by participating group;
- determine the distribution of the net economic benefit by group by adding the difference between net benefits by group at economic and financial prices;

A simple example of this sort as used in the ADB Guidelines is reproduced below in Table 17. The original table depicted net economic benefits. The table is slightly rearranged to present benefits and costs so that the derivation of net benefits would be more evident.

Column 1 presents the discounted cash flow (DCF) of the financial analysis from the point of view of the firm, in this case a telephone company selling services to final consumers. Column 2 presents the results of the CBA and Column 3 the difference between the CBA and the DCF. The project results in 250 units of benefits accruing to consumers (consumer surplus), 120 in country losses due to foreign currency overvaluation, and 10 less in labour economic costs, because labour opportunity costs are 10% lower than market wages. Columns 4, 5, 6 and 7 distribute these economic costs and benefits among producer, the government, labour and consumers.

Table 17. Asian Development Bank Example of Distributional Analysis

Benefits and Costs	DCF of the producer (1)	CBA (2)	CBA - DCF (3)	Distributional Matrix			
				Producer (4)	Government (5)	Labour (6)	Consumers (7)
A. Benefits							950*
Sales	700	700	0	700	400		
Consumer Surplus		250	250				
Wages						100	
B. Costs							700
Imported	400	520	120	400	520		
Installation	100	100	0	100			
Labor costs	100	90	-10	100		90	
Other costs	200	200	0	200			
Net benefits A-B=	-100	+40	140	-100	-120	+10	+250

Source: Based on Asian Development Bank (1997)
Notes: *The gross benefits to consumers consists of the 700 in product plus the 250 in consumer surplus (i.e. total consumer willingness to pay for the product is 950 but they only had to pay 700 and market prices). All figures are present values in million of local currency.

Note that in the case of the firm its financial analysis is the same as its distributional analysis (columns 1 and 4). The government sells to the firm 400 of foreign currency, but since the real cost is 520, incurs a loss of 120 (column 5). Labourers receive 100 in salaries but since their opportunity cost is 90 they make a profit of 10. Consumers pay 700 for services that are worth 950 to them and so make a profit of 250. Note also that adding up the net benefits of all four groups returns the net project economic benefits of 40 units (Column 2).

If a consistent set of project cost and benefits is available, a simplified EDA can be easily performed and may be useful to inform a discussion on the projected distributional impacts of a project. Table 18 summarises one such exercise for Kedung Ombo dam in Indonesia (with cost and benefits expressed on an annuity base in 1995 million dollars). Since the exercise is based on secondary information the figures are not intended to be accurate nor complete, rather they are intended to give a good idea of what an EDA is about.

A similar but more detailed approach is used in Technical Annex 10 to perform an EDA of five dam projects that were included in the 1996 study by the Operations and Evaluation Department of the World Bank. The full sets of these provide a characterisation of patterns of economic distributional impacts that may arise in dam projects.

Table 18. Simplified EDA matrix of Kedung Ombo dam, Indonesia (commissioned in 1993)

Social Groups	(a) Power Benefits	(b) Irrigat. Benefits	(c) Urban Water Benefits	(d) Flood Control Benefits	(f) Direct Invest. Costs	(g) Direct Operat. Costs	(h) Resett. Indirect Costs	(i)Fish. and. Costs	Net Benefits
1. All urban households + business	+3.9	+12.5	(P)		-12.4	-0.1			+3.9
2. All rural households + producers		+8.4	(P)		-2.8				+5.6
3. Same as (2) in flood protect. areas				(VP)					(VP)
4. Farmers in the area irrigated		+20.9				-1.4			+19.5
5. Resettled population							-10.1 (EU)		-10.1 (EU)
7. Population in the project area								(VP)	(VP)
8. Total	+3.9	+41.8	(P)	(VP)	-15.2	-1.5	-10.1 (EU)	(VP)	+18.9

Source: OED (1996)

Qualitative red flags: P: Positive, VP: Very Positive and EU: may be unacceptable on equity grounds

Notes: One characteristic of EDA matrices is that while costs and benefits are mutually exclusive (no double counting should be allowed) social groups usually overlap (e.g. here a person in the flood protected area is at the same time part of a rural household). In most cases this is overlapping will not affect the analysis, and it can be removed by a further breakdown of information

9.6 Overall Analysis of Distributional Impacts

As stated earlier a full distributional analysis will cover the full range of impacts, not just the distribution of measurable effects of direct welfare effects of a project. As this involves the collation of a range of qualitative and non-quantitative information, and information on impacts that may change over time, the full exposition and presentation of such an analysis can be a very involved undertaking. Below two approaches to this problem are presented. The first approach reflects a comprehensive methodology for working through a full distributional analysis, as developed by Kyra Naudascher-Jankowski as a contribution to the WCD process. The second approach reflects the much more abbreviated approach to distributional analysis as pioneered in the WCD Case Studies.

