

CGIAR Science Council Commissioned Ethics Study III: Ethics and the CGIAR Mission¹

(submitted 12 August 2008)

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^{1 1} The report has been prepared by an independent panel consisting of Gebisa Ejeta, Michael Lipton and Peter Sandøe (chair) with the assistance of Karsten Klint Jensen and Peter Gardiner.

Ethics and the CGIAR Mission

1. Introduction

The CGIAR mission was from the outset driven by an ethical agenda: the global commitment to mobilize the advancement of science to feed humanity, avert hunger, and safeguard our natural resources. The CGIAR mission is not fulfilled until the repugnant problems of severe hunger and poverty and depletion of natural resources have been solved.

On the background of this honourable ethical agenda it might seem superfluous to discuss the ethics of the CGIAR mission. However, the aim of the present study is not to question the mission as it was originally conceived – we strongly affirm it – but rather to re-vitalize it. This has become necessary for a number of reasons.

Firstly, the CGIAR centres – like any other research organisation – tend, over time, to become prisoners of their own logic of survival. Funding needs to be found to continue activities and avoid cut-backs and redundancies. Directors who not only maintain a certain level of activities but manage to expand and grow are seen as successful. Similarly, donors need to rationalize their existence and manage their solvency, to appear more bold and ambitious, more focussed and on target. Donors need to be seen to perform in the eyes of their domestic constituencies – commercial, NGO or other; or to follow the current fashions in development or aid. In order to make a visible impact – preferably in a rather short term – new hitherto undiscovered constraints and conditions for success are identified. Such constraints and conditions are perceived by the donors as adding focus and sharpening approaches and activities towards achieving the primary goal(s).

However, whereas changing paths and making adjustments sometimes is necessary to make things happen, to add and sharpen focus and to reduce time to reach goals, the CGIAR at other times experience wholesale shifts of research agendas or gross changes of programs among donors that often have the unintended effect of making pursuit of long-term research strategies difficult for the CGIAR.

Short-run pressures – recently the sharp rise in world staple and energy prices – create a hectic climate of rapid shifts in supply and demand of activities aimed at finding ways of making poor people more food and nutrition secure. Then, there is a real danger that the ethical vision is lost, played down or inappropriately exploited for the benefit of securing contracts and making ends meet in the budgets of the centres. However, the short-term ‘logic of survival’ pressures have a high and rising price. The cost is felt in terms of the CGIAR’s capacity to adapt to pursue an ethical goal, to reflect on and develop this goal and to continue to find the best ways to pursue the goal. The tendency for donors to restrict funds to specific projects sharpens this conflict.

Secondly, the CGIAR needs to adjust to a number of new long-term challenges:

- Large parts of Africa and some parts of Asia require new approaches, if they are to be reached by Green Revolution strategies.
- Moreover, the classic approach has run into diminishing returns. Rice and wheat semi-dwarf varieties have reached almost all suitable areas. Although gains in the future may come from tolerance of abiotic stress, in general plant breeding is increasingly defensive against new biotypes.

- Hence, new, non-classical ways to meet the goal of reducing poverty are required. This reflects the finding that the main cause of food poverty turns out to be failure of ‘entitlements’ to food,² more than a too-small ‘pile of grain’ as the fathers of the Green Revolution believed.
- Environmental changes – worsening soil depletion, water scarcity and climate change – make additional demands on CGIAR research.

Moreover, there are also challenges in the context in which the CGIAR operates as priorities and sensibilities have changed dramatically since the early days of the Green Revolution. These changes necessitate reflection on the goals and means of the CGIAR, resulting in a clear statement that could help the CGIAR to navigate successfully and make its values more transparent to stakeholders.

For example, today’s technical solutions aimed at making agricultural production more effective are met with sceptical attitudes by many influential stakeholders and by large segments of the populations both in rich and poor countries. This is true both for the use of pesticides and for the application of various forms of biotechnology. Often the concerns relating to new technologies are expressed in ethical terms and have to be addressed as ethical issues. Also it is an ethical requirement to try to take seriously the worries and concerns of those that one tries to help. Finally, if such issues are not addressed properly it may make the attempt to solve problems for poor people less efficient, both because of lack of uptake and because of lack of support from donors.

A second example is the rise of concerns relating to the protection of the environment and nature. These concerns have clearly been taken up by the CGIAR system in terms of an increased focus on sustainability in relation to agricultural production. However, the debate about protection of the environment and nature cannot be reduced to a simple operational notion of sustainability. Very diverse values are at play; and these need to be articulated and discussed to make sure that key stakeholders are not alienated.

A third reason has to do with the position of the CGIAR system as part of an international community rooted in the UN system. As such, the CGIAR should on the one hand respect different cultures and traditions and on the other hand it should have a solid base in the international human rights framework which is the foundation of international collaboration. To manage this delicate combination - of a pluralist view and a stance on issues where international law has had a clear say - it is important to be able to state and express clearly the values at stake.

A fourth example worth mentioning here is the increased focus on empowerment of poor people. Some will see this simply as a way of making help to poor people be more effectively disseminated. The logic is that the uptake of new ideas based on agricultural research will be higher if the end-users – or people trusted by the end-users – are involved from the start. However, for others, empowerment is a goal in itself and should be pursued even in cases where there are no obvious benefits to be achieved in terms of increased efficiency. Here, the focus will be on personal autonomy rather than on efficiency.

1.1 Background

By terms of reference of 1 May 2007, the Science Council of the CGIAR has commissioned a panel study “to address the topic of *Ethics and the CGIAR Mission*.”

² *Amartya Sen: Poverty and Famines. An Essay on Entitlement and Deprivation.* Oxford: Clarendon, 1981.

The study will focus on policy relating to development, to provoke discussion and thought about issues that may require possible later revision of CGIAR policy. The study should deliver principles and guidelines concerning the following:

- Economic Equity:
 - how to balance size of impact against the focus on helping the very poor
 - how to balance concern for the welfare of the poor in various regions
- Intergenerational Equity: how to balance concern for the people living now and in the near future against concern for future generations
- Nature protection: how to protect parts of nature that are production resources but may possess intrinsic value
- Empowerment: how to enhance the share of benefits from research that accrue to the very poor in the context of their relative lack of empowerment compared to the more privileged
- Ends and means: how to evaluate the efficiency of means in the light of the above points.”

The immediate background of the study is described thus in the TORs:

In 2004, at the request of the Science Council, Professor Peter Sandøe, assisted by Karsten Klint Jensen, prepared a review paper³ on the possible ethical issues affecting the CGIAR. Professor Sandøe presented his findings to the Science Council at its meeting in September 2004. This report drew on the authors’ expertise, external sources such as the report of the FAO’s Panel of Eminent Experts on Ethics in Food and Agriculture’s first (2000) session, and an earlier internal working paper prepared for the Standing Committee on Priorities and Strategies, *Ethics and the CGIAR*. Prof. Sandøe identified four major areas of ethical concern to the CGIAR: **research ethics, equity, protecting nature and respect for donors and partners**.

The categories of **research ethics** and the **respect for donors and partners** are concerned with questions of how the right means (i.e. acts and procedures) should be chosen and reinforced to meet the goals of the CGIAR. These topics necessarily focus on the internal processes of doing research within the CGIAR and in collaboration with Centre partners. The Science Council accepted Dr. Sandøe’s recommendation of further review and development of these issues through the creation of a panel of experts. The first panel study was formulated and addressed the question of *Ethics and CGIAR Research*.⁴ The Science Council received the findings and advice of this study in April 2006 and as a revised Report in May 2006. The Report, together with a Science Council Commentary on the Report, have been recommended to the Alliance Executive for consideration and action in November 2006.

By contrast, **equity** and **protecting nature** are not only concerned with the choice of means, but with the selection of goals for the System, too. Assessing the merits of different goals depends on the manner in which these broader concepts are defined and requires a somewhat different focus, on development policy more broadly. For example, different definitions of what constitutes **protecting nature** can radically alter the manner in which ‘sustainability’ is interpreted and, consequently, the very mission of the CGIAR, as well as its priorities and strategies, which have been the subject of extensive deliberations over the past two years. These Terms of Reference govern the second Science Council commissioned panel study envisaged by the 2004 Report - on *Ethics and the CGIAR Mission*.

The commissioning of the present report can be seen as part of a larger process, which started with the reformulation of the vision and strategy of the CGIAR in 2002 (and the work leading up to it),⁵

³ *How Should the CGIAR Handle Ethical Challenges? – Issues and Proposal for a Strategic Study*. August 2004, Science Council, FAO, Rome. Can be found at: http://www.sciencecouncil.cgiar.org/publications/pdf/Ethics_first_report.pdf

⁴ *Ethics and CGIAR Research*. (Panel report, revised June 2005), Science Council, FAO, Rome. The panel consisted of Linda Adair, Clarence Dias and Peter Sandøe with the assistance of Karsten Klint Jensen.

⁵ *A Food Secure World for All: Towards a New Vision and Strategy for the CGIAR* (TAC, 2002)

followed by the work on how to derive priorities for research and related activities⁶ and the still ongoing work on how to interpret this foundation and derive precise guidelines from it.

This process was, for one thing, motivated by the recognition of the fact that the then dominant CGIAR strategy of yield-enhancing improvements of the major food crops mainly has had impact in the more favourable agro-ecosystems. The statement of the new vision, goal and mission for the CGIAR intended to put more focus on tackling the complex problems of poverty in the marginal and hard areas, notably extensive areas within South Asia and Sub-Saharan Africa. This intention reveals an ethical motive: the aspiration to put more weight on fighting the kinds of poverty which has turned out to be more difficult to eradicate.

