

	Please list your primary discipline (field of highest degree) (Please check only one area):	Describe this key opportunity for innovation:	What is the problem that this innovation is supposed to address? (Please describe)
	Response	Open-Ended Response	Open-Ended Response
1	Economics/Agricultural Economics	Development of new late blight resistant varieties with improved culinary qualities for Andean farmers	Productivity losses due to late blight and lack of market demand for traditional potatoes
2	Crop breeding/pathology	Increase yield potential in wheat through increasing Photosynthetic efficiency (Rubisco, C3/C4, partitioning of PS products)	Wheat productivity needs to increase by at least 1.5/year (other sources calculated 1.8%) over the next 40 years to meet the global demand. For the last decade annual increase was around 1%. Without significantly increased investments in R&D it will be impossible to meet this challenge.
3	Crop breeding/pathology	Formation of research hubs for conservation agriculture systems in major crop production systems in the developing world	Sustainability of cropping systems; stop soil fertility decline; minimize erosion; crop diversification; minimize impact from global change
4	Economics/Agricultural Economics	-new institutions, new strategies and policies	-poor and weak institutions in agricultural and rural development -stagnation of yield -poor infrastructure
5	Agronomy	GOOD AGRICULTURAL PRACTICES spread via teaching and extension services establishment and/or improvement	Scarce or null education of the people involved in agricultural fields
6	Biotechnology	natural resources and environment	conserving biodiversity and agrobiodiversity and using biodiversity to help people adapt to climate change
7	Agronomy	sustainable crop production practices for the drier sub-saharan Africa	production practices that enhances utilization of the available moisture for crop and fodder production
8	Other (please specify)	Contribute to production efficiency and enhanced income opportunities through improving expert-extension-farmer exchanges	Lack of intensive communication in this continuum from farmer to research experts hampers spread of resource conserving and/or income-augmenting technologies
9	Agronomy	Development of commodity value chain innovation platforms	Brings value chain stakeholders together working towards a common vision of the needs and opportunities in the development and growth of specific commodity subsectors. This allows for income generation and food security issues to be addressed through publi-private partnerships.

10	Economics/Agricultural Economics	Improve input (seed, chemicals, finance, land) and output markets. This would involve investing in building human and institutional capacities within developing countries to reform trade, commercial, finance and land policies and regulatory frameworks. Activities would include strategic research across countries, training and technical assistance. The aim would be to ensure developing country organizations - public, private and CSO - are fully capable of developing and implementing policies that provide smallholders with access to appropriate technologies at affordable prices and that provide smallholders with opportunities to sell their surplus production at fair and profitable prices.	Systemic market failures at most levels and in most sectors.
11	Economics/Agricultural Economics	Empowering women with the knowledge, access to assets, and decision making authority to contribute fully to agricultural development.	Systematic biases that restrict women's roles in the economy and in the society more generally. These biases often derive deep social and cultural norms, and have been embedded into institutional cultures and in many cases national policy.
12	Other (please specify)	Forest regeneration coupled with agricultural production for sustainable development. Livestock production and production of food crops like tomatoes which is highly demanded	Addressing food security and prevention of degraded lands and natural catastrophies like landslide and erosion of vulnerable lands as a result of human activities. Biodiversity conservation in the rural melieu where our activities are based
13	Biotechnology	low carbon, ecological farming	We are foolish to continue business as usual in agricultural production methods as the planet warms and oil supplies diminish. In particular for small-scale farmers, the fossil fuel-based input-dependent agriculture is a model that needs redesigning because of the heavy economic costs which will just continue to rise. The private sector is not going to carry out this work. The CG system needs to be the forward thinkers, moving agriculture towards low carbon, ecological farming for a post-oil era.
14	Biotechnology	Food security/nutrition security. Development and promotion of agricultural systems that enhance food and nutrition security by incorporating a wider range of food plants into production systems. Incorporation of a wider range of food plants will increase dietary nutrients at the same time that cropping diversity will increase the resilience of the system under conditions of climatic changes.	Loss of traditional food crops and emphasis on commodity crop production has impoverished diets, reducing historical sources of micro- and macronutrients. Additionally, the resilience of production systems, particularly with respect to climate shocks, can be addressed by integrating more plant diversity within the production system.

15	Biotechnology	Policy/institutional innovation. In times of financial constraint, what are the policy options that can be used by governments to support the small-farm sector in the transition to low-carbon, ecological farming systems?	Governments have little flexibility with budgets in times of economic downturns, yet a viable agriculture sector is fundamental to feeding people, and often governments will need to support the agriculture sector to maintain that viability, particularly in times of economic crisis. The transition to a low-carbon agriculture is an important public good that merits government support.
16	Other (please specify)	- Quality seed systems - National and regional vegetable production for future food security	- To many farmers use farmer saved seed in these areas - Change in climate gives vegetable production a great future, is an important part of the in the food consumption chain for food security and better health .
17	Livestock/veterinary	Improving livestock productivity using indigenous animal genetic resources	better coordination among institutions (policy makers, research institutions, education, etc) in terms of rural development, gender equity, improving market opportunities, reducing gaps between urban and rural areas, making agriculture more sustainable and attractive to people
18	Natural resources	Policy:secure ownership of land resources including services such as carbon sequestration and the role of forests in watershed management, (availability of water for consumption and hydropower) and establish viable mechanisms for compensating the rural communities for the maintenance of the ecosystems services	a) Unsustainable use practices due to lack of b) Lack of compensation of the rural people for the contribution to maintenance of ecosystems services (PEF), particularly in Africa. c) Poverty and lack of benefit from the natural resources for the rural communities that depend on them
19	Natural resources	Natural resources accounting	undervaluation of the natural resources and lack of acknowledgement of the sustainability aspects when macro-economic indicators are presented. Reform the natural accounting systems to include natural resources and environmental consideration.
20	Agronomy	Combination of yield enhancing (mainly fertilizer), risk management and improve market access implemented in integrated/rational manner and with stakeholders (sounds like the obvious no?) Challenge is to create enabling environments/policies and subsidies on fertilizers are in my view a must.	Food deficit, low income, food crisis
21	Natural resources	Design new models of agricultural production, taking in account as well staple products as environmental issues : i.e. overcome the production/conservation dilemma by a diversity of production systems (size, content, locations, etc.), by managing their complementarities within an heterogenous area and by producing a set of evaluation criteria taking in account economics, social issues and ecosystem services. Increasing production is not only increasing productivity at the field (or herd) level, but deals with land use at a large scale, market access, farmers organizations, etc.	To diversify food production, to better manage land use in heterogeneous situations, alleviate poverty and control exclusion processes, generate frantic rural areas while taking care of the major environment issues as water quantity and quality, climate change, biodiversity, etc.
22	Agronomy	Breeding, research, production, postharvest processing, food consumption, natural resources and environment	apply modern new practice, technology, and modern education.

23	Crop breeding/pathology	Technology should be developed that could be disseminated among farmers of developing country to boost the desired production target. Food security should be ensured for every citizen in developing world. Therefore, nutritious crops varieties with short duration and higher yield related technology be developed through agricultural researches.	We have minimum fund and lack of well equipped laboratories in developing countries like Bangladesh. Also lack of skilled researchers. So, human resource development should be strengthened.
24	Economics/Agricultural Economics	Climate change policies, of all types	GHG's and climate change
25	Agronomy	water managment Use of modern tech. Obtaining useful water for agricultural activities and maximizing the efectivnes of irrigation systems.	Expensive tecnologies at this moment.
26	Agronomy	Production and productivity should include increases in yield, quality, resource use efficiency, land use efficiency or labor use efficiency.	This innovation should take place anywhere in the world, but particularly under harsh environments under current production level is low. The technology should be robust against climate change. Innovation will unlikely be achieved by a single technology. Integrated approaches specific to local conditions will be needed.
27	Other (please specify)	Developing diagnostic tools for various pests and diseases for increased resource use efficiency and reduction of pest and diseases. Result increased yield of cultivated crops	Ability to detect and identify a pest or pathogen correctly and early in the growing period of a crop. Correct identification is like solving the problem halfway. Followed by use of correct inputs and at the right time
28	Food safety	Development of technology of processing postharvests from local food with a handcrafted level, that improve nutritional quality of food, so much as food alternative as offer of program of food support like elaboration the product of products of major added value.	It is directed to improve the nutritional conditions and living conditions of the local populations, to low cost. The family groups can appropriate of the simple technology across the technological transfer.
29	Forestry	Crop Breeding and Integral Management to increase the efficiency of an area in production of goods and services to reduce the risks of conflict of use (eg. biofuel vs. food, agricultural production vs. biodiversity protection)	Shortage of land to provide all services and goods from natural resources to support the needs of humankind
30	Economics/Agricultural Economics	Innovative and affordable rural energy: rural electrification, alternative energy sources (e.g., wind and solar energy, etc.)	Most of the poor regions in the world have poor access to modern energy sources. Infact in my extensive observations of the rural setting in many developing countries, the single most differentiating variable between the better-off villages and the not so better-off ones is the level of utilization of modern energy. Lack of access to modern energy sources have far reaching implications: it encourages rural people to resort to unsustainable sources of energy such as trees, it limits people's capacity to access key factors of production such as water ultimately consingning them to rely on unreliable rain-fall pattern for crop production, it limits the development of agriculture connected bussinesses such as processing, storage, etc.
31	Agronomy	Production, productivity and technology combined with resources management and environmental conservation: an integrated innovation hub for Conservation Agriculture	We want high and stable yield with increased income for the farmers and least impact on environment possible.

32	Economics/Agricultural Economics	Improved broadly adapted potato varieties with multiple resistances to pests and diseases coupled with improvements to seed potato systems to assure delivery of improved varieties.	Persistent yield gap in developing countries. Poorly developed seed systems. Low institutional capacity to establish and sustain seed systems.
33	Economics/Agricultural Economics	Improved white and orange fleshed sweetpotato varieties coupled with improved planting material production systems.	Food security and malnutrition especially in SSA and South Asia
34	Agronomy	Better understanding and use of the potential of existing crop diversity, based on different complementary analysis methodologies (ex situ characterisation participative varietal selection, molecular analysis, GIS)	Growing population, land degradation and climate change are serious constraints to the ongoing efforts to sustain, and increase, current food production and to improve people's livelihoods. Crop diversity can offer solutions to some of these problems, e.g. in the selection of promising materials (e.g. adapted to marginal or extreme conditions) for cultivation or as input for breeding programmes, yet for a lot of crops this potential is not fully understood let alone effectively utilized.
35	Crop breeding/pathology	An interface that on one side finds reliable service providers, makes contractual arrangements, defines a modus operandi and negotiates affordable bulk prices for services. On the other side, receives concrete requests for services from scientific organizations, helping them to adapt in order to comply with the service providers' structure Also arranges for the development of the requests and in the process removes from the scientists the administrative hassles, following up tasks until completion, addressing conflicts and disputes (should they arise) and taking care of the financial operations. When needed, provides technical support to analyze and interpret the results. The user pays for the technical service and for the interface service at cost recovery rates. The process generates significant savings in time and funds, enhancing the capacity of the users and promoting the use of the best techniques on a per case basis.	An array of proven technical products and services (such as Molecular Marker technology) are ready to be used by scientists in the developing world. These scientists have no adequate means to access them, thus best technologies are not within their reach. Reducing this access barrier would significantly enhance the performance of scientists by improving the quality and productivity of their work outputs.
36	Crop breeding/pathology	Information systems allowing more thorough probing/selecting into germplasm collections	Genebanks hold a (presumed) wealth of genetic diversity, but accessing that diversity is often difficult. User enabled tools that allow specific, probing searches of germplasm based on diverse data (passport, pedigree, characterization, evaluation, genetic, molecular) will enhance the utility of germplasm collections to users.
37	Other (please specify)	Development of traits to allow plants to respond to abiotic stress such as drought tolerance	Plant adaptation to climate change and limitation of water availability
38	Other (please specify)	Improvement in the efficiency of photosynthesis	Photosynthesis is only 25% efficient and has a marked temperature dependence. Improvement in photosynthesis efficiency would increase yields and could be applied to all crops indigenous to countries.
39	Economics/Agricultural Economics	"Re-greening" through collective action, combined with property rights innovations that allow successful efforts to continue to benefit the people who make them.	Desertification