9.6.1 Naudascher-Jankowski Approach[48]

The premise of the Naudascher-Jankowski approach is that, at a general level, the primary questions that distribution analysis of a dam project seeks to answer include the following:

- Which individuals, groups, and entities will be most (and least) affected by the project?
- What is the original endowment of groups affected by the dam project (i.e., how well does each affected group start off)?
- How well-positioned are affected groups to take advantage of gains from the dam project (or, conversely, to mitigate project costs)?
- What is the larger context in which groups are operating that also influences how well they fare (i.e., what is the baseline)?

This methodology provides a set of templates that can be used to organise and view qualitative and quantitative data describing distribution impacts in ways that help to answer these questions. For example, different templates can be used to organise data by the following variables of aggregation: geographic region, time period, type of household (e.g., urban/rural), gender, private and public sector entities, income level and employment type (e.g., casual/formal). The steps involved in applying this methodology and developing these templates are provided in Box 21. When applying this approach, if the analyst is in doubt about the existence of an effect or its measurement, the effect should be dropped from the distribution analysis. This reduces uncertainty and more importantly, it focuses attention on more substantial distributive impacts of a dam project.

Box 21. Naudascher-Jankowski Steps in Distributional Analysis

The eight steps in developing a distributional analysis according to Naudascher-Jankowski (1999) are as follows:

1. Setting the scope of distribution: establish the extent to which consideration of initial group endowments, non-project impacts, and opportunities for using distributed outcomes will be incorporated into the distribution analysis;

2. Determining the effects considered: compose a list of project effects using categories such as: *primary/secondary, direct/indirect, first round/second round,* and *planned/unplanned,* and determine if the effect is a cost or a benefit;

3. Choosing the time frame of the impact assessment: decide upon the time frame of the assessment; (two generations usually covers most first- and second-round effects);

4. Selecting regional levels: determine the local, regional, national, and international levels of interest of the analysis;

5. Evaluating the effects: perform a variety of analytical steps to quantify effects where possible (e.g., find market prices, capture externalities and non-priced factors, integrate uncertainty measures), or describe effects qualitatively;

6. Aggregating effects into cross-cutting impacts: add up effects and group them into the following impact categories: *(macro)economic*, *social*, and *environmental*;

7. Defining the distributional categories: define project groups according to socio-economic role, region, and time variables; also consider other variables such as race, gender, and income;

8. Establishing the distributional outcomes: combine quantitative and qualitative aspects, calculate impacts and aggregate according to the distributional groups of concern.

9.6.2 WCD Case Study Approach

Were the WCD to undertake a full Distributional Analysis of an existing dam it would require to have at hand all three analyses DCF, CBA, and EDA as performed at the time of the project inception, and monitoring reports of the relevant information during the dams' operation life. As noted earlier such information is generally not collected for the purpose of dam appraisal, much less is the information collected as a monitoring activity. Given the absence of this data the WCD attempted a simplified Distributional Analysis exercise in all the eight dam case studies. The information in the chapters on projected and actual impacts were employed in a separate chapter on distributional analysis with the purpose of summarising the distributional impacts of the project. Given the reliance on secondary data in the Case Studies the distributional analyses are mostly qualitative: they present distributional impacts in terms of whether they were gains or losses.

The distributional matrix employed in the Orange River pilot Case Study is presented in Table 19. This table represents an effort to compile the information on the distribution of project gains and losses on a single summary page. A generic template is provided in Table 20. Obviously in practice there would be a need to adapt the generic matrix to different situations and to experiment with different versions of the sheet for different audiences, such as a summary sheet for stakeholder presentation and discussion. Still, the availability of more comprehensive matrices would be important to underlie simplified versions. The set-up and interpretation of these tables is briefly summarised below.

The distributional matrix employs the attributes of project impacts as follows:

- Columns. The type of impacts are differentiated by columns with the left side of the table referring to gains under the project and the right side to costs under the project.
- Rows. The spatial distribution of the impact are differentiated in rows of the table.
- Impacts. The information on the impact is presented in detail in the text through prose, tables, graphs, maps, etc. (of an annex as suggested below) and summarised in the value attributed to the cell itself.
- Other Information. Additional information about the impact can be conveyed by an attribute of the cell on the sheet such as colour, shading or a comment (the latter is used in the Orange River matrix).