Another motivation was to respond to changes in the external environment in which the CGIAR operates, such as “the broader natural resources and social agenda, and the need for new types of partnerships with the private sector, NGOs and development institutions”.⁷ This reveals another ethical motive: changes in the environment make adjustments in the strategy and priorities necessary in order to ensure that the goals will be effectively pursued in the new environment.

Hence, ethical motives are involved in the ongoing process of reforming the CGIAR at two levels: in clarifying and stating precisely the goal of the CGIAR, and in ensuring that the optimal means to achieve the goal are chosen. What becomes clear from the process is that discussions about the mission of the CGIAR cannot just start from a well-defined goal and then focus on finding the most efficient means to reach the goal. Rather, the two levels are related, and therefore a discussion about ethical values is necessary to connect the two levels. The TORs put it this way:

The mission of the CGIAR, achieving sustainable food security and reducing poverty through scientific research, is by its very nature a task charged with complex ethical concerns, which in turn raise problems of priorities. If sub-optimal means as regards the goal are chosen, less good is achieved than might have been the case. In order to choose the optimal policy, the goal needs to be clearly stated, and the relations between the goal and possible ways to achieve it need to be known. Changing social norms and associated ethical values, globalization, environmentalism and the creation of new technologies, such as genetically modified organisms (GMOs), within a multicultural setting are only a few of the difficult issues that affect the CGIAR. Successful navigation of these and other complex issues necessitates direct reflection on, and a more thorough understanding of, the ethical principles and assumptions that underpin the work of the CGIAR. A clear statement of these principles will not only make the values of the CGIAR more transparent to stakeholders, thereby enhancing the policies and principles that embody these values, but also has the potential to offer a better understanding of the responsibilities of the CGIAR to its donors, national and international partners, and the people that it attempts to serve in developing nations.

The panel wants to confirm these reasons to clarify the goal of the CGIAR and to reconsider its strategy in the light of this clarification; in fact, we have added further reasons in the introduction. However, it is one thing to recognize the ethical character of this process; it is another thing to introduce ethics explicitly into this process. However, this is the task the paper seeks to address.

⁶ *A Food Secure World for All: Towards a New Vision and Strategy for the CGIAR: Companion Paper on Priority Research and Related Activity Themes* (TAC, 2002) and *System Priorities for CGIAR Research 2005-2015* (CGIAR Science Council 2005).

⁷ *A Food Secure World for All: Towards a New Vision and Strategy for the CGIAR*, p. 12.

1.2 The Role of Ethics

This section draws on the report *How Should the CGIAR Handle Ethical Challenges? – Issues and Proposal for a Strategic Study*. August 2004, Science Council, FAO, Rome (cf. footnote 1). First, we shall introduce a distinction between two notions of ethics:

- **The ethics of a person or a group of persons:** Values underlying how a person or group of persons, e.g. the CGIAR, treat themselves, others, nature and the sacred.
- **Critical ethics:** The attempt to understand, criticise, improve and systematize existing ethical values, norms and visions.

This report will use *critical ethics* to understand, systematize and possibly help improve the *ethics of the CGIAR*, as this is stated in the CGIAR Vision document (cf. note 3) and other relevant documents. The goal of engaging in ethical thought, from the point of view of the CGIAR system, is, of course, to end up adopting a convincing ethical position which provides transparency as to which values underlie the goal of the CGIAR and how these values trickle down into the CGIAR mission and priorities.

However, to reach this goal, critical ethics is called for and the reason for this has to do with *justification*. Ethical views cannot be confirmed or rejected empirically in the way scientific hypotheses can. The only way to “test” an ethical view is by setting it up against alternative views to see if it “does better” than the alternative views. Philosophers who work professionally in the field of ethics have developed an advanced discourse where different, so-called ethical theories are presented and discussed in great detail. Ethical theories can be compared to competing research programmes, each with the intent to provide – at least in principle – a precise interpretation of relevant ethical concerns, and a determination of their relative weight in decision-making.

Different ethical theories will have different implication for what is right in a given situation. Roughly, an ethical view on what is right in a given situation can be said to be confirmed or justified, if it is implied by the theory and if the theory has no other implications that would be incompatible with the view. Ethical theories thus aim at covering our ethical views by more fundamental concerns in a coherent way; and the better they do this, the more both views and theories are justified. This form of justification will thus allow for more than one coherent system of ethical theory and ethical views being justified.

Because of this interrelation between ethical theories and ethical views, critical ethics can serve to increase *transparency*. To allow people to see the ethical choices and priorities which underlie the CGIAR goal and mission is to state clearly how this goal is defined and how it is specified in terms of the mission statement. By means of ethical theory it will be possible to clarify how the values mentioned in these definitions and specifications are to be understood in terms of more fundamental concerns.

To serve as a background for the following discussion of the CGIAR goal and mission we have in Annex 1 attempted a very brief overview of so-called ethical theories which make up the intellectual backbone of critical ethics. With this outline of ethical theory as background, we will in the rest of this report conduct a critical ethical analysis of the CGIAR mission. Firstly, there is a discussion with the aim of clarifying the vision, goal and mission and the related ethical values that should underlie all activities within the CGIAR system. Secondly, CGIAR’s choices and means of operation are discussed in the light of these values. This paper seeks to open discussion about how the CGIAR centres should focus to make a maximum impact in terms of realising the fundamental

goals of the system. Finally the main conclusions and recommendations of the study are summarized.

2. Understanding the Values Underlying the CGIAR Goal and Mission

The CGIAR has adopted the following strategic framework:

- **Vision:** *A food secure world for all*
- **Goal:** *To reduce poverty, hunger and malnutrition by sustainably increasing the productivity of resources in agriculture, forestry and fisheries*
- **Mission:** *To achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, livestock, forestry, fisheries, policy and natural resources management.*

In this section we shall conduct a critical analysis of this framework. The aim is of course not to claim that the vision of a food secure world is in any way wrong, but rather to understand the ethical concerns and dilemmas involved in it. We shall focus on the two main stated goals, poverty alleviation and sustainability. As part of the discussion of poverty alleviation we shall discuss a further value, empowerment, which is not explicitly adopted by the CGIAR system but which according to the present panel ought to be seen as an important value in the further work to develop the CGIAR goal and mission.

The discussion is mainly about understanding the goals. What the CGIAR can and should do to contribute to the achievement of these goals is discussed in Section 3. It is important to clarify the goals, before the choice of means is considered, rather than just choosing between what appears to be the only available strategies. Sometimes, better understanding of the underlying concerns in a conflict between goals allows search for new solutions that may soften what otherwise may appear to be un-resolvable dilemmas.

2.1 Food insecurity, poverty, hunger and malnutrition

If we turn to ethical theory, the main teleological ethical explanation of why food insecurity and poverty are bad is based on the idea that the ultimate good of people is to have as high a welfare status as possible. There are, as mentioned above, competing theories about what welfare, or the good life, consists of precisely. These range from rather narrow theories like hedonism (the good life consist in good quality of one's mental states), over preference-satisfaction (the good life is the one you prefer) to broader theories like perfectionism, Rawls' primary goods or Sen's capabilities. We shall not here try to settle on a specific understanding of the nature of welfare.

The general implication of considering welfare the ultimate good of people is that a situation is ethically worse the worse off people are. Some theories make the urgency of the badness increase the worse off people get. One sort of theory (*prioritarianism*) claims that the weight ascribed to increasing people's welfare increases the worse-off they are – and thus increases the urgency to act. Another sort of theory (*egalitarianism*) would claim that it is worse ethically if some are worse-off than others; of particular interest is the claim that it is worse if people do not have a fair share of (important) resources, and much worse if they fall below some threshold of minimal shares.

It seems natural to understand the CGIAR strategic framework in the light of these concerns. Firstly, the major deontological ethical theory of relevance for food security and poverty reduction is human rights theory, according to which there is a right to fulfilment of certain basic needs. Contributing to

structures which keep people in poverty, but which could be avoided, therefore violates these people's human rights. But the CGIAR can hardly be accused of contributing to such structures. Rather, the CGIAR is involved in pursuit of goals relating to making life better for food insecure and poor people in the developed countries. Secondly, in the case of teleological theories, if increasing the welfare of the well-off as well as the worse-off had the same weight, why bother particularly about the poor? However, on the contrary, the CGIAR puts great weight on trying to avoid people having such low levels of welfare that they are food insecure.

The problems with the concept of "welfare" are, firstly as was noted above, that it is controversial how it is to be defined precisely, and secondly, that it is a theoretical entity which is not directly measurable. It is therefore far more operational for the CGIAR to state its goal in terms of food insecurity, poverty, hunger and malnutrition. These can all be thought of as indicators of low levels of welfare.

The overarching ethical goal, as stated in the vision, is *food security* for all. The TAC refers to the FAO definition that food security is 'access at all times to sufficient nutritionally adequate and safe food.'

Food insecurity and hunger seem to be related. The prime need is to avoid famine. Secondly, it is important to avoid people being hungry and unable to eat. However, for two reasons, *nutrition security* is probably a better formulation of this goal than 'food security'. Good nutrition means avoiding serious imbalance between food intake and requirements. A level of food intake inadequate to maintain good health, adult work capacity, and child growth is usually one symptom of 'protein-energy malnutrition'⁸ (or PEM). Over time, populations experience big changes in requirements (due to changes in age-structure, physical activity, or frequency of pregnancies) and this may render previously adequate food intake either much too little, or much too much, for nutrition adequacy. In order to stress the importance of adequate nutrition, we shall use the term 'food and nutrition security'.