40	Economics/Agricultural Economics	creating a policy environment for expanding fertilizer availability to smallholders	Deteriorating soil productivity.
41	Other (please specify)	Development of urban horticultural systems based on the use of wide diversity of (mainly) local, indigenous food and medicinal crops	Food insecurity and health issues for the urban poor as well as loss of biodiversity (especially related to medicinal plants)
42	Livelihoods	Increasing the resilience of small-scale farmers, pastoralists, fisherfolk and other local resource users	High vulnerability to rapid change
43	Economics/Agricultural Economics	Whether a innovation or not might be discussed, but access to markets for farm produce is essential. Research in Eastern Africa I've been involved in shows how prices increase dramatically with better access. In many cases, to get a 50 % increase in income is a lot easier by increasing p (price) than x (productivity) in the gross income = p*x equation.	
44	Food safety	Development of readily available/accessible starter cultures for fermented foods	1. It will solve the problem of non-uniformity in quality of fermented foods and safety issues. 2. Income generation for traditional processors and improving the livelihoods of the processors.
45	Agronomy	Improved high yielding crop varieties,	low crop productivity and reducing hectareage put into crop production, drought, poor storage
46	Agronomy	Improved postharvest processing and storage at the farm and village level requiring low input	Post harvest losses of crops, income loss, low income of producers, safe food and nutrition,
47	Agronomy	breeding of new high yielding crop varieties which are drought tolerant, requiring low soil fertility inputs	low yields, poor productivity,
48	Economics/Agricultural Economics	Small scale processing of coconut so that smallholders can produce final products at a farm or village level.	A copra trade with only the most basic processing done by the grower of a highly nutritious 'fruit' into a debased raw material (copra). The producer cannot gain any of the benefits of the final products that are produced
49	Nutrition	reduction in seasonal variability in food availability and prices i.e access to foods through providing women with opportunities to use improved technological skills	seasonality of food supplies (lean season) and gender inequality
50	Agronomy	Bio-energy should be targeted as a main area for economic development and livelihoods improvement in tropical countries. It is an vital answer to pollution and climate change issues, and to the coming shortage in petroleum. There is an absolute necessity to work on sustainable cropping systems that would combine energy and food production.	This theme of research adress as well global environmental change issue as nutrition and poverty in developing countries.
51	Other (please specify)	First priority is to Increases yield, use available resource efficiently, reduced pests and diseases which reduce yield and quality, and weeds management	to increase yield we have to go hibrid varieties but still not available and need new technology
52	Economics/Agricultural Economics	Conserving and using agro-biodiversity	food safety and nutrition quality through a diversified food production and hence diet. Food sovereignty: leave the options that communities rely on their own traditional foods or are free to make their choices on the management and conservation of their food systems, Resilience of production systems and adaptation to changing environments through the use of agro-biodiversity

53	Crop breeding/pathology	Effective management of pest and diseases of crops to reduce damage and increase productivity. This could be done by research and development of IPM practices in partnership with NARS, NGOs and farmers	It will address the problems of insect pests and diseases that account for >30% crop yield loss annually, and develop technologies and advisory for <u>effective management of this serious problem</u>
54	Institutional development	Production, productivity and technology, post-harvest processing and value addition, food safety, consumption and nutrition, natural resource and environment management and utilization and institutions, policies and markets.	These will address the need for a new approach to agriculture like the development of multifunctional agriculture in a biodiverse environment, mobilizing local knowledge through participatory research and equitable <u>intellectual property regimes</u> .
55	Economics/Agricultural Economics	Widespread adaptation and dissemination of low-cost postharvest technologies for fruits and vegetables through a training of trainers approach that involves all supply chain actors, from farmers through collectors and wholesalers to retailers. Many postharvest technologies are available in the shelves but rarely are they disseminated at large scale. Dissemination activities need to recognize that actors other than farmers need to be involved (i.e. collectors, wholesalers), as they decide over quality traits (i.e. maturity, color) and packaging of produce that they purchase from farmers.	High perishability of fruits and vegetables contributes to seasonal oversupply and low prices, and contributes to low incomes of all supply chain actors.
56	Other (please specify)	Empirically confirm, raise awareness of and pursue the implications of the "prevention dividend". A number of major sources of ill-health, including HIV, are in varying degrees caused by hunger and insecure livelihood. Innovations of different kinds and at different levels in agriculture and natural resource management are alleviating food and livelihood insecurity or have the potential to do so and could thereby help people avoid these sources of ill-health, contributing substantially to prevention. Indeed, some innovations may already be making an inadvertent and as yet uncounted contribution - a prevention dividend. Disciplinary and institutional divisions have obscured what are to many people, particularly at the grass-roots, obvious links between food, work and health	Major sources of ill-health such as HIV are addressed by public health interventions. Poverty, hunger and inequalities are often recognized by the institutions involved as important determinants but as structural in nature: slow to change and beyond the reach of near-term interventions in support of prevention. Clarifying the existence and importance of the "prevention dividend" and pursuing it operationally could make prevention much more effective. Recognition of these links could also raise the profile of demonstrated opportunities to enable rural people secure their food and livelihood, increasing support for them at all levels.
57	Economics/Agricultural Economics	International Fish Trade Model to analyze the effects of food quality and safety related policies	Developing countries continue to record an impressive trade surplus in fish products. However, raising consumer concerns about a range of food safety matters and increasingly stringent regulatory standards related to fish product supply pose on-going challenges to the sustained international market access of many developing country suppliers. Quantitative modeling of fish supply, demand and trade is a extremely useful tool for analyzing the effect of recent changes in food quality standards. The results are expected to help developing countries to expand their fish export and to improve the well-being of poor fish farmers and fishers.

58	Economics/Agricultural Economics	Community based fish culture in seasonal flood plains	Fish culture in seasonal water bodies requires appropriate social and institutional arrangements. There is an urgent need to develop location specific institutional arrangements to expand fish production in seasonal flood plains in tropical developing countries.
59	Natural resources	management and marketing of resource-efficient high value crops (herbal, medicinal)	income of rural families in resource-poor environments
60	Nutrition	Improving nutritional status of families by enhancing quality of diets at the household level through diversification using local staples.	Malnutrition at various level across the life span especially among vulnerable household members.
61	Other (please specify)	national and local seed systems for clonally propagated crops	loss of yield potential due to pests and diseases, especially viruses loss of yield potential due to lack of physiological potential of planting material loss of yield potential due to highly variable genetic yield potential from one plant to the next
62	Crop breeding/pathology	The main problem to solve development issues are not technological, even if new technologies are required (e.g. new varieties), they are economical, sociological and political. Therefore, I am convinced that the main opportunity and challenge for agricultural research for development are 1/ to develop research that makes the link between biophysical and socio-economical research (e.g. modelling, anthropology and sociology of techniques), and 2/ to change the "easy way" disciplinary research are performed. It should be underlined that 1/ these are real high level and complex scientific challenges and 2/ that they apply to global issues and to issues faced also by industrialized countries.	See answer 1.
63	Agronomy	Participatory Market Chain Approach (PMCA). The PMCA focuses on innovation in products, technologies, and ways of working together. By carefully selecting market chains and partners, and building in social responsibility, the PMCA can lead to favourable outcomes and impacts for poor farmers, typically the weakest link in the chain. To ensure that impacts are sustained, the PMCA is best used as part of a broader programme of market chain development. It facilitates group processes in which market opportunities are identified and assessed, and innovations developed. Three types of innovation may result: > Commercial innovations, such as new or improved products > Technological innovations, such as new production or post-harvest practices > Institutional innovations, such as new ways for smallfarmers to work with market agents or service providers.	Food systems are evolving rapidly in developing countries. Supermarkets and sales of packaged food are expanding fast, impacting on production and the marketing practices and livelihoods of small farmers. There is a new consensus that agricultural research and development (R&D) should help small farmers link up with profitable markets. The Participatory Market Chain Approach (PMCA) was developed to address this need. The PMCA differs from other market chain approaches because of its focus on stimulating innovation and long-term partnerships among farmers, market agents, and service providers. It pays particular attention to engaging private sector actors, who are critical in identifying and making use of new market opportunities.

64	Natural resources	Chairgroups within Wageningen UR run a large innovation-focused interdisciplinary collaboration programme in West Africa (Benin, Ghana, Burkina) that aims to develop mutual insight in farmer's own innovation/experimentation/indigenous knowledge and scientific approaches to productivity enhancement. In other words: find scientific explanations for what works in terms of farmer's own experimentation in order to allow their scaling-up. Programme is named: 'Convergence of Sciences'. See: http://www.inref.wur.nl/UK/Research+Programmes/Convergence+of+Sciences/	Various, depending on issue/commodity being researched. Pls visit website or contact programme leader: (professor) arnold.vanhuis@wur.nl
65	Economics/Agricultural Economics	Public policy, public investment, and political economy	Examining the political economy factors inhibiting public investment in areas widely established to play an important role in reducing poverty.
66	Natural resources	Natural resources and environment/policies and institutions	The increasing loss of natural resources, in particular i am focusing on the wildlife-livestock rangelands sustainability. These areas have high and rich biodiversity associated with wildlife-livestock interphase. However, the increasing pressures on these lands due to increasing human population and lack of proper policy institutionalization on the use and management of the natural resources are threatening the survival of these lands, loss of wildlife, key habitats and grazing areas, water catchment areas and other services and goods provided by these areas for the poor
67	Natural resources	Rainwater harvesting and its efficient use	Failure of crops and investments of small and poor farmers, sometimes even leading to suicides. Highest marginal returns of improved productivity with minimum investments. Substantially reduce poverty.
68	Nutrition	elimination of methyl bromide for food presevation using physicals new technologies (for dates, dried fruits and vegetables) concen,trato of juice for nutritional preservation withoutheating at small scale unit use natural fongicides to avoid pesticides uses	this innovation is adressed to industrials or consumer: the main problem is to develop finalisd research with local centers of resrach and....industrial.

69	Natural resources	Seed security: create a sustainable seed system in each villages by given them the seed of most common crop in the begining of the season and asking villagers to return it in a appropriate propotion and then link the farmers with market so that they can sale the collected grain and buy the new seed for next season crops. This system will be continue in the villages and will solve the problem of seeds in the villages.	Seed is the main problem in all developing countries. The lack of extension services, time supply of seed and quality of seed are the main problem in farming. resources poor farmers face this problem every where and considering the number of resource poor farmers 80 % of efforts of research should go for them there are two reasons for this 1) in most of the devloping countries huge amount of land is unirrigated and farmers are practicing rainfed ag. and compare to this most of the technologu developed are for irrigated ag. and this is the main reason that farmers practicing dry land agriculture could not receive good yield and remain always poor. 2). the statistics in India indicates that more than 80 % farmers own rainfed and degraded land which is completely depended on nature. Poor monsoon means poor production which mean poor earning and ultimatley no change in people's life. Poor farmers also trap into market as they never receive good prices of their products. It has two basic reason one is small quantity of products and no value addition of their products.
70	Agronomy	Production, productivity and technology	Climatic changes aroused many stresses for plant production worldwide.
71	Economics/Agricultural Economics	1 - Post-harvest processing and value addition	1 - Lowered the losses; protect the production in order to market it, in a good conditions.
72	Economics/Agricultural Economics	2 - Market Information	2 - To be aware of the tendancies in the short terms (price for example to get a power in the relation between seller and buyer) and in the medium and long term to anticipate the regulation (envrt !!!!!), the news consumption tendancies, the evolution of the demand, etc.
73	Management	Farmer to Farmer Seed Fairs; Food Sovereignty	Benefit Small and marginal farmers to be more resilient; farmer to farmer interaction; and ultimate goal of sovereignty for food
74	Crop breeding/pathology	Plant breeding, and development of new cultivation technology	Yield improvement, Better quality, Pest resistance, Reduce of chemicals
75	Institutional development	Improving smallholder access to markets.	Taking this beyond producer organizations to include institutions, conducive policies and provision of credit. Also looking a other alternatives other than organizing farmers through collective action