Room is made in the “extent” column to provide space for a quantitative indicator of the extent or size of the impact or affected population in non-monetary terms. This column may be useful in conveying changes over time through it being divided into a “then” and “now” sub-column (as in the Orange River matrix).

Transfers between government agencies may be noted as inflows and outflows on the sheet but that in the case of other stakeholders where gains and losses are related to the same impact category it is easier to understand the matrix if only the net gain or loss should be recorded on the sheet. The Orange River matrix contains a “compensation” category that is gain/loss neutral simply in order to record who received compensation without trying to specify whether it was on balance a gain or a loss. This, as compensation may be judged to be more or less appropriate. If compensation paid is widely acknowledged as insufficient or excessive this might be recorded as a gain or loss.

Cells of the matrix may contain whatever information is available from either analysis, discussions with stakeholders or other sources. Thus, matrix cells may contain the following indicators of impact:

- a mere indication that an impact exists (just a “XXX”, for example) as opposed to an indication that no impact occurred (just a blank cell),
- a relative indicator of importance or magnitude (High, Medium or Low or X vs. XXX)
- a quantitative indicator of importance (i.e. hectares affected, number of species lost, households affected)
- an estimate of the value of the impact (again, whether it is a financial or economic value would be conveyed by the cell attribute).

Distributional analyses will differ in terms of the types of impacts and the extent to which they can be described, quantified and valued. The emphasis of the analysis, however, may usefully be to feedback such information as can be gathered or collated rapidly to stakeholders and decision-makers in order to empower an informed discussion or negotiation. While it would be ideal to incorporate present values into the matrix where available, these may be easily misinterpreted or misunderstood and thus it might be preferable to include annual value figures insofar as monetary values are concerned. The drawback of this approach is that investment costs that occurred a long time ago are difficult to present in a meaningful annualised figure that is consistent and comparable with, say, annual gross value of agricultural production. In any case, the basic principle that applies is that whatever figures or ranking that is included in the table should be internally consistent and intelligible.

The revised categories used to arrange and group impacts into rows and columns in the matrix are covered in the next two subsections.

Distributional Impacts (Columns of the Matrix)

First of all the impacts are separated into gains (benefits) and losses (costs). This eliminates the need for plus and minus signs in the matrix cells as a way of indicating the direction of impact. It also enables a two page (or table) format, with the ability in presentation to juxtapose the benefits (on one side) with the costs (on the other side).

The benefits and costs are divided into those associated with changes in water land, vegetation and atmosphere that result from the project and those that relate to social benefits and indirect economic impacts derived from the project. In the case of the cost matrix it is also important to include direct costs of the project.

As a way of classifying benefits associated with water, land, vegetation and atmosphere the total economic value framework applied in natural resource and environmental economics is a useful one and is lightly adapted as follows

Direct Use Values. The installation of a dam alters water flows, as well as land and vegetation (in and near the reservoir) and in the process generates benefits in terms of hydropower, irrigation water, flood management, water supply, navigation, recreation, etc. vegetation. For example, by impounding water a dam increases water availability for irrigation during dry periods and creates a reservoir that can be used for recreation. As irrigated water is an input into the agricultural production process and as the reservoir is used by recreationalists, the dam can be said to have a direct use values, i.e. it produces goods and services that directly enter into production and consumption.

Ecosystem Function and Biodiversity. This includes both indirect use values and existence values. Indirect use values include the effects on environmental functions and biodiversity that result from dam construction and subsequent alterations to flows, land, vegetation and atmosphere. Environmental functions do not actually enter into production or consumption but rather serve to support economic production and consumption, entering into the economic system in only an indirect fashion. For example, changes in land use due to migration into the upper portions of a watershed following creation of a reservoir may increase the rate of sedimentation of the reservoir. The sedimentation may ultimately have an impact on water available for use in hydroelectric production, however the function itself does not enter into or pass through end use or factor input markets. In this case the dam has altered the indirect use value of hydrological function leading to eventual impacts on the economic system. Biodiversity impacts can be included here insofar as changes in biodiversity in turn affect ecosystem function and lead to economic impacts.

Existence, or non-use, values arise simply from existence of the good or service without any regard to actual or intended use of the resource by consumers or producers. For example, certain individuals or societal groups may be willing to devote a portion of their income to avoid the flooding of biodiverse forest area or an area with great cultural significance, without ever having had plans to actually go and visit the site for touristic purposes. The degree of uniqueness possessed by the area to be converted and the degree to which such change is irreversible will of course increase this existence value.