However, malnutrition can also result from 'hidden hunger' (micronutrient deficiency) even in people with enough calories and protein. Cutting 'hidden hunger' is a structurally different problem from cutting energy under-nutrition, and the CGIAR was set up mainly to deal with the latter problem only. Increasingly, more focus has been put on micronutrient deficiency, most recently spurred by the Harvest-plus challenge program.

The CGIAR is *not* set up to tackle another fast-growing problem of malnutrition – a paradoxical one. In North Africa, the Caribbean and Polynesia 15-25%+, and in South East and some of South Asia and Latin America a rapidly increasing 10-15%+, of (most urban) people are obese. Though some are not poor, many are. They are pressured by poverty and work away from home to eat large amount of energy-dense snack foods (fats and sugars), and by the "less-than-agriculturally-active" nature of their new work not to burn up many calories.

In using 'malnutrition' as an indicator of the welfare of the poor, it is important to judge the importance of these problems for the CGIAR vis-à-vis the problem of energy under-nutrition. It appears that the CGIAR so far has put most weight on energy under-nutrition, less on 'hidden hunger' and still less on obesity. The present panel agrees that obesity should not be a key concern of the CGIAR system. However, judged from the effects on welfare, the panel thinks that under-nutrition and

⁸ The vast majority of people with PEM are short of calories, but not *independently* of bioavailable protein or specific amino-acids: i.e. they would have enough of these if current food intakes increased so calories were adequate.

micronutrient deficiency should be given equal priority. Considering both the potential competences of the system and the relatively small additional costs of fighting micronutrient deficiency, this appears an obvious priority. Anyway, it is important that the priorities of the CGIAR here are made clear.

The stated goals of the CGIAR system – besides the reduction of hunger and (energy and micronutrient) malnutrition (which are both included in food security as defined above) – also includes reduction of poverty. What is the relation between poverty and hunger? Even though we should expect a rough correlation, recent IFPRI work has demonstrated that, because of the multifaceted nature of severe poverty and the existence of poverty traps, the relation is not a simple and uniform one. This raises the question of the relative importance of these concerns.

Again, from the perspective of welfare, the panel would suggest that the form of poverty that should concern the CGIAR the most is the poverty that translates into food insecurity; i.e. the poverty that consists of not having entitlement to sufficient and properly-balanced food. It seems worse to have more money but experiencing hunger than having less money but being able to eat more adequately.

2.2 Who should be benefited?

This section tries to address the question of

- how to balance the size of impact against the focus on helping the very poor.

In order to be able to act on the goal of food and nutrition security, it is essential to identify or describe the beneficiaries more precisely.⁹ As we have just noted, consumption is theoretically a better measure than income. But often, only income measures are available.

The first step is to determine the level at which the poverty line should be drawn (ideally, the poverty line should be measured in terms of income per consumer-unit (adult-equivalent), with modest allowance for the fact that larger households enjoy some economies of scale in consumption). For a NARS, the *national* poverty line is clearly the relevant one. But the CGIAR and each Centre have to compare poverty impact of (past or potential) projects affecting different groups of countries. To maximise poverty impacts through this approach, comparable poverty measures for all countries are needed. The only one currently available is the PPP-dollar-per-person-per-day.¹⁰

The next step is to decide on the balancing between the size of impact against the focus on helping the very poor and then develop a poverty measure which reflects this balancing. For instance, it could well be that some crops used by the poorest are less amenable to research than crops used by moderately-poor people. If only the number of poor below the poverty line counts, it is therefore

⁹ Discussion and references for the contents of this paragraph appear in M. Ravallion, *Poverty Comparisons*, Harwood (Chur), 1994; and M. Lipton and M. Ravallion, 'Poverty and Policy', in *Handbook of Development Economics* (vol. 3B), ed. J. Behrman and T.N. Srinivasan, North Holland (Amsterdam), 1996.

¹⁰ In 2010-15 a new formulation of the MDGs will almost certainly be sought. If, as we believe, the moral focus of the CGIAR is on reducing *food* poverty and insecurity, it makes sense for the CGIAR, as such, to press for an internationally comparable poverty measure that reflects this. Such a measure is provided by the so-called *food energy method*: the consumption-per-adult-equivalent at which – given the actual spending pattern, both for foods and for non-foods, of a typical household at risk – dietary energy intake just suffices to avoid PEM at all times.

likely to be more cost efficient to research the crops used by the moderately-poor. But the CGIAR might consider it ethically more important to help the very poor. Thereby it assigns ethical weight to the size of the shortfall below the poverty line.

In the vision and strategy statement of 2002, the CGIAR appears to give highest priority to great severity of poverty while still giving some weight to the moderately-poor. This tendency has perhaps been strengthened during the recent focus on the ultra poor and the causes of their poverty.

One can try to define in a more exact way how to measure the outcome of attempts to alleviate poverty. Such measure may be assessed in the light of the above considerations. For example, instead of alpha-0 (poor as proportion of population), more relevant measures, in light of what was said above, would therefore be:

- Alpha-one, where each individual is weighted by its proportionate shortfall below the poverty line, and the results added and expressed as a proportion of total population. This poverty measure rises with intensity of poverty (even if the numbers stays the same) but is not affected by distribution of income among the poor.
- Alpha-two, where each individual is weighted by the square of its proportionate shortfall below the poverty line, and these amounts added and expressed as a proportion of total population. Alpha-two is a poverty measure that increases with (i) number of poor, (ii) intensity of average poverty, and (iii) inequality among the poor.

The choice between these measures thus depends on whether *vertical inequality* among the poor is thought to matter ethically. We see no reason why it should not. It seems worse if some net gain in poverty reduction is achieved by increasing inequality among the poor rather than the same net gain achieved without increasing inequality.¹¹ However, concern for inequality among the poor raises challenges for the CGIAR. This question is pursued in Annex 2.

That point granted, some version of Alpha-two would be the right measure to develop. There is still a trade-off with efficiency, if a higher proportion of poorest than of moderately-poor cannot work (old, sick, etc.) and therefore has lower output response to a given spending on poverty policy. Hence, the measure should reflect the priorities of the CGIAR, and it earns its justification if it (in theory at least) could be translated into an ethical ordering of consequences which again reflects the priorities of the CGIAR.

Having said that, it is clear that the nature of a CGIAR strategy renders it uncertain what the exact impact of CGIAR research will be. The main charge for CGIAR is to gear its science to solving palpable agricultural and natural resources problems. The issues are often long-term, and the effects of the research can be both direct and indirect, and the impacts depend heavily on the actions of others: long after the research is done, the delivery and dissemination of the technology and identification of the target community for the technology is often decided by others, i.e. local public/private/political forces beyond the CGIAR.

¹¹ Consider this example: Raising the income of a person 10% below the poverty line by 11% reduces Alpha-0 (incidence) and Alpha-1; raising the income of a person 30% below the poverty line by 11% does not affect Alpha-0, and probably cuts Alpha-1 less than does concentrating relief on the less-poor. Virtue is accorded to the wrong choice!

Hence, the CGIAR cannot take the full responsibility for what comes out of its research in terms of poverty reduction. However the system has the responsibility to keep the goal of poverty reduction clear and seek for the strategies that make it most likely that the goal is achieved.

Another relevant consideration for the CGIAR is *horizontal inequality* between genders, regions, ethnic groups, clans, tribes or castes. The issue here is whether or not to focus specially on groups that over-represent the poorest, such as Xinjiang province in China, scheduled castes in India, minority tribes in Kenya, families with many children and few adults almost everywhere. If it is believed that some form of discrimination, or lack of access, causes the unusually high prevalence of poverty among such a group, two things follow.

First, attending to any particular measure of overall inequality among the poor may not help much: those at a given poverty level will have less chance to access the poverty-reducing input (e.g. annually distributed open-pollinated hybrids) if they are in a discriminated-against group. Instead, focusing the money on, say, a scheduled caste usually helps mainly the better-off in that caste.

Second, unlike the case of vertical inequality and attending to the poorest persons, there is in the case of horizontal inequality likely to be an efficiency-growth *benefit*, rather than trade-off, in attending to (some of) the poorest groups. Members of the poorest groups have been denied competitive access to a 'level playing field', then according such access can both reduce their poverty and improve efficiency and growth.

Such inequality is a source of serious injustice and resentment, and perhaps of conflict, societal breakdown and even civil wars. Country specialists should be asked to explore the possible effects of CGIAR research outcomes that might increase or reduce such inequality, especially regionally and among ethnic groups, tribes or castes.

The CGIAR's poverty focus, as so far discussed, has been on absolute poverty. As countries move to middle-income status, their populations increasingly become concerned with relative poverty – the gap between the poor and those at median (or sometimes mean) income. Despite evidence that smaller farmers are at least as efficient resource users as larger farmers – and in developing countries socially more efficient, due to higher yields and employment-intensity¹² – history shows that the better off are more likely to capture new technology and enhance existing income gaps. This can be affected by clan status, family relations or politically. Also here, we see no reason why relative inequality should not matter ethically. To the extent that CGIAR policy decisions can reduce 'elite capture' and stem relative poverty *without* cost to their impact on absolute poverty, they should do so, e.g. by focusing on crops, regions or techniques of greater concern to the relatively poor.

2.3 How to benefit: Empowerment

According to an influential line of thinking, to benefit someone is to prevent suffering (or create pleasure) for that person or it is to increase that person's preference satisfaction. The outcome is all that matters – it does not matter how the outcome is produced, whether it is the product of that person's own effort or brought about by others.