76	Other (please specify)	Re-design agricultural research to include benefit for those, who have neither land nor animal, but live in rural areas. (permanently female headed houses, descendants of late migrants, smallholders, who lost their property within drought, landslide ...)	Their number will increase due to climate change, specifically in mountain areas. They live on hard and cheap day labor and often in humiliating conditions, and often have no other chance than to exploit nature for survival. But if they get training (land levelling, bee keeping, grafting fruit trees, rangeland management, nurseries, isolation of houses, energy effic ...), they can contribute to the environmental and agricultural performance of the region. Collective action has to be strengthened and they need to get access to training and equipment and empowerment on village level.
77	Other (please specify)	development of plants for high altitudes and rapidly increasing temperature; research on multifunctional plants (e.g. Sea Buckthorn: desertification, vitamins, work, income (also by export of processed harvest) and fire wood. In the villages it is still possible to find old people with a lot of knowledge on the environment and how to use wild plants. But the plants and sites are not sustainably managed and decision makers often regard them as desert without any value.	In the high mountains temperature increases quickly. Changing ecosystems might not be able to catch up with the consequence of starving people and animals.
78	Other social sciences	To develop a "well-being index" and "partner satisfaction index" at national level for developing countries we work in, based on indicators identified by our beneficiaries and partners. This would determine, monitor and assess that the aims of our agricultural research, technological interventions and policies are consistent with the needs of those whom we claim to serve.	Although the CGIAR and related institutions have worked in developing countries for many decades and contributed to increasing agricultural productivity, we are nowhere near to making any measurable impact on eradicating poverty and food insecurity, nor reducing it to "manageable" (through safety nets) levels. One reason is that the criteria and indicators we use to measure development and impact are inadequate and often inappropriate. Agricultural innovations developed by CGIAR scientists, although theoretically sound, often fail in adoption and dissemination. Thus, we need a better set of indices to measure both the ultimate goal (well-being of beneficiaries) and means (working with national and local partners) of agricultural research in developing countries.
79	Natural resources	FOR LOCAL-LEVEL ACTION Interdisciplinary frameworks for environmental management and human development and simple methodologies for participatory diagnostic approaches to governance that are appropriate for developing country contexts. E.g., Ecosystem services frameworks (e.g. MA and ESPA) E.g., Multi-dimensional diagnosis and objective-setting frameworks (e.g. Diagnosis radar (Garcia et al., 2008), decision-trees) E.g., Resilience and adaptive governance frameworks E.g., Ecosystem-based approaches (e.g. EAF) and environmental health approaches (e.g. HEHI)	Continued lack of legitimacy, equity and effectiveness in environmental management and social development in developing country contexts. Relative lack of ownership, empowerment and initiative-taking by local people as a result of continued prescription, consultation and external intervention. Relative lack of meaningful and durable (adaptive) capacity development. Need better ways to operationalise participation, accountability and social innovation.

80	Natural resources	Innovations in local scale efforts and global analyses remain disconnected by a lack of understanding of the intermediate processes and structures. There is little research that can link local, context-specific dynamics to global policy processes. Understanding the policies, institutions and networks that work in this middle ground is particularly necessary considering the wide-ranging effects of global processes / crises (e.g. food price, fuel price and economic and financial crises).	Expanding impacts of globalisation on the local-scale and people already challenged by their political, economic and social circumstances and a lack of understanding of how these processes and impacts are transmitted.
81	Natural resources	Governance and policy related to adaptation	Climate change is going to wreak havoc on smallholder agriculture
82	Agronomy	Increase production and consumption of legumes (pulses)	Claim on meat might reduce, and with that the claim on natural resources (e.g. consume soybean directly, rather than through porc/poultry. This might especially be important in Africa, but also other continents. Currently only 60 million tons of pulses (excluding soybean) are produced.
83	Natural resources	Improved 'broadband' livelihood support from water resources	Widespread low conversion efficiency of water into livelihood support. This applies to virtually all agricultural uses of water and is caused by a lack of institutional capacity to value, share and distribute this resource
84	Biotechnology	Plant tissue culture technology. A technique which involves rapid multiplication of plants in vitro.	Problem of insufficient planting materials for farmers. Provide farmers with disease-free planting materials. Crops with recalcitrant seeds can be propagated via tissue culture technology.
85	Agronomy	How to maintain or increase soil fertility for plant growth.	Most rural families depend on crop production. Crop yields depend on soil fertility to a large extent. If we take care of soil fertility, yields will go up without worrying too much about imported fertilizers.
86	Economics/Agricultural Economics	Appropriate use of water Integrated water resource management Agroenterprise development through Market Opportunity Identification Develop a development strategies based on local specific comparative advantages Capacity building	There are experiences at specific locations but need scaling up in wider area. Institutions, resources, policies and strategies need to be harmonized.

87	Livestock/veterinary	The implementation of a Competitive Agricultural Research Grant Scheme to be operated and supervised by the Agricultural Research Council of Nigeria (ARCN). The scheme was established to fast track the development, utilization and use of improved agricultural technologies aimed at increasing productivity, raising income, fostering agro-industrial growth, national food security and export earnings.	Dependable access to operational research funding has been a perennial problem of agricultural research and most often, funding is not linked closely to performance. Consequently, incentives to perform are inadequate and resources are wasted on poor performers at the expense of those who could deliver. In addition, even when research is scientifically sound and well executed, it may not be relevant to farmers' needs because, in most instances, agricultural research has never been sufficiently demand driven. This scheme is expected to contribute to agricultural development, employment and income generation, and rural poverty reduction in Nigeria through the generation and dissemination of new technologies, provision of baseline data for policy planning and implementation and capacity strengthening of research institutes to respond to changing technological demands. Accordingly the implementation of the scheme is aimed at harnessing under-utilized research capacity that directly brings benefits to farmers, agro-processors, industries, exporters and other end users.
88	Biotechnology	Increasing maize productivity by developing genetic markers linked to major diseases and pests. The markers could be deployed in breeding of better adapted genotypes with multiple disease and pest resistance.	This innovation will likely increase and stabilize maize productivity in Sub-Saharan Africa. In East and Central Africa, the major maize diseases should be Grey leaf spot and Maize Streak Virus. Others include; Leaf blights and stalk and ear rots.
89	Crop breeding/pathology	Sustainable increases in yield and yield stability at farm level from diversity of crops/varieties and better adaptation to effects of climate changes through participatory research	Food shortage exacerbated by the consequences of climate changes
90	Economics/Agricultural Economics	Cash transfers for poor families in which there is no available labor force.	Labor force scarcity specially from old people and female headed households
91	Agronomy	New practice: increasing biodiversity in cropping system	Yield decreasing & susceptibility to environmental changes could be reduced if we propose system with more biological diversity : biodiversity in the soil, cultivated diversity and animal diversity artificial and natural.
92	Other (please specify)	new midge resistant sorghum variety available	solve the problem of midge damages on sorghum
93	Other (please specify)	new resistant variety to midge damages	
94	Other (please specify)	Midge resistant sorghum variety	reduce damages of midge on sorghum
95	Other social sciences	institutional	disparity between the role of men and women
96	Other (please specify)	Biofortification	Malnutrition-Hunger

97	Other (please specify)	Instilling into people the "I can do spirit"	Many technologies have been introduced to farmers and other people. After the introduction of the technology to the farmers, its sustainability is shortlived. Probably, the farmers do not believe in themselves in the sustenance of such programmes. If the 'I can do spirit' is instilled in them, they can use the technology regardless of the fact that someone is there or not and on their own they can even improve that technology to suit the local conditions in that prevailing area. This generates confidence in them to attempt to solve other future problems. In this way, the mind set of people can be changed. It could even be extended further by educating farmers not accept poverty as a way of life but they should reject and attack it in every way that they can. When that knowledge base is built then the thinking pattern also changes.
98	Other (please specify)	Relating changes in the soil microbial community to management practices of soil so as to control the emission of greenhouse gases to the atmosphere (this particularly means controlling the carbon and nitrogen cycles in soil).	Reducing greenhouse gas emissions into the atmosphere
99	Other (please specify)	Managing the soil resource base to sustain upland rice yields. By introducing super inoculant that can supply fixed atmospheric nitrogen and also phosphates to soil. The use of cover crops such as mucuna and pidgeon pea will be encouraged.	Declining soil fertility base whilst the human population increases at a faster rate.
100	Other (please specify)	reduction of post harvest losses and value addition for food and non food uses either from crops able to yield food & non food products & from crops dedicated to non food uses	- food security (in spite of limited land or water resources) - to help development through higher economical reward per land unit or per man work unit - to reduce dependence on importations especially for less developed countries (food or non food products)
101	Economics/Agricultural Economics	At scale diffusion of existing technologies and other agricultural inputs to resource-poor farmers	Inherent low productivity due to limited access to improved technologies (seeds) and critical agricultural inputs such as fertilizers and pesticides
102	Other (please specify)	natural resources and the environment: we have not sufficiently tapped into what the natural resource base of agriculture can offer in terms of increased production and in terms of sustainable, or more sustainable production. We have emphasised genetic issues so far, which is good and effective, but have now reached a point where we have to factor in natural resources and environmental issues if we want to keep being relevant and to keep facilitating progress and improvements for farmers.	It is supposed to address the whole issue of sustainability, including climate change and global environmental change.
103	Biotechnology	Food security and food quality: By the use of modern methods in genetics, a continuous supply of high quality food will be available hence securing food assets at the family level and having excess for markets.	This innovation is addressing the issue of common problems affecting food security and quantity such as disease

104	Biotechnology	Improving the current live vaccine for East Coast fever	East Coast fever is a fatal disease of cattle and is responsible for losses of USD300M per year in affected countries.
105	Crop breeding/pathology	Cacao is the mainstay of many economies of poverty-stricken West Africa. The cacao industry is hampered by pests and diseases. Management of these pests and diseases is mainly by chemical spraying. A change for more environmental-friendly means of managing these menaces will not only have a positive effect on the environment and biodiversity but also produce "healthier" food for millions of chocolate lovers. A second aspect is to add value to cocoa by processing some of the by-products. This will increase income per unit area and also better the lot of farmers.	Environment and reduce poverty amongst cacao farmers
106	Biotechnology	The use of Food Value Chain in food production and consumption could improve average availability of calories, protein, and other nutrients, improvements in nutritional quality and safety of foods, dietary diversity, or taste and cooking characteristics of foods, reduction in seasonal variability in food availability and prices, and reduction of gender and age disparities in nutritional status.	Looses and poor quality of foods getting into our markets and then kitchens
107	Crop breeding/pathology	Increase yield and yield stability with scientific understanding of the processes involved	To ensure food and nutritional security around the globe
108	Other (please specify)	Greater quarantine control at national boundaries. New technologies are enabling quicker and cheaper communications eg. Email groups such as Pestnet.	Reduce pest and weed load on a country. Reduce eradication and control costs. Maintain productiveness of agricultural areas.
109	Other (please specify)	Natural Resources and Environment could include increasing sustainability of the land resource base, reducing the water footprint of food production, reducing pollution, conserving biodiversity and agrobiodiversity, increasing rural energy security. It could also contribute to climate change mitigation through carbon sequestration or GHG emissions reductions, or helping people to adapt to climate change.	The innovation would address the problem of unsustainable use of natural resources, and mitigate the impacts of climate change either for the people and for the ecosystems
110	Natural resources	Providing a welcoming institutional working environment including adequate work-life balance for Africa's women scientists	Africa's women scientists are essential to Africa's development - they are the voice of the vast majority of Africa's farmers. However, most African R&D institutions are led by men and institutional policies favor men's careers. Institutional and national HR and educational policies need to invite Africa's girls and women to take up careers in agricultural R&D
111	Agronomy	Production, productivity and technology	Increase productivity of grain legume crops and methods of seed production and distribution with farmers in rural areas.
112	Forestry	Integrated or comprehensive Landscape planning for sustainable production and environmental conservation.	Unclear land tenure, unfair decision making mechanisms.
113	Management	basic genomics of key agricultural crops and species linked with applied genomics for breeding	enhanced breeding to meet local needs