Social Impacts. Analysis of positive (such as the social dimension of increases in irrigated land, food production, employment opportunities, improvements in access to social services, improvements in nutritional and health status of the population) and negative (such as position of small and marginal farmers, land concentration, loss of access to common goods, traditional knowledge, social cohesion, cultural impacts, health impacts, etc.) social impacts should be documented here, trying to avoid any double-counting of benefits or costs already accounted for in previous columns. This analysis should be conducted primarily for the project area but should also include impacts at regional and national level (food production, food security, population's nutritional status change, poverty alleviation, etc.).

Indirect Economic Costs and Benefits. This category encompasses the knock-on economic effects that a project, particularly a large dam project, will have on related markets and services in the larger economy. In particular, the prime concern in this case will be with the economic multipliers associated with introduction of a dam project. In the case of very large projects, the multiplier impacts may be quite important, simply because the size of the project is large in relation to the national economy. Still, the significance of these indirect impacts will also depend on the extent of leakage in the economy. If all the machinery employed in dam construction is imported and the net revenues from production accrue to international interests then the resulting multipliers will be limited in nature.

Arrangement of Interested and Affected Groups (Rows in the Matrix)

Clearly, there is no way to generalize about the types of settings that will be found in the case of a particular dam project and the decision on how to identify the relevant groups will be up to those involved in the process. The generic distributional matrix (Table 20) however tries to convey a number of general principles. First of all, it may be possible to separate out the interests of groups that are in the “project” area as versus those of groups that reside outside of this area. Within the project area it may be possible to identify groups by whether they are those displaced by the flooding of the reservoir or those whose livelihood or assets have been affected by the creation of the reservoir. The latter groups may be divided into those located upstream, downstream and along the perimeter of the reservoir. If there are areas adjacent to the reservoir that are greatly affected by the displacement of people and economic activity, such as with encroachment of uncompensated, displaced people into upper watershed areas, the perimeter area may be extended to cover a reservoir “buffer” area.

Beyond the project area there will be some non-project areas that may be the remainder of states or provinces of a country. Identification of beneficiaries at this level and at a series of higher levels such as rest of the nation and rest of the world is also useful. Where the project affects more than one country it will be necessary to identify impacts in each of the basin countries. Again, the determination of the levels that best serve to draw out the distinctions between how benefits and costs are distributed across the full range of interests will depend on the particular case. The Orange River matrix provides an indication of how the generic matrix may be adapted to a given case.

Finally, with regard to the unit of measure of distributional impacts, it is suggested that individual interest groups be classified according to whether they are households, firms or the government. This has the advantage of providing a degree of theoretical and practical consistency with the analysis of the wider economic impacts (such as may emerge from a macroeconomic model). If NGOs, civil society groups or trade associations have direct operational responsibilities, such as managing a protected area or producing goods and services, they might also be included as a major classification group. However, in most cases these groups are organised to represent specific interested or affected parties. Thus, it would be preferable where an NGO or other organisation is communicating and lobbying for particular interests, to simply include the groups that are actually affected by the project. Thus, a representative of an environmental NGO that represents white-water rafting interest may be an effective member of the stakeholder group for a given decision process, but the households that are avid white-water rafters would be the group identified in the distributional matrix.