¹² R. Eastwood, M. Lipton and A. Newell, 'Farm size', in R. Evenson and P. Pingali (ed.), *Handbook of Development Economics*, Rotterdam: Elsevier, 2008 (forthcoming).

Of course, according to the same line of thinking, there can in many cases be good reasons why it is more efficient to help people to solve their own problems rather than solving them on their behalf. As the saying goes: “Give a man a fish; you have fed him for today. Teach a man how to fish; and you have fed him for a lifetime.” However, whether one should help people directly or rather help them to help themselves is of not of intrinsic moral significance – it is only a matter of what is most efficient in terms of the final outcome.

Other traditions in ethical theory will take a different view on this matter. Firstly, one may consider the theory of Amartya Sen, according to which what matters in helping others is not provision of welfare but of capabilities, i.e. the ability to control one’s own life. Secondly, in the Kantian tradition of ethical theory, a key value is autonomy, i.e. that an individual governs her own life by defining her own standards and aspirations.

Both these lines of thought have been extremely influential in discussions about development; and it is fair to say that the Kantian tradition is reflected in the human rights framework that is part of the international law foundation of the international community. Therefore, there may be good reasons for the CGIAR system to take empowerment seriously not just as a means to more efficient aid but also as a goal in itself.

So far the value of empowerment has not been explicitly adopted by the CGIAR in the vision and strategy statement, but it nevertheless seems to play some role within the system. Empowerment is implicit in the CGIAR practice of making research results accessible for the local organisations where the poor people live, and even more in enhancing the capacity of local NARS and the capacity of farmers to adapt to a changing environment in their management of natural resources.

Empowerment is clearly related to food and nutrition security, since hunger, severe poverty and environmental collapse are themselves very disempowering. Indeed, the formulation of the TORs for this study infers that lack of empowerment could even work like a poverty trap:

- Empowerment: how to enhance the share of benefits from research that accrue to the very poor in the context of their relative lack of empowerment compared to the more privileged

Thus, the value of empowerment as a goal in itself and the increased concern for the very poor both imply strong weight on empowerment of the very poor, e.g. through providing education, basic health care, employment opportunities etc. In sharing the goal of food and nutrition security with NARS, local governments and others, it is a great challenge for the CGIAR, while being efficient as regards the goal of long-term food and nutrition security, at the same time to work for enhancement of empowerment – in the last resort for individuals – through these partnerships. The CGIAR’s approach to empowerment can be direct, focussing on measures that can be directly linked to agriculture and improved natural resources management, or indirect, going through partners with more direct contact with end-beneficiaries.

2.4 Sustainability

The vision and strategy statements add the further requirement that achievement of food security should be *sustainable*. Sustainability is a notoriously contested notion, which has been defined in many ways. Consideration of the sustainability of activities date back to the late 19th century, where

the question arose within forestry how to determine the maximum cut that could be sustained in the long term; later, similar considerations were developed within fisheries science, and eventually they spread into many other areas. The underlying principle was the constraint that the resource stock in question should be kept constant over time, and the simple prescription was to keep the harvest rate per year within some area smaller than or equal to the natural regeneration rate per year for the resource within the area.

In a similar vein, the CGIAR is concerned with protecting and possibly increasing the productivity of natural resources in agriculture, forestry and fisheries. However, natural resource systems change naturally with time, and the size of a given stock is often influenced by other factors than harvest, e.g. different sorts of pollution. The base line for sustainability also depends upon when we intervene; for instance, many of the world's fisheries are today well below historical levels. It seems arbitrary to link sustainability to the baseline where the intervention starts. Then there is the question of how to deal with finite, exhaustible resources and the possibility of extinctions. And, finally, technological development might increase production efficiency, but it may also make certain resources superfluous by making it possibly to substitute them with others. Hence, it seems odd to assign value *per se* to sustaining harvest of some resource over time, if technology or other developments will make that resource superfluous.

There is therefore reason to be concerned rather with the *value* of natural resources over time. This is captured by the statement of the Brundtland Commission that the need-satisfaction of the present generation should not compromise the need-satisfaction of future generations. Here, the value of natural resources is measured by their ability to satisfy human needs.

However, the Brundtland Commission makes sustainability a constraint on development which is rather rigid in the sense that it does not allow one generation to have slightly lower degree of need satisfaction even if later generations could have a far higher one. A more general way to understand sustainability would be to understand it as a concern for equality between generations but allow for trade-offs between equality of welfare between generations and the total of welfare over time.

What is relevant for the CGIAR is particularly the management of natural resources, in the widest sense, on which the poor will be dependent for food. The productivity of resources should be safeguarded and possibly be increased when they are handed over to future generations also dependent on them for food and nutrition security.

This concern raises a number of trade-offs. Two such questions raised in the TORs of this study are:

- Intergenerational Equity: how to balance concern for the people living now and in the near future against concern for future generations
- Nature protection: how to protect parts of nature that are production resources but may possess intrinsic value

For intergenerational equity, there is a conflict between an impartial view that would consider future generations worthy of concern for their own sake, and the economic practice of discounting for time, reflecting the present (decision-making) generation's natural bias in favour of itself and its nearest and dearest. However, in this debate it is often not made clear exactly what should be discounted, and the details are rather complicated. The panel shall therefore not attempt to settle this issue.

Rather, the panel considers inequality *within* generations and how *it* develops over time a far more important issue for the CGIAR. This is because the CGIAR is not primarily concerned with

sustainability in the wide sense defined here (equality of welfare between generations). Equality in the *average* level of welfare, and even an increase of the *average* level of welfare over time, are compatible with the continued existence of food insecurity for some people.

Rather, the CGIAR's concern with future generations is concentrated on the poor. Hence, compared to the scenarios just described, the CGIAR would favour food security for all at all times, even if the implication would involve that rich people now and in the future became less rich than they otherwise would have been. In the concern for environmental protection for the sake of the future poor, equitable sharing of local costs and benefits, evidently, must be very important for the CGIAR.

A particular question is how to balance the concern for food insecure people living now in a certain area and dependent on certain natural resources against the concern for future poor people likely to live in the same area or to be dependent on the same resources. (We do not here consider the scenario where some development makes all parties better off.) Part of this problem is that increasing risks in the long term does often do not get sufficient attention.

From an impartial perspective, the concern for the welfare of the future food insecure people should be the same as the concern for the present food insecure people. But whether or not this impartial perspective is taken, the panel would stress that the concern for the future food insecure people ought to be given much more weight than the concern for other future people.

The practical answer depends very much on the options available. Firstly, a solution could be to improve the capacity of local communities to manage natural resources so as to be better placed to counter changes in the ecosystem. Secondly, as was hinted at in the paragraph above, if natural resources in some area are threatened by some praxis, the local community could be paid compensation in order to protect the endangered resources. Thirdly, certain practices might irretrievably compromise water or other resources if they are continued. In this case, migration/establishing other livelihoods for the involved people might be the best solution (of course the CGIAR could only recommend this, not bring it about). Again, equitable sharing of costs is very important.

As for nature protection, the attempt to increase productivity of resources will often involve a trade-off between exploitation, changes in land and water use etc. and conservation. So far in the discussion of sustainability nature is only seen as a resource for production of food and other human necessities. However, as was made clear in the brief outline of ethical theories above, people may be worried about nature not just as precious resource but also as something worth protecting in its own right. It is possible to consider the concern for nature in itself (e.g. biodiversity, protecting habitats for wildlife) as part of the general ethical goal to be balanced against the concern for human welfare. (It might also be considered part of human welfare that nature is protected for its own sake, not just considered a resource for use.) This is actually not a new idea – it originates in the idea of nature as something created in the image of God, an idea found in many of this world's old religions. The idea has again come to the fore with the growing awareness of losses in nature and biodiversity as a result of human activities.

The balancing here is difficult and depends on the importance of either side. Protection of nature for its own sake appears to have most weight when there are serious threats of irreversible losses of important aspects of nature. The concern for the poor appears to have most weight when they have no other

possibilities. But again, it would seem very unfair, if the cost of protecting nature were to be borne by the poorest people rather than being shared equitably.

Clearly, it can never be a primary objective of the CGIAR system to engage in protection of nature and biodiversity not related to food production. However, it can be important, in the effort to find new ways to increase and improve food production for poor people, to consider the concern for protection of wild nature. This is so for at least three reasons:

Firstly, there are precautionary reasons for including nature protection in the effort to develop food production. Genetic resources, land, soil and water provide the ingredients of agricultural and natural resource systems and it is expedient to use these components wisely for current and future uses. There have in the past been many cases where man has damaged nature with severe, unforeseen consequences for future livelihood. For example felling and burning of natural forests may lead to further land degradation or have adverse effects on water levels and climate.

Secondly, wild nature may both in the short and the long term be of value for people living in the poorer countries. In the short term for example, wildlife in Africa provides a resource for the tourist industry and the sections of the human population who depend on this industry. In the longer term, when the livelihood of the population has been secured, local nature may again be seen as a valuable asset by the local population. In the more well-off countries enormous sums are now invested to recreate nature which was destroyed recently when food production (or industrial production or energy) was the only priority.

Thirdly and finally, protection of nature as a concern for the CGIAR may increase the willingness of people and decision-makers in the rich countries to support the activities of the CGIAR system. Whether one likes it or not, the protection of this world's natural heritage seems for many people in the rich part of the world to be a higher priority than bringing poor people out of poverty. To appeal to positive side-effects on nature protection of CGIAR activities may serve as part of a contractualist argument in favour of support. Just like representatives of the CGIAR system often argue that poverty alleviation may benefit people in the rich world by preventing unrest and terrorism, it may, if the CGIAR system does its job in the right way, be argued that support for CGIAR is also support for a development where there is focus on nature protection.