114	Other (please specify)	Application of enzymes for detoxification of cassava during processing that has previously been done through traditional process of heap fermentation that takes a long time and is not fool proof. The fungi <i>Rhizopus oligosporus</i> produces enzymes that have been known to have good characteristics for complete detoxification and acceptable textural properties of the cassava products.	Cassava is a food security crop in Africa, that is mainly grown by women. Women prefer to grow the bitter varieties that have high levels of cyanogenic glucosides inspite of the new varieties that are being promoted by Agricultural Research Agencies because they are food security attributes and also not easily stolen by house hold thieves who are mainly husbands. The varieties however require fermentation processing to safety and the technique takes a long time, posing a risk of poisoning during dry season when there are few options for food. The products are also poor quality and variable quality due to natural fermentations and difficult to control process.
115	Economics/Agricultural Economics	Strategies for developing key value chains for getting the poor over the threshold into market-oriented production Adopting an integrated, holistic approach to designing and supporting implementation of upgrading of agricultural commodity value chains that includes growing local service and input provision (e.g. BDS) to support more intensive production systems, institutional arrangements that improve access to input markets, services and output markets, and growing the commodity value chain in such a way to promote broadbased development and employment opportunities.	A key issue to using agricultural development as a pathway out of poverty is allowing smallholder farmers and associated value chain actors to intensify and adopt more productive technologies. Many efforts focus on single dimensions of this process rather than recognizing that it requires a number of different conditions to be met for the process to start and to be sustained.
116	Natural resources	Research highlights the potential of agricultural water management (AWM) for poverty alleviation. In practice, however, adoption rates of AWM interventions remain low. Moreover, even where adoption has taken place locally, implementing programs promoting adoption at a large scale, in a manner that is sustainable, and that targets benefits to the poorest people, including women, remains a challenge. Understanding the constraints to AWM adoption in different settings and concrete measures to overcoming them opens significant opportunities for successfully achieving pro-poor, gender-equitable AWM investments in the future.	Research clearly indicates that when farmers are confident of having water and markets for their crops they are willing to invest in inputs, thus reducing or even eliminating the need for government handouts. In many parts of South Asia and sub-Saharan Africa, doubling, or even quadrupling of rainfed crop yields is possible with existing technologies for water and nutrient management. But these technologies have been slow to spread because of real and perceived risks as well as lack of practical incentives, knowledge, collaboration among stakeholders and support from government institutions.
117	Economics/Agricultural Economics	New approaches to reform the public administration in charge of agriculture (reforming Ministries of Agriculture, irrigation administration, etc)	This field of public sector reform is rather neglected. Reform efforts in this field are typically financed by international financial institutions (such as the World Bank), left to foreign consultants (who mainly suggest some restructuring), and have little if any effect. There is almost no serious research on the topic, at all.
118	Economics/Agricultural Economics	fostering farmers' organizations, including cooperatives	This is not really an innovation, but the potential of collective action among farmers has often been neglected (especially in fields outside Natural Resource Management)

119	Crop breeding/pathology	Natural Resources & Environment- Natural Resources refer to Water, Agriculture (Soil) & Range Land, Range forests-flora Environment refers to temperature, drought etc.	Water stress-water deficit Irrigation water is high to highly saline Agriculture land is turning high to highly saline Rangeland forests are getting degraded with loss of pasture plant species Very high temperature during cropping season
120	Other (please specify)	Understand and develop social networks and safety nets that will function as assets for men, women and households in the rural areas and influence access to information and benefits from research and development. Another opportunity is to foster gender equitable change processes. Current research is underway to understand the dynamics of network formation (by gender) and mapping the network architecture of rural communities.	the overall objective is to bring people both men and women out of poverty. Understanding and helping develop social networks will address the problems of access to resources, information, and also assist in technology uptake and empowerment of rural poor.
121	Economics/Agricultural Economics	Alternative fuel	It would satisfy people's demand for fuel while reducing demand for fuel sources currently in use like wood, crop residues and animal waste that have other important uses. This could do a lot to improve natural resource conditions in many countries.
122	Biotechnology	Agriculture solutions network by cell phone and internet to share farming expertise across the globe	For both developed and developing nations, agriculture does require large inputs (fertilizer, pesticides, water,...). The increasing costs for inputs, their negative impacts on the environment does require solutions to foster the adoption of agricultural products that can sustain crop yield at a lower input level. For developing countries, such solutions will sustain agriculture-based economy.
123	Fisheries	Natural Resources and Development: both coastal and inland small-scale fisheries and related activities (fish processing and trade) can play a critical role in the early economic development process of a large number of regions in the developing world. Where managed and supported by appropriate planning and policies, these small-scale fisheries and related activities have been showed to be critical in terms of food security, income generation, women empowerment and local (or even national) economic development. They can be a very powerful enter-point for poverty alleviation.	At present time -and with few exceptions-, small-scale fisheries and related activities are perceived (both by national planners and international development agencies) as minor economic activities (activity of last resort). As a consequence they are largely overlooked and do not receive the appropriate support and investment, with dramatic consequences, both the local population's economic and nutritional status and for the resources.
124	Crop breeding/pathology	education for the masses is the most important poverty reduction approach. I realize this is not the mandate of the CGIAR. Next is crops that are appropriate to the region and adapted for the biological and physical stresses encountered locally. Simultaneously is the need to provide education to farmers for the use of these new cultivars.	
125	Economics/Agricultural Economics	Enhance early life nutrition	Over 200 million children not reaching their developmental potential

126	Economics/Agricultural Economics	Improved systems for production, processing and marketing indigenous tree crops in the semi-arid tropics for high value regional and international markets -- esp. shea nut butter and gum arabic.	Farmers currently capture a very small share of the amount that consumers spend on tropical tree products such as shea nut butter and gum arabic. There are several inefficiencies in the marketing system that could be resolved.
127	Economics/Agricultural Economics	Control of trypanosomiasis.	Tsetse-transmitted trypanosomiasis constrains agricultural production across much of Africa. Control has been intermittant.
128	Economics/Agricultural Economics	Water harvesting by individual farmers and groups for domestic water supplies, livestock, home gardens and small-scale irrigation.	Variability in rainfall and low water storage capacity leading to seasonal water shortages.
129	Crop breeding/pathology	Better integration of off the shelve molecular technologies in applied breeding programs in those NARS responsible for regional food security. This will require a commitment to resource activities on the ground in these programs for the short to medium term - informatics will be key	Rate of genetic advance
130	Other (please specify)	Internet and cell phones in Africa are on the verge of broad expansion. We can use this development to "grease the wheels" of the agricultural R&D and value chains.	This innovation can address the lack of adoption of agricultural technology in Africa.
131	Other (please specify)	Production, productivity and technology could include increasing the photosynthetic efficiency. Only a small fraction of the solar energy is captured by plants. Increasing this efficiency will result in a higher yield of biomass and will both enable the diversification of biomass-use and assist in reaching both food security and eliminating energy poverty, which is generally considered an inevitable step in the direction of development	Biobased fuel and feedstock is a valuable alternative for the economy based on petrochemicals. Sooner or later, we will run short of petrochemicals. The biobased economy will contribute to the use of renewable materials (source) as substitution for petrochemicals. Furthermore, where petrochemicals contribute to the GHG emissions, the biobased economy may help to sequester carbon (sink) and mitigate climate change. However, competition with food security is never acceptable, and improving photosynthesis is probably our only chance to enable a sustainable economy for future generations
132	Other (please specify)	Breeding crops for improved nutrition	Undernutrition is a cause of at least 35% of under-five mortality and a major contributor to reduced economic growth.
133	Crop breeding/pathology	linking social science interventions such as risk management or credit to technical development projects	
134	Other (please specify)	Managing major insect pests of field crops, especially sorghum, for increased production, postharvest storage, and conservation of the environment by developing plants resistant to insects. Also educate students from Africa and the United States in the IPM approach.	Major insect pests of field crops, especially sorghum, in the field and storage in Africa and the U.S.

135	Biotechnology	To develop global, public goods, resource platforms to help providing/accessing tools services and expertise around a specific research approach/technology (molecular breeding, natural resource management), a kind of products (genetic, genomic resources) or policy (IP, licensing). Those platforms should be demand driven and should become self sustainable after initial developmental phase. They should build on solid business plan and users will pay for services. They should target developing countries needs, building on CG Centers, Universities and public services and when possible private sector assets and expertise.	They should address the critical issue of having different initiatives addressing similar or related issues in parallel. Resources platforms should coordinate efforts and funding efforts, favor communication (among users and among communities: users, service providers and technology developers), create spillover among initiatives, centralize data management and facilitate access to products (broad sense: final product to information).
136	Economics/Agricultural Economics	Involving farming communities in design of programs and management activities. This method ensures sustainability and resilience of the program. It also ensures ownership.	Weak systems of information gathering and analysis among farmers. There is need for their decisions to be based on facts they collect themselves or are part of collecting and analysing .
137	Biotechnology	Development of regional crop improvement networks that provide researchers in developing countries better access to improved germplasm, information management tools, standardized protocols, and biotechnology tools to improve the effectiveness of selecting improved cultivars.	The primary problem that this innovation will address is the knowledge and infrastructure gap between national programs and CGIAR centres (or private / public institutions in the developed world). This gap appears to be getting wider.
138	Forestry	Agroforestry may provide good opportunities for food productions from agricultural crops as well as sustainable production of tree crops. Such success stories can be shown in Indonesia, Thailand and Philippines where ASEAN-Korea Environmental Cooperation Project (AKECOP) has been conducted.	To do this in success, education or training on this system practice is often needed depending on what agricultural and tree crops mixed. Thus, capacity building for learning such practices is necessary too. In addition, communications among those involved in such systems are also important.
139	Biotechnology	Late blight resistant potato varieties	Yield losses, high cost of production due to fungicide purchase, and farmer health
140	Economics/Agricultural Economics	Introduce sustainable aquaculture practices	provide high-quality protein and create sustainable incomes
141	Economics/Agricultural Economics	Define rights to give greater responsibility to communities and individuals to manage fisheries.	reduce waste, increase sustainable incomes, reduce overfishing and mitigate the open access problem
142	Other (please specify)	Market oriented investments to achieve food and financial security. This strategy will need to address dual needs within countries / regions such that (i) Value Chain Development in Major Commodities focuses on GDP gains and global national / regional food security, whereas (ii) Market chain linkage for vulnerable communities, esp women, will focus on empowering communities to reach improved levels of food and financial security.	The market oriented investments in development will help to provide "joined up" thinking in agricultural programing, taking advantages of many innovations in technology, finance, social organisation and information technology that will support interventions along the market chain.

143	Crop breeding/pathology	Development of plant disease diagnostic protocols that can be used in indexing of plant diseases in propagation facilities of tissue culture in the Kenya. This can be simple home grown diagnostic protocols that can be used by pro poor farmers in disease identification for early intervention in disease control in their agri- bussiness enterprises. This can be pocket boxes that are simple to carry to the farm and simple to use too. Some of this protocols have been developed in the USA but we can develop and fine tune the to our local conditions and use them by our farmers.	It supposed to be used by pro poor farmers in nurseries and farms to identify plant diseases and apply control measures to minimise crop loss early enough. This innovation is not available in the COMESA region and is an important tool that can be used for plants like bananas, passionfruit, several fruits in tissue culture facilities and on farms to reduce diseases thus increase yields for the farmers for food security and for trade
144	Livestock/veterinary	investigation in to production and use of appropriate browse to enhance livestock performance	the low productivity and slow rate of growth and high mortality of grazing ruminants in ranglands
145	Institutional development	Encourage further levels of self-organization -- local governance including capacity to tax local residents--to provide services like education, routine health care. etc.	Many farm communities have no capacity to make policy decisions that fit their particular needs. They have to beg national government for funds and can't make long-term decisions.
146	Economics/Agricultural Economics	Science-based solutions to the adaptation challenges to climate change for the rural poor, especially the most vulnerable farmers in the semi-arid regions of Asia and sub-Saharan Africa. Identify and prioritize the sectors most at risk, and develop gender equitable adaptation and mitigation strategies as an integral part of agricultural development programs in the most vulnerable areas; focus on vulnerability to climate change and adaptation strategies	The problem is to deal with the threats posed by a changing climate on attaining food security, enhancing livelihoods and improving environmental management.
147	Legal	Set up of a non-profit high-quality law office specialised in drafting co-operation agreements between public and private bodies in the field of R&D and development co-operation, with expertise in global agricultural issues, food laws, microfinance, IS 2.0 and the economic and social development of women. All on a cost-plus basis (which means approx. 90 EURO per hour) and with a guarantee of the EU, UN or national governements that lawyers' loans can be paid at least during the startup period.	Bundeling of lawyers' expertise, without a commercial interest. The NGO will be able to hire independent high quality lawyers instead of having to rely upon the internal lawyers of private companies or very expensive external lawyers.
148	Other (please specify)	Food-Water-Ecosystem nexus with a Poverty focus: research at the interface between food, water and ecosystem to increase the social and ecological resilience of farming systems and beyond (up to global system).	- Increasing worldwide population in degrading natural systems requires great attention and efforts on finding ways to increase the local and global food production while conserving ecosystems (terrestrial and aquatic) and alleviating poverty. - Increasing water scarcity and variability in availability and geographical distribution
149	Other (please specify)	Integrated Agro-Ecosystem Analysis to increase the social-ecological resilience of farming systems Integration refers to: - the inclusion of all relevant farming sectors (e.g. fisheries which used to be neglected in AEA) - the application of AEA across scales (communal-catchment-national-river basin)	The need to increase the application of such analysis because of its particular relevance to current food-water-ecosystem issues in poor countries and regions. The need to improve such analysis in particular through integration of the whole range of farming activities and sectors.