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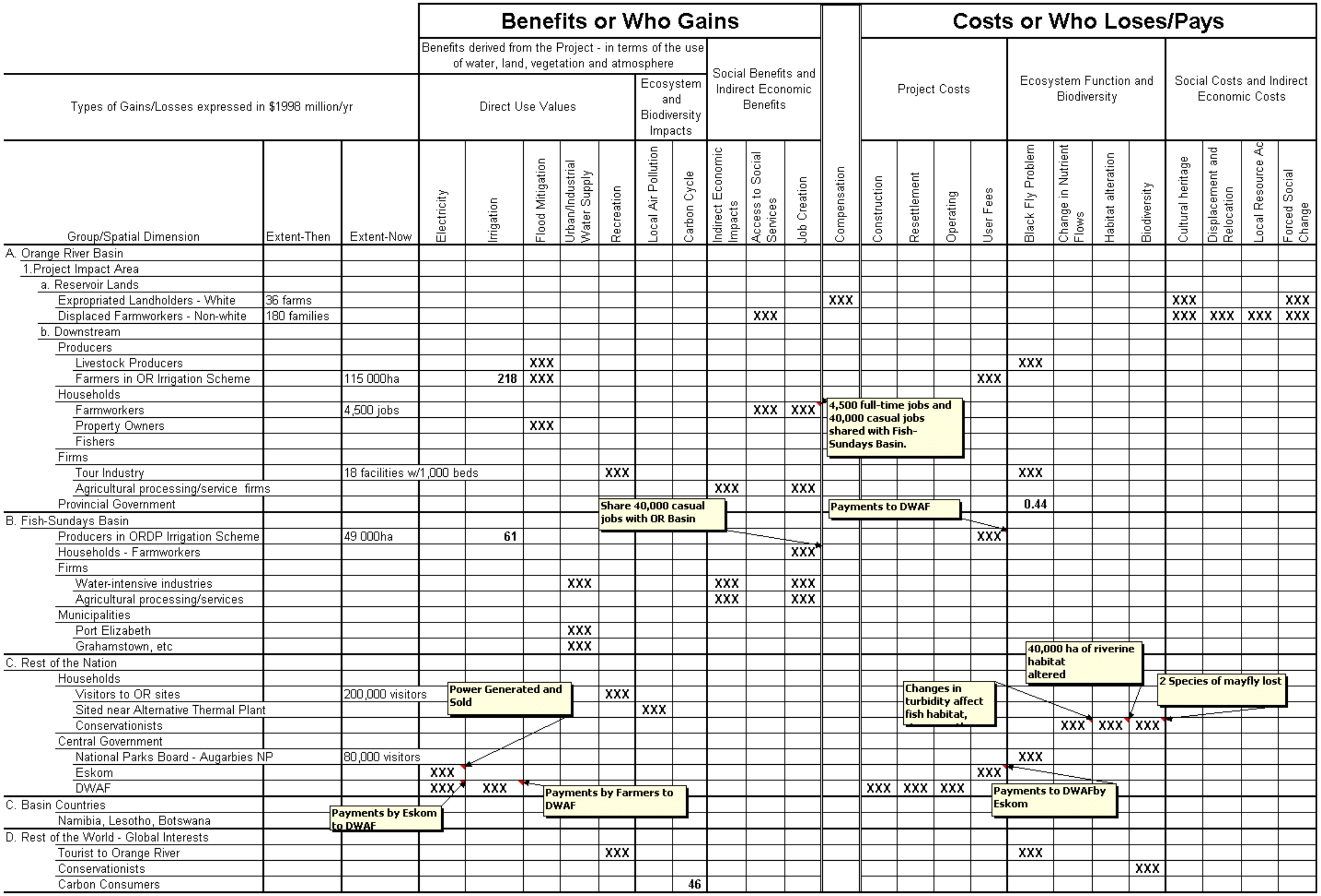
[46] The WCD Case Studies may be downloaded from http://www.dams.org.

[47] The methods used in both the WCD Case Study and the review of World Bank dams are presented later in this Chapter. The World Bank dams were selected from the OED study of 1996 and were chosen so as to represent different potential combinations of distribution of impacts.

[48] This is a brief summary of a longer contributed paper Naudascher-Jankowski (1999) that is available from the WCD Secretariat

Table 19. WCD Distributional Analysis Matrix, Orange River Development Project



			Benefits or Who Gains											Costs or Who Loses/Pays											
			Benefits derived from the Project - in terms of the use of water, land, vegetation and atmosphere							Social Benefits and Indirect Economic Benefits				Project Costs				Ecosystem Function and Biodiversity				Social Costs and Indirect Economic Costs			
Types of Gains/Losses expressed in $1998 million/yr			Direct Use Values					Ecosystem and Biodiversity Impacts																	
Group/Spatial Dimension	Extent-Then	Extent-Now	Electricity	Irrigation	Flood Mitigation	Urban/Industrial Water Supply	Recreation	Local Air Pollution	Carbon Cycle	Indirect Economic Impacts	Access to Social Services	Job Creation	Compensation	Construction	Resettlement	Operating	User Fees	Black Fly Problem	Change in Nutrient Flows	Habitat alteration	Biodiversity	Cultural heritage	Displacement and Relocation	Local Resource Ac	Forced Social Change
A. Orange River Basin																									
1.Project Impact Area																									
a. Reservoir Lands																									
Expropriated Landholders - White	36 farms												XXX									XXX			XXX
Displaced Farmworkers - Non-white	180 families										XXX											XXX	XXX	XXX	XXX
b. Downstream																									
Producers																									
Livestock Producers					XXX													XXX							
Farmers in OR Irrigation Scheme		115 000ha		218	XXX												XXX								
Households																									
Farmworkers		4,500 jobs									XXX	XXX													
Property Owners					XXX																				
Fishers																									
Firms																									
Tour Industry		18 facilities w/1,000 beds					XXX											XXX							
Agricultural processing/service firms										XXX		XXX													
Provincial Government																		0.44							
B. Fish-Sundays Basin																									
Producers in ORDP Irrigation Scheme		49 000ha		61													XXX								
Households - Farmworkers												XXX													
Firms																									
Water-intensive industries						XXX				XXX		XXX													
Agricultural processing/services										XXX		XXX													
Municipalities																									
Port Elizabeth						XXX																			
Grahamstown, etc						XXX																			
C. Rest of the Nation																									
Households																									
Visitors to OR sites		200,000 visitors					XXX																		
Sited near Alternative Thermal Plant								XXX																	
Conservationists																			XXX	XXX	XXX				
Central Government																									
National Parks Board - Augarbies NP		80,000 visitors																XXX							
Eskom			XXX														XXX								
DWAF			XXX	XXX										XXX	XXX	XXX									
C. Basin Countries																									
Namibia, Lesotho, Botswana																									
D. Rest of the World - Global Interests																									
Tourist to Orange River							XXX											XXX							
Conservationists																					XXX				
Carbon Consumers									46																