It is not a main role of the CGIAR to do research on the protection of nature *per se*. However it must be a central element to sustain the productivity of natural resource systems and useful agrobiodiversity. It will continue to be an important element of research concerning innovation in agriculture and its possible side-effects on natural ecosystems. The CGIAR will need to build strong alliances with institutions set up to protect natural biodiversity.

2.5 Conclusions

The paper so far, has discussed ethical principles in the light of the present statement of the CGIAR goal and mission. Furthermore the panel recommends that empowerment should be considered a goal on par with poverty alleviation and sustainability. In summary, the panel suggests that the CGIAR strategic framework should be understood in the light of the following principles:

The ethical goal of the CGIAR is to fight, at all times, the serious inequality consisting in some people living with a welfare level so low in absolute terms that they face hunger and malnutrition. This concern is stronger

- *the worse off people are*
- *the more inequality there are among the poor*
- *the worse off the poor are relative to the better off*
- *the less empowered the poor are*

and it should be addressed while at the same time observing concern for protection of wild nature.

However, none of these principles have simple and uncontroversial definitions; rather they can be given different interpretations in the light of different and potentially conflicting ethical traditions.

The panel recommends that the CGIAR should be transparent about the tradeoffs made. Before embarking on major research initiatives, CGIAR institutions should always report on possible tradeoffs – or complementarities – between the relevant concerns. To ensure transparency, it is important for the CGIAR to engage in explicit reflection on how to understand the two key goals of poverty alleviation and sustainability.

3. Choice of Strategies and the Decision Context

We now focus discussion on the CGIAR's choices and means of operation in the light of the ethical principles outlined in the previous section.

Compared to the size of the problem it is dealing with, the CGIAR has very limited resources. Therefore it is important that these resources are spent in a way that gives an optimal result in the light of the goal and mission of the CGIAR viewed in the light of the underlying principles. So for every potential task one may ask whether it is worth pursuing, and, if so, whether there are other agencies that would do the job better.

In the mission statement, the CGIAR identifies itself as an organisation concerned with *scientific research and research-related activities in the fields of agriculture, livestock, forestry, fisheries, policy and natural resources management* aimed at *reducing poverty, hunger and malnutrition by sustainably increasing the productivity of resources*. Hence, the CGIAR sees its core strength in agricultural research. It follows from this that the CGIAR has to choose between *strategies* or, more precisely, alternative portfolios of strategies for its research and research-related activities.

Locating its activities somewhere in the middle of the research-development continuum, the CGIAR has tried to define its position vis-a-vis other agents. Very roughly, the CGIAR has earned its *raison d'être* through the fact that it has succeeded in applied research for the benefit of the poor that would otherwise not be conducted: not by the private sector because the poor people have insufficient buying power; and not by the NARS in the developing countries, because their limited finance largely confines them to urgent local problems and they do not have the resources necessary for general or basic research, or for research with benefits that cannot be substantially confined to the country that finances it. This ethical *raison d'être* has been put as a mandate for CGIAR to generate 'international public goods' in areas where the CGIAR possesses 'comparative advantage'.

However, the CGIAR has struggled hard to make this positioning more precise.¹³ The most important reason for the difficulties appears to derive from the CGIAR's increased focus on the ultra poor, as underlined by the panel in Section 2 of this document. This concern puts the traditional positioning under pressure in two respects. Firstly, the causes of severe poverty are often of a location specific nature, such as particular difficult agro-ecological conditions, lack of infrastructure and health care, etc. Fighting severe poverty thus has a tendency to pull the CGIAR away from conducting *international* research, i.e. research that is targeted at two or more countries. Secondly, fighting severe poverty involves many other activities than agricultural research; e.g. investments in education, health care, roads, markets, credit institutions, water management infrastructure, etc. Hence, fighting severe poverty has a tendency to pull the CGIAR in the direction of development and away from research. We shall discuss each of these challenges in turn.

3.1 Regionally versus Internationally Targeted Research

If the term 'international public goods' is used correctly and rigorously as a technical term (non-price-excludable, non-rivalrous, and benefiting many countries but none sufficiently to justify it in

¹³ Cf. particularly Jim Ryan: "International Public Goods and the CGIAR Niche in the R for D Continuum: Operationalizing Concepts", in *Positioning the CGIAR in the Research for Development Continuum*, SC CGIAR (2006), pp. 1-24.

researching the product in its own public sector), its use to 'screen' CGIAR activities is inconsistent with achieving the best impact on sustainable poverty reduction. Many of the CGIAR system's knowledge products are not non-rivalrous and therefore not public goods; indeed, making access charges to developed-country institutions and/or private companies is on the CGIAR agenda and may have already happened. Nor would, or should, the CGIAR rule out research into private goods that benefited many poor people and would not be researched outside the CGIAR. Similarly, nobody would claim that all CGIAR knowledge was international in this sense. Nor should the CGIAR reject research, say, because it would help 'only' 200 million poor Indians and a sprinkling of people elsewhere, while researching knowledge products that would benefit 5 million poor people in, say, seven well-scattered small developing countries across the world.

The particular commitment of the CGIAR, as we see it, is to make its results available for the poor by providing *non-exclusive access*. The initial results may, but need not, be public goods (which are *non-rivalrous* and *non-exclusive* in consumption). The important thing is that the results, whatever their nature, are made non-exclusively accessible for the poor, directly or e.g. through agencies expected to catalyze sustainable increases in productivity of relevance to the poor.

True, 'international public goods' is used by some in the CGIAR system in a different, often vaguer, sense to mean roughly what we say here.¹⁴ However, uncertainty about how to understand the term 'international public goods' create muddles and confusions, mostly verbal, but with big effects in derailing and muddling CGIAR efforts to define, let alone discharge, a clear ethic in allocating or planning resources and uses. The positioning of the CGIAR, in the last resort, should get its justification by being the position that contributes most to the ethical goal.

The ethical goal of the CGIAR implies that the impact should be measured in numbers of poor targeted, where each individual is weighted according to how bad off he or she is, how much inequality there is among the poor, how bad off the poor are relative to the better off, and how much they lack empowerment; and the impact should be pursued while at the same time observing concern for protection of wild nature.

Other things being equal, this ethical goal implies that the CGIAR should put highest priority on extreme-poverty regions, perhaps especially where emigration (often even to other parts of the same country) is difficult for linguistic, educational or ethnic reasons. Thus people will depend on better agriculture in place to start escaping extreme poverty.¹⁵ As noted, this priority creates challenges for an internationally oriented research organisation.

Discussion of this challenge comprises discussion of the second part of the question on economic equity raised in the TORs, i.e.

- how to balance concern for the welfare of the poor in various regions?

The CGIAR, as an agency for the *world's* poor supported by *world-wide* donors and NARS, should have an agenda for *world research options*, prioritised by their likely contribution to the CGIAR goal.

¹⁴ E.g. Appendix by P. Pinstrup-Andersen to the paper by J. Ryan (see note 11).

¹⁵ Poverty-reducing growth in the rural non-farm sector generally requires prior growth in smallholder incomes as a source of local demand. See, for example, P. Hazell and C. Ramasamy, *The Green Revolution Reconsidered*, Baltimore: Johns Hopkins, 1991.

Only after establishing a high priority research option should it select which agenda items should be done by the CGIAR system or possibly by other agencies. This depends on what the *world* consequences would be, should the CGIAR not do it.

As a general rule, there should be a proper division of labor, which will optimize achievement of the CGIAR goals. Other things being equal, this implies that the CGIAR should concentrate on the longer term and on problems of a more general nature than a NARS typically would do, in areas where private-sector or developing institutions will not provide freely or cheaply knowledge outcomes.¹⁶

In general, it is likely to be more efficient on the medium or long term, if local NARS do research related to national or regional problems, even if the CGIAR were able to do it more cost efficiently in the short term. Were the CGIAR to do it, it would be likely to reduce the incentive for the national government to allocate funds to the NARS and perhaps crowd out the national researchers; this again is likely to have a negative impact on the CGIAR goal of poverty reduction in the long term, and it would also be a problem in terms of empowerment.

In the case of a serious regional problem and where there is a NARS with capacity to solve it, things are straightforward: the NARS should do the research. If there is a NARS, but it lacks capacity, there has been long standing tradition in the CGIAR for capacity building of local NARS (courses, program-associated training, and networking) or for performing research in partnership with the NARS, both of which are in good accordance with the concern for empowerment. If there is a NARS with capacity but lack of will to engage in the problem, the CGIAR should engage in advocacy in order to establish funds from the national government or international development agencies and encourage the NARS to engage in the relevant research.

However, there might be cases of serious regional problems, where nothing is likely to be done were the CGIAR not to take action, simply because no other agents appear to be available. Then it would follow from the ethical goal that the CGIAR should engage in the problem. However, two qualifications are important here.

Firstly, even when engaging in a regional problem of severe poverty with specific local causes, the CGIAR should keep an eye for the general aspects of the problem in order to build up knowledge that may be useful in other regions. Secondly, it is an operational need to attract widespread support and funds (and also support from NARS). This can, however, be achieved if the CGIAR system as a whole is working for people in many parts of the world, and donors and NARS feel that the CGIAR system as a whole is doing this well, even if some Centres specialise in the concerns of particular regions.