150	Economics/Agricultural Economics	Addressing gender issues/gender inequality in all stages of agricultural research and dissemination	Because agricultural research systems rarely take into account gender-specific needs (needs that differ between women and men), new varieties and technologies produced may not be adopted by their target groups, leading to unrealized productivity and income gains. This problem permeates not only upstream research, but also downstream efforts, although more progress may have been made "downstream" than upstream.
151	Economics/Agricultural Economics	Designing safety nets to protect consumption and prevent asset depletion after negative shocks (reducing vulnerability to shocks)	Poor households often fall into poverty when they dispose of productive assets when faced with a shock. Having lost their productive assets, it becomes difficult to maintain consumption and incomes in the future. There are also gender-specific consequences, as women's assets are often the first to be disposed of when shocks occur (or for specific shocks such as illness).
152	Economics/Agricultural Economics	integrated pest management	public goods nature, lack of collective action, lack of knowledge, lack of private sector investment, underinvestment of public section in diffusion of technology, perverse incentives, vested interests
153	Livestock/veterinary	Along with an increased investments in international research for agriculture, livestock, food security issues and biofuels, a much higher and dedicated investment into formal education at all levels is necessary to make an impact. Furthermore research and extension linkages need to be enourmously strengthened toguanrantee an impact.	Transfer of knowledge and information from the research organisations, national, regional, global to the producing sector of agriculture, livestock and forestry and respective relationships tp climate change, water availability and food security
154	Biotechnology	the development of crops resistant to biotic stresses with high water and nitrogen use efficiency is considered a key opportunity for innovation. This has implication for developing a critical mass of plant breeders properly equipped to deliver the necessary varieties	higher and stable yields of crop will address the food insecurity problem
155	Livelihoods	Participatory Tree Domestication as a process of selecting, propagating, integrating and marketing of high-value local food and medicinal trees.	Rural poverty and high dependance on traditional cash-crops, so need for diversification of income sources. High levels of poverty in biodiversity-rich areas, so need to find ways of adding value to natural resources.
156	Livestock/veterinary	Help people use small-scale dairy, chicken, pig and other livestock enterprises (production, marketing, processing, value-added) as pathways out of poverty in the more extensive mixed crop-and-livestock farming systems of South Asia and sub-Saharan Africa.	Livestock enterprises are largely ignored by the research and development communities, and so the potential they offer to reduce poverty, particularly on lands lying between high- and low-potential agricultural regions, remains under-exploited. This despite the fact that worldwide, livestock foods place No. 1 (cow milk), 3 (beef), 4 (pork), 5 (chicken), 7 (eggs), 9 (buffalo milk), and 19 (mutton) in the top 20 agricultural commodities.

157	Crop breeding/pathology	Seed system-availability of high yielding varieties to farmers	Farmers have no information and especially access to good seeds. With the establishment of seed system by involving private sectors, government and NGOs will revolutionize crop production in Sun Saharan Africa
158	Crop breeding/pathology	Inytroduction and dissimination of Small scale Farm mechanization and appropriate postharvest technologies	Reduce labor cost and increase efficiency in crtop farming
159	Economics/Agricultural Economics	Implementable compensation systems for land users offering ecosystem services	assessing all relevant components of potential ecosystem services partly public good character of these services (no private sector incentives for delivery) Identifying "right" discount rates, intergenerational justice issues lack of innovativeness in designing compensation mechanism in "poor countries"
160	Economics/Agricultural Economics	Stream line regulation of biotechnology innovation- based on expected benefit cost ratio adjusted to risk of regulatory process	Costly regulation of biotechnology innovations that reduce incentives to adapt existing traits for crops of the poor and to invest in discovery new traits
161	Other (please specify)	Use of biodiversity	Sustainability
162	Nutrition	Engaging men in relation to gender issues and nutrition	Addressing gender and intrahousehold constraints is important to reduce undernutrition in South Asia, particularly. this has often been done through targeting of technologies or interventions solely to women, without broader engagement of other influentials (e.g., men, older women, community leaders, etc.). As a result, community norms about women's roles are not addressed adequately.
163	Other (please specify)	communication simple technology to benefit villages and communities Biofuel and bioenergy micro credit	communication- involving people in dmocratic process, sensitising people especilly women in technology availability providing energy for community providing finance for small business
164	Other (please specify)	information technology utilisation of biofuel and empowering women in rurual community	providing energy and electricity in village through empowering of women
165	Forestry	Use of natural genetic diversity to improve livelihoods	The problem is that nowadays use of seeds and other reproductive material tend to focus in single varieties and we are loosing a lot of genetic diversity that could be more resistant to diseases and to climate change
166	Economics/Agricultural Economics	Investment on research (breeding, molecular, economic, etc) of underutilized crops that are locally important. For instance: local fruits in the Andean region, local leafy vegetables in Sub-Saharan Africa. Some research effort have been directed to underutilized crops but only on a very small number of them and only on selected countries.	These crops have the potential to improve livelihood of rural household by either generating additional incomes or providing other important ecosystems services (soil protection, contribution to the diet, adaptation to climate change, resistance/tolerance to pest and diseases, etc.)
167	Economics/Agricultural Economics	Implementation of better postharvest and storing practices for vegetables, roots and grains in Sub-Saharan Africa	Currently yield losses due to inappropriate postharvest practices and deficient storing conditions are very high (too high). According to some experts they could be higher than losses due to pest and diseases.

168	Other (please specify)	Palm Research Institutions Need Constitutional Integration Provide Economic Sustainability (PRINCIPES)	CGIAR needs an "all palm institute". The International Coconut Genetic Resources Network (COGENT) could be radically restructured with an expanded remit covering every aspect of coconut research & development (R4D), not just genetic diversity or poverty reduction. Eventually other palms, starting with the African oil palm, date, sago, rattan, etc., could be included.
169	Natural resources	institutions, governance and policies that promote equity	inequality in access to opportunities and resources
170	Agronomy	rapid multiplication and distribution of superior and healthy planting material	farmers lack enough superior planting material despite it was developed by CGIAR; CGIAR and partners multiply that superior planting material at a very low level to make impact. The low yield farmers have is often translated in further breeding efforts but the current existing varieties are inadequately grown by the farmers.
171	Agronomy	improved plant nutrition involving micro-organisms leading to higher yield and less pests and diseases	higher yield and less pests and diseases
172	Food safety	A key opportunity for innovation in my field of research which I will like to see in developing countries like mine (Nigeria) is the utilization of locally available cereal, tubers and other substrates for new food product development especially nutritionally balanced and functional foods	This innovation will address the problem of wasting scarce foreign exchange on importation of substrates for which there are good indigenous alternatives that can be used. This will also provide more jobs, by forcing the increase in production and processing of the local agric resources. It will also reduce the cost of foods produced from such substrates
173	Other (please specify)	Increasing the capability of rainfed farmers to store and access not only green water (through appropriate soil and water conservation measures, tillage techniques etc.) but also and essentially blue water in the semi-arid savannah areas, by means of developing and implementing spatially distributed small-scale water storage infrastructure that capture excess runoff during storms to bridge dry spells during the rainy season. Additional blue water storage capacity in the order of 100 mm may be sufficient!	Many semi-arid rainfed farming areas are characterised by low crop yields, which are primarily explained by relatively poor nutrient levels combined with the regular occurrence of dry spells. Increased water security will allow farmers to invest in improving soil fertility. The combination of enhanced water and nutrient availability will translate in large crop yield increases.
174	Economics/Agricultural Economics	Innovation along the entire value chain from plough to plate would be beneficial to small scale farmers	It would address the problem of assured input supplies to the small scale farmers, assured market for their produce, and some share to the farmers in value addition at different stages.
175	Agronomy	Agroforestry is a practice which prevents land degradation and also improves on the yield in agricultural productivity that is better harvest where less fertilizer is used which will render the soil toxic in long term and unproductive. It will also mitigate climatic change which has had a negative impact on food security. Trees that improve the soil productivity will also prevent soil erosion and also help in the sequestration of carbon dioxide in the atmosphere which causes the green house effect leading to climate change	The production of crops such as tomatoes associated with trees which are nitrogen fixing will improve on productivity and will prevent erosion of soil in slopes such as Solanum tuberosum which thrives in high altitudes or associated with other food crops such as beans. The problem this innovation is to address is soil erosion which leads to land degradation.

176	Other (please specify)	Integration of human rights approaches with research and development	Most development and associated research ignores rights and this is one reason for persistent poverty despite billions of dollars of aid
177	Crop breeding/pathology	Independent, safe, cheap, minimized size (including with nanotechnology) non-(bio)carbon-based fuel-cell, which provides energy to the equipment it powers for at least it's expected lifespan. Nuclear-based seems presently the most likely, once safety issues fully addressed.	ENERGY: This would revolutionize energy needs, making the planet non fossil-fuel and non internal-combustion engine dependent, and eliminate need for refueling and associated infra-structure. No more electric grids, no more electric wiring in houses, appliances, etc. needed. Fuel source available everywhere, so less/no conflict over energy source acquisition.
178	Crop breeding/pathology	WATER: Cheap sea-water desalinization technology. In tandem with new, cheap and safe fuel-cell mentioned above, transport from sea to remote areas relatively cheap, allowing at least supplemental irrigation in many dry areas.	Lack of water in many of the world's drylands is limiting food production. This is only expected to increase in magnitude and area affected, as climate change proceeds. Abundant water for agriculture will change the entire approach to agriculture.
179	Other (please specify)	Improving soil quality is the only means of addressing world hunger. We must act now.	Restoration of soil productivity in degraded situations
180	Other (please specify)	Transfer of information from model plants to crop plants at the level of genes when enough is understood about the function of particular genes in either developmental processes which can impact yield, ripening time, stress tolerance etc. Need to have people dedicated to identifying and assessing possibilities and then delivering and testing via genetics and GM.	Wide range of problems can be addressed but it requires assessment of know;edge in specific areas to identify those where the degree of knowledge is at a mature enough stage to follow up.
181	Livelihoods	Reduce dependents on maize production by promoting the production and marketing of small grains (sorghum, millet and rapoko) in low rain and marginal parts of Zimbabwe.	Poor cereal production in Zimbabwe low rain and marginal parts
182	Crop breeding/pathology	Provision of quality seed/planting material	Increased yield and productivity
183	Economics/Agricultural Economics	Institutions and policies, particularly relating to international economic regimes.	Many countries have difficulties in escaping from the trap of poverty.
184	Other (please specify)	Postharvest processing and value addition to indigenous food crops Food safety, consumption and nutrition education. Effect of methods of improving crop productivity on food quality	Postharvest processing will eliminate post harvest glut and losses during the production season, ensure that food is available throughout the year, encourage increase in productivity by farmers and generate income, thus ensuring sustainable food security for all stakeholders...farmers, processors, women. Value addition to foods will enable us to break the subsistence mode of some of these crops, and enhance their commercialization. Food safety, consumption and nutrition will improve nutritional quality, encourage diet diversification, reduce diseases
185	Natural resources	Conservation and Development of Traditional Small Scale Water Resources with Ecosystem approach by Building Social Capital and Integrating Microfinance services.	Productivity Enhancement from Tankfed Agriculture, Easy access to farm credit and value added farm enterprise for higher income earning