4,500 full-time jobs and 40,000 casual jobs shared with Fish-Sundays Basin.

Payments to DWAF

Share 40,000 casual jobs with OR Basin

40,000 ha of riverine habitat altered

2 Species of mayfly lost

Power Generated and Sold

Changes in turbidity affect fish habitat,

Payments by Farmers to DWAF

Payments to DWAFby Eskom

Payments by Eskom to DWAF

Table 20. WCD Distributional Analysis Matrix, Generic Template

		Page 1 - Benefits or Who Gains																		
		Benefits Derived from Water, Land, Vegetation and Atmosphere																Social Benefits and Indirect Economic Benefits		
Types of Gains/Losses		Direct Use Values								Indirect Use Values					Existence Values					
Group/Spatial Dimension	Extent	Electricity	Irrigation	Flood Mitigation	Urban/Industrial Water Supply	Navigation	Recreation	Fisheries	Agriculture and Livestock	Hydrological Cycle	Carbon Cycle	eg Carbon Offsets	Nutrient Cycles	Biodiversity	most likely none	??	??	Indirect Economic Impacts	eg Employment	Access to Social Services
A. Project Region																				
1.Project Impact Area																				
a. Reservoir Lands																				
Households																				
Resettled																				
Expropriated and Compensated																				
Expropriated																				
Firms																				
Compensated																				
Uncompensated																				
b. Reservoir Perimeter/Buffer Area																				
Households																				
Property Owners																				
Users of Reservoir Land																				
Firms																				
c. Downstream																				
Households																				
Property Owners																				
Fishers																				
d. Upstream																				
Households																				
Fishers																				
Uses of River Navigation																				
Firms																				
Transport																				
2. Rest of the Project Region																				
Households (disaggregated as relevant)																				
Firms																				
Government																				
Other																				
B. Rest of the Nation																				
Households																				
etc.																				
C. Basin Countries																				
Country A																				
Households, etc.																				
Country B																				
etc.																				
D. Rest of the World																				
Households																				
etc.																				

		Page 2 - Costs or Who Loses/Pays																											
		Direct Project Costs					Opportunity Cost of Lost Goods and Service from Water, Land, Vegetation and Atmosphere																			Social Costs and Indirect Economic Costs			
Types of Gains/Losses							Direct Use Values								Indirect Use Values								Existence Values						
Group/Spatial Dimension	Extent	Construction	Resettlement	Operating	Royalties	Decommissioning	Electricity	Irrigation	Flood Mitigation	Urban/Industrial Water Supply	Navigation	Recreation	Fisheries	Agriculture and Livestock	Hydrological Cycle	e.g Downstream Fisheries	Carbon Cycle	eg Carbon Offsets	Nutrient Cycles	eg Upstream Fisheries	eg Downstream Agriculture	Biodiversity	Landscapes	Species	Cultural heritage	Social Cohesion	Cultural Heritage	Helath Impacts	Loss of Use rights
A. Project Region																													
1.Project Impact Area																													
a. Reservoir Lands																													
Households																													
Resettled																													
Expropriated and Compensated																													
Expropriated																													
Firms																													
Compensated																													
Uncompensated																													
b. Reservoir Perimeter/Buffer Area																													
Households																													
Property Owners																													
Users of Reservoir Land																													
Firms																													
c. Downstream																													
Households																													
Property Owners																													
Fishers																													
d. Upstream																													
Households																													
Fishers																													
Uses of River Navigation																													
Firms																													
Transport																													
2. Rest of the Project Region																													
Households (disaggregated as relevant)																													
Firms																													
Government																													
Other																													
B. Rest of the Nation																													
Households																													
etc.																													
C. Basin Countries																													
Country A																													
Households, etc.																													
Country B																													
etc.																													
D. Rest of the World																													
Households																													
etc.																													