3.2 Empowerment, Participation by End-Users and Advocacy

The CGIAR research should consider the whole chain from discovery to delivery. To be efficient, it is necessary to ensure that research output actually contributes to the ethical goal. Hence, for all CGIAR research, beginning at the initial planning stages, the project or programme should be evaluated as how it is likely to achieve this goal. In this subsection the panel will focus on how the CGIAR ought to

¹⁶ But sometimes, other things may be radically unequal. When rice was attacked by grassy stunt, only the IRRI germplasm collection allowed identification of a wild *O. Nivara* rice variety that had resistance. This very short-run, emergency use of CGIAR resources had huge returns.

involve stake-holders and end-users to achieve its goal; and in the following subsection the panel will discuss the need for the CGIAR and its donors to focus on the long term mission.

In order to ensure effective dissemination of research results, it is important that CGIAR researchers listen to end-users (farmers, labourers and consumers) in order to understand their needs and wants and to learn from them, for the simple reason that if people are engaged in solving their own problems, these problems are usually likely to be better solved, if sometimes more slowly. This is an area, where well thought out partnerships with proper division of labour allowing engagement of all relevant stakeholders in the chain from discovery to delivery are necessary for creating effective synergy and impact for all groups of poor.

The literature is growing and offers snippets of evidence for why and (occasionally, how) local knowledge becomes invaluable in adding relevance and efficiency in developing technologies that would work for users. Examples of where the understanding of the bio-physical environment for which the technology under development will be utilized, or why traditional farmers grow certain cultivars in certain situations, or employ certain management practices in a certain way, has provided invaluable perspective and increased efficiency to the research and development work of keen scientists.

Other examples come from the field of participatory plant breeding. Typically, a new cultivar may be highly productive and resistant to pests and diseases, but may not fit into the preferences of a farm household. Possible reasons include timing of labour requirements; compatibility with highly localised soil, water, or crop-mixing conditions; suitability of straw for animal feed; and storage or cooking characteristics. These and similar problems are good to anticipate *ex ante* so as not to be surprised at the end. Such approaches may increasingly complement on-station research with regular scientist-farmer dialogue.

A similar point holds true for the introduction of new technologies. For example, with the introduction of genetically modified crops it is important that a dialogue is held with a number of stakeholders to make sure that the new crops will be accepted and that the national frameworks are in place to deal with the new regulatory issues following the use of these crops (For a further discussion of this point, see the report mentioned in footnote 2.)

A third point is that the advancement of the ethical goal through research is not only dependent on effective dissemination of the attained knowledge. Because of poverty traps and the multifaceted nature of severe poverty, science has to be applied within a range of other measures (provided by partners and not the CGIAR). Thus, creating alternative livelihoods outside agriculture, or better infrastructure etc., appear to be outside the scope of CGIAR options. Also, the urban poor are likely to be helped rather indirectly through price stabilisation and, perhaps, diversification of available nutrition at affordable prices.

The challenge for the CGIAR here is to keep the focus on its position as research organisation within the world community of science and development players, while at the same time increasing the engagement in the additional partnerships and roles necessary to turn research into deliverables with impact on the ethical goal.

For instance, the right incentives for the poor to use the knowledge are also necessary. The use of marginal lands by poor people which degrades important resources is an example at hand. There is research-based knowledge about what to do to prevent soil degradation. However dissemination of this

knowledge by itself is not likely to solve the problem, because the land users may not have any obvious alternative available. The cost/benefit and risk assessment calculations of the poor must be met for adoption and impacts to accrue from research.

The CGIAR should increasingly engage in advocacy for the policies necessary to effect the poverty alleviation. In order to maintain its credibility, however, the CGIAR should only engage in advocacy in areas where it possesses science based knowledge on policy development. Also, it is necessary to strike a reasonable balance between advocacy activities and the core research activities. Thus there will continue to be a need to create a strategic long-term research agenda balanced with a) research approaches (often including substantial social science approaches) which will ensure the more immediate effects of prior research on poverty alleviation, and, b) advocacy to raise the contribution of others towards the CGIAR goal.

3.3 Maintaining the Focus on Agricultural and Natural Resources Management Research

In keeping the focus on research activities, a conflict has evolved between the long-term ethical goal that the CGIAR has set itself and the nature of research for development funding which is allocated for impact in shorter actual and political timeframes. The early Centers of the CGIAR were established under much less restrictive funding conditions in which long-term research budgets were awarded in the expectation of renewal over many years. The response to this challenge should be that CGIAR seeks out expert partnerships and perhaps the slow assimilation of new expertise (sufficient to maintain an effective brokerage role) but not the wholesale institutionalization of new skills. The response should *not* be to move away from the long-term ethical goal in order for the Centres simply to survive.

Research on natural resource management is by nature long term and therefore under particular risk. It requires sustained investment of effort and resources. While research and conservation efforts in biodiversity have managed to receive sustained effort and investment within the CGIAR, important elements of key agricultural and environmental resources such as water, nutrients as well as management of aggressive weeds have not always been held up on the radar. Neglect of research in this area is costly and of significant ramification as it exasperates losses of soil, water and natural resources and delays potential interventions for proper exploitation of these resources. The slow nature of research in NRM often forces scientists and administrators to put their efforts in this area on the back burner when decisions are made in priority setting based on use of meager financial resources.

As for capacity building, there may be areas of research such as ‘basic biotechnology’ or ‘genomics’ in which the CGIAR does not have sufficient human and infrastructural capacity to be a centre of excellence to lead a comprehensive research agenda that may produce a great impact. This should not imply that the CGIAR should close shop on ‘biotechnology’; rather the CGIAR needs to strategize in developing a set of partnerships that would allow the most basic knowledge or research results to come from other centres of excellence, yet leaving an appropriate set of research agendas for the CGIAR to conduct. Also, a mechanism for the CGIAR to serve as a conduit for transfer or extension of the greater knowledge base to its other partners, the NARS of the developing countries that it serves, should be developed.

Another ethical issue raised by the tension between long term goals and short term funding are the promises made to donors. For instance, overstating the deliverables of a research project and their

(direct or indirect) effects on poverty are sometimes done as part of "gaming" – winning the contest for project funding – but nevertheless present unrealistic assessments of what the CGIAR (centers or programs) can deliver in the time frame of funding. This practice would seem to raise expectations, mislead other donors and create, subsequently, a sense of unfulfilled promises from the funding of the CGIAR which in turn becomes a constraint.

Moreover, the demand for visible results put the CGIAR under pressure. To give an example, there has been an inevitable shift to defensive breeding. Thus, the same contribution to the CGIAR's ethical goal is made by a new variety that (a) raises yield by 5m tons a year, or (b) resists a pest that would cut yield by 5m tons a year. Donors see (a) but (b) is quasi-invisible. The shift from (a) to (b) has cut the visible yield impact of the CGIAR, but the returns to CGIAR plant breeding remain as high as ever.

This doesn't alter the fact that growing populations and workforces need *rising* yields for sustainable food and nutrition security; and the Green-Revolution path appears unable to deliver those alone. If the donors worry about this inconsistency between the CGIAR's main goal and the scientific means available, they need – ethically speaking – to consider enlarging the set of means by supporting new ways of meeting the goal of poverty reduction.

Hence, there seems much to be gained in entering into more honest debate with the donors on the true time frame and scheduling of research and its impacts. This could perhaps be enhanced by the public discussion of climate change which introduces a new mind-set and time frames necessary for having research impacts. These discussions should include the relative emphasis and investments to be placed in international vs. national vs. local research.

4. Summary and Recommendations.

- 1.1. In the background section of the TORs set for this panel the Science Council recognizes the need to view CGIAR policy in the context of ethics. This is particularly true when it comes to the specification of the key notions in the statement of the goals of the CGIAR system:

“... *equity* and *protecting nature* are not only concerned with the choice of means, but with the selection of goals for the System, too. Assessing the merits of different goals depends on the manner in which these broader concepts are defined and requires a somewhat different focus, on development policy more broadly. For example, different definitions of what constitutes *protecting nature* can radically alter the manner in which ‘sustainability’ is interpreted and, consequently, the very mission of the CGIAR, as well as its priorities and strategies, which have been the subject of extensive deliberations over the past two years.”

The panel is fully in line with this statement; and an attempt is made to briefly summarize the developments which have led the CGIAR system to rethink its goal and mission. Following this the panel tries to pinpoint three kinds of challenges facing the CGIAR system when redefining its goal and mission: 1) That traditional CGIAR strategies have not worked for some parts of the world and that new kinds of environmental problems have surfaced. 2) That priorities and sensibilities have changed dramatically both in poor countries and in donor countries, e.g. concerning the perception of new technologies and concerning the view of nature. 3) That centres and donors in different ways lose sight of the goal in the attempt to make ends meet in the short term.

- 1.2. Here the role of ethics in the study is outlined.
2. Here the panel conducts a critical analysis of the values underlying the CGIAR goal and mission with the aim of understanding the underlying ethical concerns and dilemmas involved. Focus is on the two main stated goals, poverty alleviation and sustainability. As part of the discussion of poverty alleviation a further value not explicitly adopted by the CGIAR system, *empowerment*, is discussed. According to the panel, empowerment ought to be seen as an important value in the further work to develop the CGIAR goal and mission.
- 2.1. The panel here addresses the goal of reducing poverty. Ethically speaking the problem about poverty is lack of welfare. However, it is far more operational for the CGIAR to state its goal in terms of food insecurity, poverty, hunger and malnutrition. These can all be thought of as indicators of poor welfare.