186	Institutional development	Forests have a significant role in providing ecoservices, timber and non-timber products and supporting livelihoods. Forest policies and institutions have now great opportunities to preserve these services and improve livelihoods capitalizing on increased international attention and potential significant financing through REDD schemes. To realize these opportunities, however, national policies and institutions should consider new development paradigms, find a balance between development and forest, ecoservices and livelihoods improvement; shift incentives, introduce new benefit sharing and co-benefit schemes, re-consider the role of communities in forest-management, employ the markets; address tenure and rights issues and address many other challenges. Research on the intersection of forest/natural resources, communities and development as well as the associated policies, institutions and modalities will provide information and options to national governments and the global community.	Current institutional arrangements and policies provide perverse incentives, which in turn deplete forests and associated ecoservices and natural resources. They also threaten the livelihoods of the millions of people dependent on forests. Development and demographic pressures, food insecurity are real problems facing developing countries and need to be addressed. Current policies tend to address short-term problems in an unequatable way and at the expense of communities, forest and other natural resources. New policy options and approaches as well as the implementation of long-delayed existing policies are needed to shift development paradigms and capitalize on opportunities.
187	Biotechnology	Genomic/phenomic approaches to plant quality improvement (especially cereals)	Product quality and end use improvement
188	Other (please specify)	Two concurrent activities are needed to release raw coconut from the position of "heart risk food" placed on it by marketers of polyunsaturated food oils, and then develop convenience foods from raw coconut. 1. A rigorous review of coconut in the health literature for publication in a prestigious journal. 2. Development of readily consumable forms of coconut from the raw kernel, rich in medium-chain triglycerides, protein and fibre, through deep frying and other possible means, for the mass market, thereby enabling a better return to the primary producer and health benefits to the consumer. Note: There is a new product from coconut labelled Virgin Coconut Oil that commands a high price in developed markets but the turnover is very small so that the impact on price for the primary producer is small.	1. The widespread belief that coconut oil raises serum cholesterol in ordinary diets. This view arises from laboratory studies where coconut oil is isolated and the moderating effects of omega 6 and omega 3 fats are not present in the experimental diet. 2. The difficulty for urbanised consumers to access the raw kernel in order to incorporate it conveniently into their diet.
189	Other (please specify)	irrigation development for smallholders (small motorized pumps, treadle pumps, rope washer pumps, small village reservoirs, use of shallow groundwater with hand dug wells)	Most investments are made in medium to large scale irrigation, but of this type of irrigation is expensive and the success rate is very mixed, particularly in sub-Saharan Africa
190	Institutional development	Methods of small scale food production in confined spaces using recycled resources is required and effective research in those small scale technologies, although expensive compared to the potential scale of individual production may be globally the most productive sector in the future.	Many people world wide, in both developing and developed nations are being displaced or voluntarily move to places where there is no land for common agricultural practices. In many cases the sites are temporary and resource poor (limited water and infertile soil at best). These situations will potentially increase as sea-levels rise displacing many of the world's poor from small island states and low lying coastal regions as well as affecting some of the rich delta regions.

191	Institutional development	Food Safety, Consumption and Nutrition	The general population of the island nations of Oceania are amongst the highest sufferers of Diet related Non-Communicable Diseases in the world yet there is evidence that the native foods of this region are amongst the best sources of essential nutrients. The problem is one of choice of foods and efficiency of preparation for meals. Improved promotion of local foods linked to appropriate scale processing methods would increase the market for and consumption of these local, high value foods.
192	Livestock/veterinary	A well coordinated Sustainable Agricultural System approach.	Integration of all aspects of sustainability: Production of crops and livestock, soil, water, humans, genetic improvement, Natural resources, land and environment, nutrition and health to lead an overall improvement of the quality of life of rural population that are connected to food production.
193	Institutional development	empowering farmer organizations	farmers' lack of knowledge and confidence in management
194	Biotechnology	High yielding seeds	Food security
195	Agronomy	Improvement in the post harvest value chain	Food losses range on the order of 30-50% for perishables and even up to 20% or more for grains. This is after all the labor and inputs to bring them to harvest. Many emerging technologies may be possible to adapt cold chain needs to small farmers.
196	Other (please specify)	The survey format mixes opportunities for key innovations at the national level with those at the global level (=the CGIAR). This causes some inconsistencies in providing succinct responses. Furthermore, the approach is "top down". The problems of resource-poor producers ought to be the primary focus - at least for the next 15-20 years - both for the CGIAR and the NARS. Since problems to resource-poor farmers may vary much within small geografic areas, this calls for great flexibility in priority-setting at the national level. As to the CGIAR, its future research must be oriented towards the future, being of global nature; not easily conducted by public institutions at the national and regional levels or by the private business sector. Nonetheless, certain existing key innovations from the CGIAR can be used in a short-term perspective (say the next five years). A third basic consideration is the following aspects of my intervention: a) the focus on poor people; b) the fulfillment of the MDGs and c) providing quickest possible impact at the local level(s). In this context, I suggest: "Improved" seed with combined with	Increase the production for poor families, thereby raising their incomes and ability to educate all children. The concept of improved seeds may range from "improved local varieties" to high-yielding varieties of good nutritional standard but be in demand - initially - by the local/national market(s).

197	Other (please specify)	<p>The survey mixes opportunities for key innovations at the national level with those at the global level (=the CGIAR). This causes some inconsistencies in providing succinct responses. The approach is "top down" but the primary focus of the CGIAR IS the problems of resource-poor producers - and the NARS. See further on page No. 1 As to the CGIAR, its future research must be oriented towards the future, being of global nature; not easily conducted by public institutions at the national and regional levels or by the private business sector. In addition, my intervention is based on a) the focus on poor people; b) the fulfillment of the MDGs and c) providing quickest possible impact at the local level(s). Also, the CGIAR vision is directed toward this target group and make use of development assistance funds with a similar purpose. There are several key opportunity for innovation through the CGIAR. One example would be: The utilization of genetic resources for the target group of poor producers. This would imply a focus on crops and animals that are commonly in use in by these producers, such as minor crops, c</p>	<p>Provide improved seed and animals that exclusively benefit the poor segments of the world - in a twenty year period (compare what was achieved with the landing on man on the moon). If very successful, the focus can easily be shifted and/or the private sector may "take over".....</p>
198	Other (please specify)	<p>I refer to my introductory text on page 1 and 2. Other key opportunities for innovation through the CGIAR would be in the following areas, for example (and implying a smaller - sharper and different - CGIAR). I list a few examples since space is limited, although I am not consistently adhering to the format.....: Policy-oriented research in subjects such as a) natural resources management (to avoid further degradation) and including energy (see below)</p>	<p>More policy research may be an area for the future where the CGIAR can play a greater role - in order to influence on policy. Many NARS are already strong and work with attempting to find practical solutions at the national level, closer to the ecological niches. Besides, the private business sector is advancing in these countries (with strong research capacity) and can be more active, since there is a growing market. This discussion requires more space.....</p>
199	Other (please specify)	<p>Policy-oriented research in subjects such b) land use</p>	<p>More policy research may be an area for the future where the CGIAR can play a greater role - in order to influence on policy. Many NARS are already strong and work with attempting to find practical solutions at the national level, closer to the ecological niches. Besides, the private business sector is advancing in these countries (with strong research capacity) and can be more active, since there is a growing market. This discussion requires more space.....</p>
200	Other (please specify)	<p>Policy-oriented research in subjects such ; c) biological pesticides and/or biological weed and pest management (not done by the private business sector and highly relevant for poor producers.</p>	<p>More policy research may be an area for the future where the CGIAR can play a greater role - in order to influence on policy. Many NARS are already strong and work with attempting to find practical solutions at the national level, closer to the ecological niches. Besides, the private business sector is advancing in these countries (with strong research capacity) and can be more active, since there is a growing market. This discussion requires more space.....</p>

201	Other (please specify)	Finally, agricultural policy research could also identify major obstacles to progress in agriculture in countries where agriculture ought to be "in the driver's seat". I'm aware of IFPRI's work at the international policy level but there is also a need for "keeping track" of issues of this kind.	More policy research may be an area for the future where the CGIAR can play a greater role - in order to influence on policy. Many NARS are already strong and work with attempting to find practical solutions at the national level, closer to the ecological niches. Besides, the private business sector is advancing in these countries (with strong research capacity) and can be more active, since there is a growing market. This discussion requires more space.....
202	Other biological sciences	There a number of lesser known but potentially useful plants	CGIAR tends to concentrate on major food crops useful to the rich and those that require expensive inputs.
203	Other (please specify)	Develop the productivity of the endogenous breeds in the country through research outputs	The productivity of our national breeds is not yet investigated
204	Biotechnology	Genetic modification of plants to achieve step-change yield increases without additional inputs	Increased yield for improved nutrition and sustainable food security
205	Fisheries	Fish feed development: Development of environmental friendly and low cost fish feed, using locally available feed ingredients. This will lead to reduction in countries' cost of importation of feed, promote employment (most especially among the rural populace whose livelihood depend solely on profit accrue from their farms) and increase protein intake in the developing countries.	High cost of fish feed, which is linked to low protein intake and mortality.
206	Natural resources	Broadening the diversity of foods in our dietary system. Establishing a clear link between biodiversity and dietary diversity	The problem of malnutrition and "hidden hunger", arising from over dominance of few crops - major staples for the bulk of global food source. Dietary diversity would eliminate the problem of lack of micronutrients and vitamins in our food.
207	Agronomy	1. Production: Developing suitable varieties adapted to low input systems and several agro ecological zones to increase yield. Sensitize farmers on the value of neglected/underutilized varieties and develop suitable agronomic practices to increase productivity and reduce extinction.	1. Low yields.
208	Agronomy	2. Postharvest: Use of postharvest Indigenous Technical Knowledge (ITK).	2. Poor storage and poor markets.
209	Agronomy	3. Food nutrition and safety: Encourage farmers to utilize the local available vegetables which are highly nutritious and adapted to the local prevailing conditions.	3. Lack of adapted species to the low input systems and poor nutrition.
210	Agronomy	4. Natural resources and environment: Encourage the use of locally available nutrient sources to improve soil fertility and use of ITK as part of Integrated Pest Management (IPM) strategy.	4. Low and declining soil fertility, high cost of inorganic nutrient sources and commercial pesticides and insecticides.
211	Crop breeding/pathology	Enhancing the biological control and developing bio-fungicides as a means for plant diseases	The increasing usage of pesticides and their inactivity due to the frequent usage. This could be avoided or reduced through the biological control
212	Other (please specify)	improving the functioning of markets	To allow the farmers to improve the self-life of their produce and give them the demands & supply of their produce so that a better price is obtained and cost for the farmer is reduced

213	Other (please specify)	commercial processes and investments	grouping of farmers, producing the same variety of good that can be processed and in continuous supply; for example during my stay in Lliongwe, Malawi I observed that farmers produce lots of tomatoes of good quality and quantity, these tomatoes fetched low prices and as they are perishables they are just wasted. Research can be conducted to see how investors can be tapped to have a ketchup factory and ensure that farmers have seeds, and other inputs on time and the correct acreage is cultivated to feed the factory.
214	Natural resources	Increased agricultural productivity through improved agricultural water management	Problem of low productivity due to poor crop (livestock) water management Problem of production failure due to prolonged dry spells and drought Problem of low land and labour productivity
215	Crop breeding/pathology	Economic/profit-based small hold agricultural production system using agrobiodiversity. The focus is to develop a production system for small hold farmers where the ultimate measurement is a real socio-economic benefit that they derive from a farming system utilizing a reasonable degree of agrodiversity. Subsistent farming communities are characterized by high degree of diversity but low profitability or economic return, in contrast to an intensive specialized monoculture production system for advanced or progressive farmers. The innovation is to give emphasis on developing a production system for small scale farmers where diversity is used not conceptualized on the basis of agroecological stability (otherwise it will just become just as the many theoretical and academic exercises that we have seen before) but economic, financial benefits. A traditional scientist do not want to see the money as the ultimate basis. However, small scale farmers will adopt a technology (biodiversity-based) if they see the practical results - money or income (foods too). It is kind of stepping out of the box. Researchers always sanct	Poverty, income, food and agroecological sustainability.
216	Agronomy	Yield and resource use efficiency	
217	Crop breeding/pathology	Developing high yielding varieties of crop specially breeding for drought, cold and terminal heat stress in case of cereal crops having resistance to various biotic stresses and developing varieties with high water use efficiency specially in dry areas.	In the era of climate change weather condition during crop season has become highly unpredictable with highly variable temperature and rainfall pattern. We need to develop varieties with better plasticity, which can give reasonably high yield under stress condition and high yielding if conditions are favourable.
218	Other (please specify)	developing IPM systems for tomato	reduce losses attributable to insect pests and diseases and reduce over reliance on synthetic pesticides; increase small holder incomes
219	Other (please specify)	Adoption of improved sorghum varieties	low productivity, old germplasm, increased incomes for farmers in semi-arid areas