9.7 Comparative Analysis of Methods and Approaches

As indicated above, the analysis of the distribution of impacts generated by a dam project must first rely on an identification and, where possible, quantification and valuation of the impacts themselves. The alternative is to first decide on the groups of concern and simply identify and evaluate the impacts on these groups (i.e. as in an Equity Assessment). In either even it is then necessary to consider what method will be used and what type of data gathered.

In order to fully examine the economic aspects of distribution in quantitative terms both a regional or macroeconomic model and CBA is necessary. Distributional analysis is just one of the functions that can be fulfilled by macroeconomic models and thus the decision to go ahead with such a model will be dependent in part on these factors as well as the objectives underlying the distributional analysis. If the project intends to redistribute wealth to the region in which the project is to be developed or to benefit specific income groups or industries that are only indirectly related to the project then the use of such models becomes imperative for two reasons. First, in order to have the means to assess the potential impact of the project or its alternatives on the objectives and, second, as a means of monitoring and evaluating the success of the project in achieving these objectives.

With regard to CBA and project-level impacts a distributional analysis at this level becomes important in a number of ways. With regard to the direct project costs and benefits as typically measured in CBA, EDA becomes a vital means of carefully documenting the distribution of these costs and benefits across project participants. Using this type of analysis, subsidies and implicit taxes are made illuminated and, thus, can be discussed as part of the project negotiation process.

However, this is only one, small part of a forward-looking approach to economic distributional analysis in the case of dam projects and their alternatives. In many countries, these are the social and environmental impacts that are accounted for through EIA and SIA. As seen in the case of the Lower Snake River study, the economic analysis is actually incorporated within the EIA. This raises the question of what will be the “home” of distributional analysis in the options assessment and evaluation process. Is it a separate entity, apart from the financial and economic analysis, and the EIA and SIA? Or is it subsumed within the SIA or simply an extension of the economic analysis. This question may have different answers in different contexts, although there is some logic to attaching an economic distributional analysis to the economic analysis and the full distributional analysis as part of the SIA.

Further, there may be a strategic rationale for setting the distributional analysis off from the other elements. In the context of a multi-criteria analysis, distributional analysis may be a strand unto itself in the analysis. Given the lack of experience with EDA there remains the question of how to use such an analysis in decision-making. Weiss (2000) puts forward some possible ideas for decision criteria emerging out of an EDA. Two variations in this regard involve demonstrating that a project either improves the distribution of income or increases the absolute income of the poor. For projects that are targeted at poverty criteria might be to set a threshold of project benefits that must go to the “poor” whilst ensuring that the cost per unit of income transferred to the poor is not excessive (Weiss 2000).[49] Such criteria may then be subject to a set of explicit or implicit policy guidelines on project acceptability, enter directly into an expert-driven multi-criteria analysis or serve as an information input into a multi-stakeholder, multi-criteria negotiation process. Clearly, such quantitative criteria are more easily applied in the case of an EDA than a full distributional analysis in which a large range of qualitative and quantitative impacts compete for attention.

An additional question is which projects should be scrutinised for their distributional impacts? In practice it may be that some projects are well known to have little in the way of distributional consequences or to raise equity issues. While dams would generally not fall into the latter category it may be that particular types and configurations of dams do not raise such issues. In other words, in suggesting the operational principle that distributional analysis should be undertaken it may be useful to screen projects in order to proscribe the need to analyse distributional impacts and even the level of analysis required (i.e. just an EDA or a full Distributional Analysis). This argues for an approach similar to that employed by the World Bank (and other agencies) with regard to specifying a series of levels at which projects must undergo an EIA. In the first instance, dam projects would likely qualify for the most rigorous level of distributional analysis.