It appears that the CGIAR so far has put most weight on energy under-nutrition and less on ‘hidden hunger’ (micronutrient deficiency). However, judged from the effects on welfare, the panel thinks that under-nutrition and micronutrient deficiency should be given equal priority. Considering both the potential competences of the system and the relatively minor costs of fighting micronutrient deficiency, this appears an obvious priority. Anyway, it is important that the priorities of the CGIAR here are made clear.

Because of the multifaceted nature of severe poverty and the existence of poverty traps, the relation between hunger and poverty is not a simple and uniform one. Again, from the perspective of welfare, the panel would suggest that the form of poverty that should concern the CGIAR the most is the poverty that translates into food insecurity

2.2. Here the panel addresses the question of the TORs on

how to balance size of impact against the focus on helping the very poor.

It is argued that ethical goal of the CGIAR should be to fight, at all times, the serious inequality consisting in some people living with a welfare level so low in absolute terms that they face hunger and malnutrition. This concern is stronger, the worse off people are, the more inequality there are among the poor, and the worse off the poor are relative to the better off.

2.3. Here focus is on empowerment which so far has not been explicitly adopted by the CGIAR in the vision and strategy statement, but it nevertheless seems to play some role within the system.

Empowerment is clearly related to food and nutrition security, since hunger, severe poverty and environmental collapse are themselves very disempowering. As pointed out in the TORs, lack of empowerment could even work like a poverty trap:

Empowerment: how to enhance the share of benefits from research that accrue to the very poor in the context of their relative lack of empowerment compared to the more privileged

The panel argues that empowerment should be considered a goal in itself and that the increased concern for the very poor also implies strong weight on empowerment of the very poor, e.g. though providing education, basic health care, employment opportunities etc. In sharing the goal of food and nutrition security with NARS, local governments and others, it is a great challenge for the CGIAR, while being efficient as regards the goal of long-term food and nutrition security, at the same time to work for enhancement of empowerment – in the last resort for individuals – through these partnerships.

2.4. Here the panel addresses two questions raised in TORs:

Intergenerational Equity: how to balance concern for the people living now and in the near future against concern for future generations

Nature protection: how to protect parts of nature that are production resources but may possess intrinsic value

As for intergenerational equity, the CGIAR is in a way not primarily concerned with sustainability in the wide sense of equality of welfare between generations, but rather with the serious inequality within the present generation and how it develops over time. Hence, the CGIAR would favour food security for all at all times, even if it would involve that rich people now and in the future became less rich than they otherwise would have been. Equitable sharing of local costs and benefits of environmental protection, therefore, seems very important for the CGIAR.

Another question is how to balance the concern for people living now in a certain area or now dependent on certain natural resources against the concern for future people likely to live in the same area or to be dependent on the same resources. The answer depends very much on the options available. Firstly, a solution could be to improve the capacity of local communities to manage natural resources so as to be better placed to counter changes in the system. Secondly, if natural resources in some area are threatened by some praxis, the local community could be paid

compensation in order to protect the endangered resources. Thirdly, certain practices might irretrievably compromise water or other resources if they are continued. In this case, migration/establishing other livelihoods for the involved people might be the best solution. Again, equitable sharing of costs is very important.

According to the panel is not a main role of the CGIAR to do research concerning nature protection. However it must be an important element of research concerning innovation in agriculture to consider possible side-effects on wild nature; and it must be important for the CGIAR to build strong alliances with institutions set up to protect natural biodiversity.

3. This section aims to provide an answer to the question raised in the TORs about ends and means:

Ends and means: how to evaluate the efficiency of means ...

The CGIAR has, compared to the size of the problem it is dealing with, very limited resources. Therefore it is important that these resources are spent in a way that gives an optimal result in the light of the goal and mission of the CGIAR viewed in the light of the underlying principles. So for every potential task one may ask whether it is worth pursuing, and if so whether there are other agencies that would do the job better.

- 3.1. Here the panel discusses the second part of the question on economic equity raised in the TORs, namely about balancing between regions:

how to balance concern for the welfare of the poor in various regions

The CGIAR, as an agency for the *world's* poor supported by *world-wide* donors and NARS, should have an agenda for *world* research options, prioritised by their likely contribution to the CGIAR goal. As a general rule, there should be a proper division of labor, which will optimize achievement of the CGIAR goals. Other things equal, this implies that the CGIAR should concentrate on the longer term and on problems of a more general nature than a NARS typically would do, in areas where private-sector or developing institutions will not provide knowledge outcomes freely or cheaply.

However, there might be cases of serious regional problems, where nothing is likely to be done, were the CGIAR not to take action, simply because no other agents appear to be available. Then it would follow from the ethical goal that the CGIAR should engage in the problem. Still, the CGIAR system as a whole should be working for people in many parts of the world, and donors and NARS should feel that the CGIAR system as a whole is doing this well, even if some Centres specialise in the concerns of particular regions.

- 3.2. Here the panel focuses on how the CGIAR ought to involve stake-holders and end-users to achieve its goal. In order to ensure effective dissemination of research results. It is important that CGIAR researchers listen to end-users (farmers, labourers and consumers) in order to understand their needs and wants and to learn from them, for the simple reason that if people are engaged in solving their own problems, these problems are usually likely to be better solved, if sometimes more slowly. This is an area, where well thought out partnerships with proper division of labour allowing engagement of all relevant stakeholders in the chain from discovery to delivery are necessary for creating effective synergy and impact for all groups of poor.

- 3.3. Here the panel discusses the need for the CGIAR and its donors to focus on the long term mission. In keeping the focus on research activities, a conflict has evolved between the long-term ethical goal that the CGIAR has set itself and the nature of research for development funding which is allocated for impact in shorter actual and political timeframes. The early Centres of the CGIAR were established under much less restrictive funding conditions in which long-term research budgets were awarded in the expectation of renewal over many years. The response to this challenge should be that CGIAR seeks out expert partnerships and perhaps the slow assimilation of new expertise (sufficient to maintain an effective brokerage role) but not the wholesale institutionalization of new skills. The response should *not* be to move away from the long-term ethical goal in order for the Centres simply to survive.

Annex 1: Overview of Ethical theories

In modern times, the dominant task for ethical theories has been to answer the question: Which act (or acts), out of a range of alternatives, is (or are) *morally right* in a given situation? An ethical theory is, accordingly, a systematic account of all the relevant ethical considerations and a determination of how these considerations combine to dictate an overall judgment as to which act is right.

Theories of the right act are often divided into *teleological* (consequentialist) theories and *deontological* (non-teleological, non-consequentialist) theories. There is some disagreement about how this distinction should be drawn, but we suggest the following rough division. Teleological theories claim that the right act is determined exclusively by considerations about the *good*, whereas deontological theories deny this claim. A teleological theory thus builds on or implies a theory of the good. A theory of the good tells us how to determine the relative value of outcomes (consequences) of an act.

Utilitarianism (found in classical sources such as Bentham, Mill, and Sidgwick) is the best-known teleological ethical theory. It claims that the right act is the act that maximizes total welfare. Thus its underlying theory of the good claims that the best outcome is the outcome providing the greatest total welfare. This theory of the good is *individualistic*, because it claims that the overall good is an increasing function of what is good for individuals (individual welfare) and nothing else. Other teleological theories would allow for non-individualistic values, i.e., values or ideals whose fulfillment is considered good even though nobody thereby gets a better life. Equality, cultural integrity, the nation, and autonomy are examples of such non-individualistic values. (Note, however, that these values could also be interpreted individualistically.)

Among individualistic theories, utilitarianism claims that it is *total* welfare that counts. Other individualistic teleological theories would claim that the *distribution* of welfare also counts. Thus, *prioritarians* claim that benefiting people matters more, the worse-off these people are, whereas (individualistic) *egalitarians* claim that certain basic resources, or all resources, or welfare should be distributed equally.

The extent to which the theories in practice will prescribe different policies depends on (1) how welfare (and the target of the egalitarian concern) is defined, see below; and (2) the weight the concern for the distribution of welfare is given relative to the concern for total welfare. Furthermore, it is an empirical question to what extent utilitarianism – because of the diminishing marginal value of resources – actually will promote equality in welfare.

Utilitarianism and other individualistic teleological theories must thus incorporate a theory of welfare: What makes one life better than another or ensures that it contains more welfare? Here several theories have been proposed. Most prominent are *perfectionism* (the good life consists in realizing the essential aspects of human nature), *hedonism* (the good life consists in the greatest balance of pleasure over pain), *preference satisfaction theory* (the good life is the life mostly preferred by the individual) and various religious theories (in which, roughly speaking, the good life consists in living in accordance with one's religion).

Some influential add-ons to these classical theories of the good life are Amartya Sen's theory of 'entitlements' or 'capabilities,' according to which the good life is not defined by the outcome but

by the ability to control one's own life; and John Rawls' theory according to which – in a similar vein – the good life is defined by possession of certain basic (“primary”) goods.

Teleological theories set up a common goal for all of us: maximizing the good (however defined). Deontological theories claim that some ethical considerations work in another way. One can mention rule-based morality exemplified by the Ten Commandments in the Judeo-Christian tradition and the Eight-Fold Way in Buddhism. A more sophisticated example is side-constraint theory, which claims that certain specified acts are wrong. A side-constraint cannot be outweighed by considerations of the good. An example is the Kantian view that we should not use other persons exclusively as means in pursuit of our goals – not even in pursuit of the overall good, however defined. Side-constraints give a strong interpretation of the notion of a right.

An interesting case in point here is the successful fight against poverty in China and Vietnam at the cost of violations of political rights. According to influential deontological theories of the kind discussed here, these violations – despite their beneficial effects – are not justified. Others with a more utilitarian approach may point to the development of China and Vietnam as examples to be followed by others.