220	Livelihoods	Research into critical rural institutions that support pathways out of poverty including informal credit, seed, labor, technology, market and land support systems to understand how some farmers fit in and climb out of poverty while others fall off. This institutions and pathways should be the conduits of support and the bases of agricultural stimulation as they affect the majority of the farming communities. Policy research should focus more in this area to highlight critical areas of support for people to climb out of poverty. This calls for a more direct and systematic application of Sociology/Anthropology in Agricultural Research in the future.	This innovation would address the practical problem of ignoring 'local solutions' and practices upon which any agricultural change should build. Good technologies from research institutions get lost in formal or new institutions such as marketing boards, cooperatives etc instead of utilizing village groups, lineage groups, women's clubs and so on.
221	Agronomy	Research on behavior and beliefs to pinpoint interventions that would work to address gender and social equity issues in research for development programs.	Despite decades of work with women and on gender issues, researchers still believe that including people in their work is only the work of a few social scientists but unless every researcher firmly 'gets' why it is important to work for the poor, research will continue to be conducted that is not adopted or adapted or is even very useful for those who are farming.
222	Agronomy	Institute a policy at all centers that encourages serious attention to assessing impact, not just outcomes and do not let donors tell you what indicators they want.	Donor driven projects result in donor determined impacts which may or may not be useful or meaningful. Like including gender (previous example), most researchers believe that the job of assessment should be done by someone else. The cost of repeating research, not learning from mistakes, collecting the same data over and over again and not learning from other projects data, the lack of adoption, etc., etc. all come back to not doing a good job of setting up an evaluation and assessment system within each project.
223	Agronomy	Revisit the efforts of Dick Harwood (IRRI), Don Winkleman, and Mike Collision (CIMMYT) and the basic hypothesis underwhich they developed the farming system program. That is that farmers are risk averse and deliberating delaying thier basic crop establishment. To the best of my knowledge this is pure hypothesis that has been fully accepted in the development documentation without ever being varified. It could be 180 degree out of phase. Then look at the calories available to impoverished smallholders and number of hours they can be expected to work. This could indicate they are lucky to have access to 2000 cal/day. This is marginally enough to sustain someone, but not enough to ask them for extensive field work. That would require up to 5000 calories. That represents a 60% shortfall. The result is what was proclaimed as risk averse might have been hunger and exhaustion. This reverses the whole approach to poverty alleviation from technology development and transfer, to drudgery relief. Take note of the role the conversion from water bufflo to power tillers had on the success of the green re	Difficulty smallholder have in implementing technology in the timely manner needed for full benefit. I get tired of hearing people proclaim the need to "teach" farmers to plant earily, without making certain they have the means to do so with the labor and calories available to them. The answer to this is not new technology but providing smallholders access to contract mechanization so they can get their crops established in a more timely manner consistent with agronomic recommendations.

224	Economics/Agricultural Economics	Production innovations aimed at limited resource households. Their nature depends on their highly diverse situations but should not require labor or cash resources usually not readily available or in seasons when scarce.	Consumption and nutrition of these households and capabilities for educating their children so they can move productively into other occupations therefore not requiring further division of scarce land holdings.
225	Crop breeding/pathology	leadership training	Leadership training will enable administrators/researchers to determine what is <u>needed for development and how to proceed.</u>
226	Livestock/veterinary	Use of thermotolerant Newcastle disease vaccine as an entry point for improving village chicken production and male and female farmer knowledge of disease, disease transmission, <u>nutrition, marketing, etc.</u>	Inadequate cold chain facilities in rural areas and lack of information and education on animal health and production issues.
227	Crop breeding/pathology	Improvement of yield and yield stability in dry areas; use of input efficiency; resistance breeding for insects and dryland diseases; use of wild relatives to improve crop productivity and resistance to abiotic and biotic stresses; improvement of nutritional and processing qualities.	Reduction of poverty in dry areas through improvement of livelihood by increasing crop productivity and quality and allowing the generation of income.
228	Crop breeding/pathology	Increases in yield, resource use efficiency, stability, reduced pests or diseases, other gains from diversity of cultivated species or varieties, or improvement in the health and safety of producers for field or garden crops, livestock, aquatic resources, forests/trees, or other types of production.	Yield
229	Other (please specify)	Value addition to agricultural production through processing, packaging and using farmer institutions for collective marketing and joint experimentation	Increased incomes and self reliance among small holder farmers. The nature of African agriculture is small scale and one farmer cannot walk the journey of income and food security alone. We need farmer institutions to mobilize small scale farmers and we need value addition to improve the quality and shelf life our african agricultural products.
230	Other (please specify)	Most agriculture produce including crop and fruits are wasted when in season, farmers fetch very low prices because of excess supply verss low demand. Yet excess commodities can be stored and processed into high value products rather being <u>wasted</u>	Food insecurity and hunger, malnutrition and poor health, low household income - all these problems can be addressed if excess produce could be stored or processed into high value products and carried onto off <u>seasons.</u>
231	Other (please specify)	Involvement of small-scale users for natural resources and environmental management	impove sustainability of natural resources without necessarily depriving communities for their livelihoods.
232	Other social sciences	Intensive, organic vegetable production incorporated into agricultural systems within integrated metropolitan regions	Low income from conventional staple agriculture and low micro-nutrient intake among poor farming <u>households</u>
233	Other social sciences	Link agricultural research on market performance to small-medium regional units' (municipality, province, etc) programs <u>addressed to women.</u>	Lack of opportunities for women to relate to local and regional markets.
234	Biotechnology	Innovations in the area of Biotechnology, particularly transgenic technology for crop production, protection and <u>quality.</u>	
235	Economics/Agricultural Economics	New drought-tolerant varieties of major staple foods (<u>especially cereals</u>).	Increase in productivity (resource use efficiency) and <u>adaptation to climate change.</u>
236	Economics/Agricultural Economics	Biofortified staple crops (enriched with micronutrients)	Micronutrient malnutrition,

237	Livestock/veterinary	Production- increasing efficiency of livestock production through sustainable management strategies using crop-livestock systems.	1) The 'problem' of poverty- or the positive approach that livestock production can be a pathway out of poverty. 2) The 'problem' of environmental impact- or positive approach that increasing livestock production efficiency can allow sustainable development by addressing land degradation, loss of biological diversity and gas emissions to the environment
238	Livestock/veterinary	Research institution information capacity building. Knowledge management. Many many researchers find it easier to make information without basing it on existing information ('the re-invent the wheel syndrome') Even with better and cheaper access to information the sheer volume of information discourages researchers to use available sources.	Wasting resources (human and financial) by repeating research instead of adapting results to new situations.
239	Economics/Agricultural Economics	Adaptive management of natural resources.it is a systematic process for continually improving management policies and practices by learning from outcomes of operations. It is flexible and responsive to new knowledge gained by targeting research to management needs; monitoring, evaluation, review and reporting of progress and by continually improving stakeholder capacity, skills and learning.It involves synthesising existing knowledge, exploring alternative actions by making predictions about future trends and outcomes, then agreeing on and implementing the preferred strategy. Further research, objectives and actions are then based on improved understanding and outcomes of monitoring and review	It will address the problem of harmonizing stakeholder interests in the management of natural resources as it encourages government, landholders and other stakeholders to adapt their planning and management responses flexibly to environmental and institutional pressures and changes. It would also help to reduce climate change as stakeholders would be accountable for their actions.
240	Economics/Agricultural Economics	Land Tenure Reform.This would involve policies and laws aimed at securing access to land for poor people and the landless who need it for securing their livelihoods. This would ensure that poor people gain private property rights.It would also promote land investment, credit supply and efficient land markets where properly implemented.	It would help to ease access to land by poor people who are mainly agricultural small scale producers.It would also address the problem of fragmented landholdings by farmers in most sub-saharan Africa.
241	Other (please specify)	From the perspective of the Commodities for Livelihoods programme, Conserving, characterising and improving germplasm resources for Cacao, Coconut and banana	these crops are the basis for livelihoods, health, nutrition and food security for millions of smallholder farmers. Our work will help protect and enhance all of this.
242	Agronomy	and carbon sequestration could be key innovations to focus upon.	The problem this innovation is supposed to address climate change mitigation but will also benefit soil fertility which is important aspect of crop production which is often neglected. Furthermore in the right set up institutionalwise it can create a potential income to small scale farmers. Soil nutrient improvement in farming systems, Soil fertility increase

243	Livestock/veterinary	<p>-introduction of improved breeds/varieties using value chain approach(input- output market credit, technical advice,linkage,group formation)market orientation & support community based input supply system,Innovation system approach,product value addition,innovation capacity building of public/private staffs,use of social networks & local innovations,Knowledge mangt,demand-derived extension approach,Gender,HIV/AIDS & the environmental issue ,mainstreaming,Study tour, best practices by projects like ILRI/IPMS, mobilization & participation,Research-development linkage,pluralistic in service delivery,partnership development</p>	<p>Productivity,lack of input,poor market linkage & information,poor extension system,lack of technology,supply driven extension,limited partners in extension services,low public capacity,lack of coordination among actors</p>
244	Agronomy	<p>1. Hydroponic production of nutritious food in areas with restricted cultivatable land can play a major role to address food security in South Africa, and in the rest of Africa. Advantages of the hydroponic production system include: Limited natural resources Hydroponic offers an ideal alternative to soil cultivation, especially when there is limited suitable soil or restricted cultivatable land. It provides good water and fertilizer use efficiency, e.g. in closed hydroponic systems water and nutrients are circulated and re-used by crops without leaching and draining into soil. Increased food productivity Plant yield and quality are higher in hydroponic systems, plants don't compete for water and nutrients, and therefore increased yields per unit area can be achieved. More effective control of pests and diseases is possible compared to cultivation in open fields. Food security Production of vegetables in hydroponics systems can be done in home or urban gardens to ensure that food security is maintained. Hydroponic production systems offer a great opportunity for home gardens to produce vegetables. knowl</p>	<p>1. Food security, job creation, increased income, improved nutrition, protect biodiversity</p>
245	Agronomy	<p>2. Develop selected indigenous food species into commercial crops. The most important research areas currently requiring attention is developing optimal cultivation practices, developing improved propagation material, develop and optimize processing, and value adding. Market studies and research on pest and diseases is also important, but the limited capacity at the ARC-Roodeplaat creates the opportunity for cooperation with other institutes. The term indigenous food crops encompass all food plants that form part of the traditional diet of African people. It includes, not only indigenous species, but also exotic species that become part of the native diet and culinary heritage over years. Many of these are wild harvested in the fields and fallow lands (amaranth, Cleome, Corchorus etc), or are cultivated in home gardens and fields (pumpkins, amadumbe, cowpeas etc). The priority species selected by the ARC is based on extent of use, popularity, nutritional content and "suitability" for cultivation. Over a hundred species of indigenous and traditional vegetables are utilized in South Africa. Some of these are very</p>	<p>1. Food security, job creation, increased income, improved nutrition, protect biodiversity</p>

246	Agronomy	<p>3. Medicinal plants The challenge with the African continent is that the use of herbal medicine is not adequately documented. Most traditional medicines which are claimed to provide "effective cures" for various diseases, lack scientific evidence for safety, efficacy and quality. One reason being that biochemical pathways, functioning, regulation and production of secondary metabolites are poorly understood. Furthermore, the lack of regulatory mechanisms to protect and conserve medicinal plants in demand is highly unsatisfactory, and leads to extinction of valuable plant species. It is estimated that about 20 thousand tonnes plant material is used in traditional healing practices per year. Less than 50 tonnes of these are cultivated, which creates an opportunity for exploitation of plants from the field. It also creates an opportunity for cultivation and propagation for plant material for the markets as well as industries. The Medicinal Plant Research Programme at the ARC-Roodeplaat will incorporate a range of disciplines to address several of the concerns surrounding traditional medicines in South Africa. Th</p>	1. Food security, job creation, increased income, improved nutrition, protect biodiversity
247	Agronomy	<p>4. Vitamin A deficiency (VAD) is a serious health problem in South Africa. The latest national survey in 2005 indicated that 63.8% of 1-9-year old children are vitamin A deficient (serum retinol levels lower than 20 µg/dL) and 18% are stunted due to chronic malnutrition. Of equal concern was the high prevalence (27.2%) of inadequate vitamin A status in women of reproductive age. The National Food Consumption Survey of 1999 indicated that 50% of 1-9-year old children have less than half of the required intake of energy, vitamin A, iron, zinc and vitamin C. Micro-nutrient malnutrition is mostly due to low intake of fruits and vegetables. Global strategies to address micronutrient malnutrition include supplementation, food fortification and dietary diversification. Dietary diversification includes crop-based approaches which address malnutrition through increasing the production, supply, access and consumption of micro-nutrient-rich foods. Crop-based approaches are considered to be sustainable long term approaches to meet the nutritional needs of populations. Orange-fleshed sweet potato contains high quantities of _-caro</p>	1. Food security, job creation, increased income, improved nutrition, protect biodiversity
248	Other (please specify)	<p>Use of Weaver ants in biological control of pest animals in plantations. The method is very effective, simple and low cost. It is very sutiable for small farmers.</p>	<p>Biological control of pest animals can replace pesticides and improve the food quality. The products can be sold as organic, if organic fertiliser is used</p>
249	Other (please specify)	<p>Carbon stocking in forest/savanna combined with biodiversity conservation can create a win-win-win situation where - Carbon sale to developed countries can create economic income - biodiversity can create food and economic input to people - protecting the environment and biolgical diversity.</p>	<p>poverty, lack of food and food diversity, i.e. malnutrition, womens lacking economic income</p>