The perception that the social and environmental impacts fall unfairly on the shoulders of those who are not direct project beneficiaries often drives controversy around particular dams. As demonstrated in Chapter 4, valuation of these impacts is more frequently observed in developed country contexts. In a developing country context the insertion of a requirement to undertake an economic distributional analysis has a number of implications. First, as only a limited valuation of benefits and costs is currently conducted in such contexts it is likely that the bulk of the time, effort and resources that would be required to undertake distributional analysis would be that devoted to the valuation of social and environmental impacts. Otherwise the EDA that results will be extremely narrow in scope. Still, even if only a limited EDA can be undertaken this would be an improvement over existing practice as explicit knowledge of how the direct project costs and benefits are distributed may greatly improve the transparency of the decision process (where such results are disclosed to stakeholders).

Thus, the implication of undertaking a more robust EDA in a developing country setting implies the need to identify, quantify and, where possible, value the significant social and environmental impacts of a dam project (as discussed in Chapter 4). This suggests that an EDA will need to feed off of both the DCF and CBA of a project and the EIA/SIA process. This may argue for setting it apart as a separate undertaking, perhaps as part of a full Distributional Analysis.

Equity Assessment and Distributional Analysis are useful means of summarising, partially or in a holistic fashion respectively, the results provided by macroeconomic models, the distributional analysis of project costs and benefits and EIA/SIA. Done well and as an integral part of a multi-stakeholder negotiation process these have the potential to incorporate consideration of the distribution of both beneficial and detrimental outcomes from dam projects into decision-making in explicit and transparent ways. A holistic approach in which available information on project impacts (not just quantified or valued impacts) is gathered and presented jointly to stakeholders and decision-makers can thus be a useful component of the decision process.

In sum, in order to begin carrying out comprehensive distributional analyses it is likely that all five of the good practice tools mentioned above will be employed in a complementary fashion. The use of regional and macroeconomic models would be more or less optional, depending on the objectives and context of the project (as discussed in Chapter 8).

9.8 Findings and Recommendations

Findings with regard to the application and development of distributional analysis include:

- although cost-benefit analysis is a rigorous tool for organising and arraying disparate information into a clear depiction of economic efficiency, it does not provide information about who project winners and losers may be, and does not take into account whether compensation of affected groups actually occurs;
- distributional analysis has rarely, if ever, been undertaken in multilateral development bank dam projects;

- methods available for producing information on distributional impacts include macroeconomic models, CBA, environmental and social valuation techniques, and SIA/EIA;
- methods for social and environmental valuation may be an important part of developing distributional information; and
- Equity Assessment and Distributional Analysis are partial and holistic approaches, respectively, for identifying, summarising and communicating distributional impacts.

Based on the analysis of these findings the following principles can be offered:

- an Equity Assessment process is necessary early on in the options assessment process or at pre-feasibility (perhaps as part of a strategic SIA) to ensure the identification of groups of special concern and to obtain an indication of the potential project impacts on such groups;
- an overall Distributional Analysis of large dam projects should be mandatory at the feasibility stage in order to weed out projects with unacceptable distributional impacts or to assist in incorporating in project design strategies for avoiding, minimising, mitigating or compensating these impacts; and
- given the history and potential for inequitable impacts of dam projects, cost-benefit analysis should not serve as the sole criterion for dam project decision-making.

Finally, a number of recommendations for operationalisation of these principles through suggested methodological improvements, process enhancements and/or changes in institutional incentives can be made with regard distributional analysis:

- Distributional Analysis should include results from economic analyses as well as other information that should include, at minimum, explicit consideration of key distribution impacts (e.g., distribution across income levels, geographic regions, and generations);
- Where CBA is practised the related Economic Distributional Analysis should also be carried out as part of the distributional analysis;
- The decision to implement a regional or macroeconomic model should be undertaken in consideration of the need to assess secondary impacts on vulnerable groups and the existence of a need for macroeconomic modelling in relation to macroeconomic objectives.
- Analysts should be prepared to supply subjective judgement when applying tools for distribution analysis, and should make these judgements clearly and transparently.
- Analysts should involve as many affected stakeholders as possible in an open and participatory process of conducting the Distributional Analysis.
- Stakeholders and decision-makers should carefully consider the type of insights they seek from the distribution analysis and the information requirements before selecting the approaches to be applied and allocating the budget between the selected approaches.
- If the identification, quantification and, where possible, valuation of project social/environmental impacts is part of CBA or the EIA/SIA; then Distributional analysis will not require significant additional resources for research.
- Strict co-ordination of those leading the Distributional Analysis with the team undertaking macro-modelling, CBA or SIA/EIA is necessary to ensure that these methods yield useful and consistent information.

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[49] The latter criteria reflects the reality that at some point the trade-off between reaching growth and equity objectives is such that it would be cheaper simply to raise the incomes of the poor with cash hand-outs than to fund the project (Weiss 2000).