Another class of deontological theories is *contractualist* theories. They claim, roughly, that the right act in a given set of circumstances is the act that rational and equal agents can agree on under certain more or less idealized conditions. Contractualist theorists differ as to what the relevant conditions are. Some theories attach weight to the idea that ethics should appeal to self-interest only. Others emphasize the idea that agreement should be unbiased and unforced. All involve an attempt to define conditions of agreement that ensure the right kind of impartiality.

An important, and in some ways separate, question here concerns the way in which *States* ought to act. *Liberals* like Rawls and Nozick claim, roughly, that the State should be neutral between competing conceptions of the good life; it should not prescribe how citizens ought to live, as long as their way of life does not harm others. *Communitarians*, on the other hand, claim that the State ought to promote values inherent in the local, historically evolved community and its culture. The State, therefore, need not be neutral between competing conceptions of the good life.

A complication for ethical theories concerns uncertainty. If there is uncertainty about what exactly the outcome of an act will be, there will be a risk of unintended consequences. Ethical theories have disappointingly little to say about uncertainty. However, very roughly, the teleological tradition is concerned with evaluation of outcomes *ex post*. When it comes to decision making *ex ante*, the idea is roughly to take probabilities into account when valuing acts with uncertain outcomes; in doing this, there is the issue of determining the right level of risk aversion. The side-constraint tradition would like to maintain that a given *act* is either right or wrong, regardless of its possible unintended consequences; and the contractualist tradition would seek rational agreement about how to deal with the uncertainty in question.

Another task for ethical theories is to say which traits of character each of us ought to cultivate. These traits are often called *virtues*. Many ethical theorists consider this question a secondary one. They believe that the answer should be derived from the answer to the primary question about the right act, and hence, in effect, that virtues are traits of character that lead a person to perform the right act in any circumstances. However, following classical and medieval traditions, a significant number of theorists argue that this puts the cart before the horse: Instead of exploring virtue by

working back from right action, we should tackle virtue directly and *then* try to shed light on right action by asking, in any given situation, what the virtuous agent would do.

By focusing on the virtues, moreover, it is possible to tackle the thorny issue of motivation. Normally, when we accept that it would be (say) wrong to lie, we act accordingly (in this case, refrain from lying). But why? Virtue theory has a ready answer to this question, since to possess a virtue is by definition to be motivated in a certain way.

A final task is to answer the question: Who or what must be taken into account in ethical deliberation? Traditionally, ethical theories have been anthropocentric. They have concentrated on human needs and interests. However, even this claim raises difficult problems of demarcation. When does a human being come into being and when does it cease to exist? Are future generations entitled to be taken into account for their own sake or only to the extent they matter to the present generation?

Animal ethicists and environmental ethicists, however, have challenged the anthropocentric view. One line of argument, called *extensionism*, points out that features we would refer to, to explain our moral concern for humans – complexity, vitality, the capacity to feel pain, and so on – are shared by sentient animals. Some environmental ethicists have extended this argument to plants (focusing, obviously, on features other than pain). Another line of argument, often called *holism*, claims that both anthropocentric ethics and extensionism represent an individualistic conception of nature. But if we reflect on the value of nature, we see that we value ecosystems or landscapes as interdependent wholes. A third line of argument, *deep ecology*, claims that if we reflect on ourselves, and on the way in which we are intertwined with other life-forms, we shall eventually develop a new understanding of ‘self’ that involves recognizing other life-forms on equal terms as being part of our own flourishing.

Let us conclude this section by summarizing some important distinctions. Ethical considerations can be divided according to a two dimensional matrix. Along one dimension are the different answers to the question of *who or what is entitled to ethical concern in its own right*. Should we be anthropocentric or should we also be concerned for nature (in some way or other) for its own sake? Along the other dimension are different answers to *how we should be concerned*. Teleological theories define a theory of good (comprising one or more fundamental values) and claim that good, defined this way, should be maximized. Deontological theories claim that some concerns are not part of the good to be maximized.

The latter distinction also involves different models for how to deal with conflicting values. For teleological theories, weighing is typical (but other models are also possible). Weighing establishes the extent to which each value that makes up the good (as defined by the theory specified) counts towards the overall good. For instance, if the theory is egalitarian, it will specify how much different degrees of inequality count relative to different totals of welfare.

In weighing, a loss in one value can typically be compensated by a sufficient gain in another value. If deontological concerns take the form of constraints, this will not be the case. Violation of a constraint cannot be compensated by a gain in another value, however big. Hence, deontological concerns constrain the pursuit of the good by demanding that it is only pursued through acts that are acceptable in that they do not violate rights or other standards of conduct. Possible constraints include respect for persons and their right to autonomy, self-determination, and political participation.¹⁷

¹⁷ Note that a number of constraints of the Kantian type for the internal CGIAR procedures were identified in the previous report *Ethics and CGIAR Research* (cf. footnote 3). In the present report, on the other hand, we are concerned with the mission of the CGIAR.

Annex 2: What is the Implication of the Concern to Avoid Inequality among the Poor?

As the panel suggests, the increased concern for the ultra poor also implies a concern for inequality among the poor. This also raises challenges for the CGIAR. It is helpful to separate three groupings of poor people substantially affected by research that affects sustainable food and nutrition security:¹⁸

- Poor small farmers
- Poor farm labourers
- Poor net staples consumers (i.e. poor people who eat more staples than they grow; this includes almost all the urban poor, and many rural poor)

Some poor people are in two or three classes, but many are in just one. The concern to avoid inequality among the poor thus imposes quite strict conditions on the CGIAR, since innovations that help one or more of the three main classes of poor (labourers, mini-farmers, net food buyers) should not unduly harm any of the remaining classes. The challenge is complicated by the fact that appropriate technology may move people from one class to another, or – since the classes are not mutually exclusive – from being, say, mainly a farm labourer to being mainly a small farmer in terms of income source.

The three main groups of poor families below the poverty-line depend for income mainly on small farms, hired farm labor, or non-farm (including urban) economic activity. To improve welfare for all three of the major dollar-poor groups, advances in applied farm science must satisfy two conditions:

1. The Price/Total-Productivity Tightrope: For new science to help poor farmers and poor food consumers, it must cut staples prices, but must also raise total factor productivity (TFP) on small farms even faster. New science usually raises farm supply of outputs and demand for inputs. That makes outputs cheaper and inputs more expensive; hence the ratio of farm output prices to input prices falls. Do small and poor farmers gain? If, and only if, this science-induced fall in their relative farm prices is slower than the science-induced rise in their conversion ratio of physical inputs into physical outputs (that is, TFP). Yet, unless the extra food brings the price of staples down, the non-farm poor, especially in towns, may not gain much from new crop science.

Walking this tightrope successfully means addressing two demand issues: (1) Is there enough demand for extra staples produced by agricultural research to avert price declines that would unduly cut research gains to small farmers? (2) How can the poor afford this extra food? It is easier to walk this tightrope if many of the research adopters are food-deficit small farmers. These, a substantial majority of the rural poor in most of Africa and Asia, spend significant portions of their extra income on more (and better) staples, eating much of the extra food themselves.

2. The Wage Rate/Labor–Land/Productivity Tightrope: In the early stages of development out of mass poverty, for new science to help poor farm laborers, it must not only raise output per labor-hour but also to a greater extent output per hectare. In most farming situations in developing countries, there is hardly any ‘spare’ farmland worth cultivating. With A (area of cropland) fixed, L (use of farm labor) can rise only if output per unit of area (Q/A) grows faster than output per unit of farm labor (Q/L):

¹⁸ This annex draws in part on M. Lipton: ‘The family farm in a globalizing world’ (IFPRI 2020 Discussion Paper no. 40 of 2005).

hence the above condition for total demand for farm labor to rise, pulling up employment or the wage-rate.

The condition is tighter if supply of farm labor grows. The number of persons of prime working age (15–64 years old) is set to rise at around 2 percent per year in most of South Asia and Sub-Saharan Africa for the next 10–20 years, and by over 1 percent even in rural areas. For farming to help raise demand for labor faster than supply, with cropland scarce, scientific advances must raise output per hectare by at least, say, 1.5 percent per year faster than output per worker.

This is not to say that agricultural research in poor areas can disregard output per worker. It too must rise significantly. First, poverty heartlands are there partly because output per worker is so desperately low. Second, they are also kept poor by low labor productivity, which deters farmers and others from hiring more labor, thus retarding the poor's wages, employment, and bargaining power. Third, higher labor productivity is especially important in areas facing acute seasonal labor scarcity – most common in Africa, particularly when hoeing is needed; otherwise, severe yield losses can occur due to late planting. Fourth, HIV/AIDS severely depresses local labor supply in parts of Africa.

Research needs to raise labor productivity, especially in peaks, but it cannot help those afflicted by HIV/AIDS to cut the demand for poor people's labor! Agricultural research, with land and water limited, will seldom cut poverty much without raising their productivity faster than labor productivity. Otherwise, farm employment demand must fall. Only much further into the process of development and rural poverty reduction, when non-farm growth and emigration have pulled wage-rates up, should researchers – like farmers – seek to raise labor productivity faster than land productivity.

The lesson for future crop science policy is clear. When choosing among research paths, alternatives should be *evaluated by their impact on all three groups of poor*. A high employment share in extra science-induced farm income should normally be seen as a gain. For countries where the dollar-poor lose out if the demand for farm labor declines, aid-backed farm research should not support better combines, herbicides, mechanical transplanters – or varieties whose advantages depend on these – unless the results can be shown to be cost-effective ways to cut poverty.