250	Management	Increasing Food availability by reducing post harvest losses-through improved grain storage	In most subsaharan Africa e.g. Malawi post harvest losses are as high as 30% this is a challenge for food security. Improvement of post harvest and storage conditions has therefore a positive impact on food security of populations
251	Livestock/veterinary	Pelleting livestock wastes (manure) to facilitate its transportation from areas where it would cause pollution to areas where it can be used beneficially as manure for soil fertility improvement. Also facilitates trading in farm yard manure, however, this would require some restrictions to avoid soil mining.	Pollution from farmyard manure from urban and peri-urban intensive livestock production systems Low soil fertility Low household incomes of urban and peri-urban livestock producers
252	Crop breeding/pathology	Improving biotic and abiotic stress resistance	Ex; improve tolerance to shoot fly
253	Other (please specify)	Land use and Land management	The key challenge is the continuous land subdivision. Policies that discourage subdivision will be key to sustainable health environment The populace must be educated on the importance of land management; linking crop and animal productivity with health environment. Supporting small scale or trying to maintain the system will never solve the problem
254	Other (please specify)	Enhancing the biotic and abiotic stress withstanding potential of plants could help in increase in yield, stability, reduce the after effects of pests attack, utilization of marginal lands for cultivation. More income to the small time farmers.	Developing biotic and abiotic stress tolerant crop species
255	Livestock/veterinary	Address the balance of activities in the CGIAR to match demand by the consumers. To support the reduction of the growth of the human population that is driving the demands that are causing the Climate Change so frequently reported.	To increase and recognise the role of livestock in the social, economic, environmental and political environment of the developing world. There are two thrusts, one to improve small holder welfare by improving the control of Newcastle Disease of poultry and the other is to under take up stream research focused on developing countries. The livestock sector is a weak sector in developing contries compared to crops and needs considerable inputs to upgrade their capaicity and resulting impact in reduction of the poorer sectors of the communities in developing countries.
256	Agronomy	Reducing pesticides used.	Lack of funding for projects (e.g. IPM).
257	Economics/Agricultural Economics	Recuperación de variedades nativas de raíces y tuberculos andinos	Pérdida de la biodiversidad del patrimonio genetico mundial de las raíces y tuberculos andinos, como una fuente barata de alimento para el mundo
258	Crop breeding/pathology	New methods and materials for improving farmers' capacities to manage their resources/crops/limitating factors	Farmers in developing countries usually lacks capacity to manage their resources/crops/limiting factors.
259	Crop breeding/pathology	Scientist working with a systems perspective, taking into account the market, and key partners, creating 'multi-stakeholder platforms'.	Many scientists have a very narrow perspective (usually a single crop, a single limiting factor)and do not take into account demand from markets, nor other partners.

260	Institutional development	crops yield for dry rural areas. Water management and harvesting techniques for rural areas. Public organizational management and planning and administrative technique for public officer	Water management and harvesting water is becoming a key critical issue for rural farmers and it leads to have good crops yield in dried areas. the innovation in this issue can impact social differentiation and rural mobility and migrations. New accumulation process in this condition can help to stabilize rural population and also could help the adaption process to climate changes. On the other side. Public officer and policy makers are demanding new knowlege about planning and management of the state and the government. Public organizationa and institutional innovation is required. New conceptual framework are needed to be able to deliver
261	Institutional development	In general, rural area in south or south-east contries has very high population density. It is hard to improve their livelihood if farmers do not know what they should do with their farming production and market. There is poor room for them to compete together. Otherwise, the farmers have to be shifting to other jobs. It may bring to them opportunity to earn money from non-agricultural activities.	With very limited land resources, the farmers are unsound in comparative market economy.
262	Other biological sciences	Treating seeds with Trichoderma sp., Pseudomonas fluorescens and Bacillus subtiles before planting	This treatment protects seedlings from soil borne pathogenic fungal, bacterial and nematode attacks.
263	Other biological sciences	Grafting eggplant and tomato on resistant rootstock for bacterial wilt resistance	Prevents eggplant and tomato plant mortality in the bacterial wilt infested fields
264	Agronomy	Cocoa is often the only viable cash crop in remote tropical lowlands, such as the Amazon. Cocoa regularly comes out high in prioritization exercises, owing to its non-perishability and high value density, in contrast to high-value products that require refrigerated supply chains, and/or costly processing facilities. Cocoa agroforestry systems are amongst the most eco-friendly land use systems. Cocoa farms can connect fragmented forests, host important non-agricultural diversity, assist in erosion control and notably provide ecosystem services such as carbon sequestration. There is sustained demand (3% a year) for bulk cocoa (commodity cocoa) and more rapidly growing demand (lately 8-10% per year) for fine-flavour cocoa from specific origins ("terroirs"), which is mainly limited by supply. The wide cultural and geographic distance between the places where cocoa is produced and consumed poses a challenge for improving cocoa supply chains and requires international collaboration.	The real unit value of bulk cocoa has decreased over the last 150 years. Periods of oversupply followed by scarcity of cocoa, spread of pest and diseases, fierce competition of producers in combination with the prevalence of inexpensive consumer products have created boom and bust cycles of cocoa production. Although often referred to as a high value crop, in recognition of the high value density of the traded cocoa beans, cocoa value per area and per labour input is actually quite low. It is therefore all the more important for poor farmers to derive greater value from cocoa. One important opportunity is now through the differentiation of cocoa for fine-flavour through the deployment of cocoa diversity. Cocoa diversity, particularly landraces also used for fine-flavour chocolate, is under serious threat from the spread of higher-yielding varieties produced for the bulk market. There is an urgent need for capacity building in production practices and cocoa quality management from the farmer to the policy maker in producer countries.
265	Natural resources	Natural Resource and Environment	

266	Livestock/veterinary	developing local strategy and involving village poultry owners in protecting their poultry against new cattle disease	reduce mortality rate due to new cattle disease with the main objective to alleviate poverty
267	Natural resources	Reorient policies and markets to enable the poor to have a higher level of engagement in, and to benefit more from natural resources management. The main constraints are often social and economic, not technical and the CGIAR needs to take this better into account.	A vicious cycle of disempowerment that marginalizes the poor. Research is needed to highlight the constraints and the opportunities and to develop innovative solutions. There is a strong need for natural-resources-oriented work because it provides opportunities for the rural poor and because it is overlooked by private sector and even university research. The CGIAR has played an important role and could do much more.
268	Economics/Agricultural Economics	1. Institutions, Policies, and Markets: improving the functioning of markets or other rural institutions and governance Production, productivity and technology: Increases in yield, resource use efficiency, stability, reduced pests or diseases Natural Resources and Environment: increasing sustainability of the land resource base, reducing the water footprint of food production, reducing pollution, conserving biodiversity	
269	Other (please specify)	Capacity-building in support of all chains of the educational systems in view of developing locally adapted, problem/problem-solving oriented, holistic/multidisciplinary curricula, based on close dialogue/joint projects between producers (farmers, industries, service providers), public authorities, civil society organisations, and the educational institutions.	The inadequacy and / or the non-fit of local human resources (skills and knowledge) in addressing development challenges by identifying effective response strategies, resulting from the subject-oriented, teacher-centered current educational systems.
270	Other social sciences	Study conduct on causes of agricultural land loss and its mitigation, conservation of prime agricultural land, soil health management	Environmental change and population explosion causes this problem and so it should be addressed
271	Other (please specify)	payment for environmental services	poverty could be reduced while reducing also emissions from greenhouse gases and mitigation of climate change events
272	Economics/Agricultural Economics	Drought-tolerant OPV maize	
273	Economics/Agricultural Economics	promiscuous soybeans with good pest & disease resistance	lack of effective inoculation of appropriate rhizobia in soybeans in SSA
274	Other (please specify)	training program, research opportunity in the field of glaciology, hydrology and meteorology	1. Glaciers(Himalayas) are the good indicator of climate change but very few continuous studies there. details studies on the glacier might help to understand the real problems. 2.MIKE-11 a software developed from DHI, I would like to use this software specially for the River originated from very high altitude to almost close to sea level height (Himalayan river).so that its performance can be tested in details
275	Natural resources	Use of Bio-char as soil amendment for maintenance of soil fertility in soils and increase in crop yield.	Increase in crop production, contribute to climate change mitigation through carbon sequestration, greenhouse emission reductions and helping people to adapt to climate change

276	Other (please specify)	Natural resources and environment. While ecosystem services of natural ecosystems are receiving some attention, the ecosystem services of agricultural systems are little studied, even though a large proportion of the land area is covered by agriculture.	The proposed innovation addresses the need to use ecosystem services as a measure of the sustainability of a given agroecosystem. By putting a monetary value on the ecosystem services such as biocontrol it can promote informed decision making for agricultural production.
277	Other (please specify)	The 'real' costs of invasive species are underestimated in India, especially on mountain areas. The Western Ghats, one of the 34 Global Biodiversity Hot spots in the world is today colonized by invasive alien species like Lantana camara, Chromolaena odorata and Prosopis juliflora calls for more research into the environmental, social and economic impact of non-native plants and animals. Invasive species like Lantana camara that have been anthropogenically introduced to the Western Ghats mountains either intentionally or accidentally. Policymakers need to be informed on making better decisions to limit damage from invasive alien species.	The degraded habitats in the Western Ghats range of mountains are colonized by the exotic Lantana camara, Chromolaena odorata and Eupatorium odorata, which inhibit regeneration of native vegetation. We must find a solution for eradication and management of these non native invasive species. Climate change has become real and we must address the threats to mountain biodiversity and ecosystem in this region of India.
278	Crop breeding/pathology	Agricultural Science Education	lack of capacity building in the area of agricultural science
279	Natural resources	increase food security, better livelihoods for the poors	people are facing lots of threats from natural disaster, climate change, lack of knowledge of using new technology, etc
280	Economics/Agricultural Economics	Harnessing the potential of commercially valuable traits (functional ingredients) in agricultural biodiversity and linking it to markets Sustainable intensification through modern organic agricultural practises Improvement of post harvest processing and yields through locally adapted technology	Lack of knowledge of commercially valuable traits in national genebank collections, consumer trends and market requirements Lack of processing knowledge, marketing strategies and procedures of how this potential can be successfully linked to high value markets for the benefit of the rural poor. Weak linkages between value chain actors and lack of stakeholder coordination
281	Other social sciences	Design and development of locally appropriate water capture technology. I think both about classic irrigation but also more effective use of flowing water - dike-dam systems of some kind.	Three problems to be addressed: (1) low and falling agricultural productivity with traditional rain-fed agriculture; (2) increasing rainfall variability. leading to even poorer yields; (3) relatively few high-value crops that can be produced on large scale in rain-fed conditions
282	Institutional development	Closer involvement with extension activities	Improved research agenda and more effective use of research results
283	Biotechnology	NO DEFINITE ONE AT PRESENT	
284	Nutrition	- Integrated Watershed Management Approach which enables the natural resource base to support the growing population and the need for food security. As it is now, the natural resource degradation, especially land, water and vegetation needs integrated approach to address the problems. -	- Integrated Watershed management addresses the problem. In my current visit to Nepal, I have been impressed how such an approach rehabilitated degraded land, empower the local community to be engaged in development activities and to take responsibility. I believe the combined action enhances food and nutrition security which demands wisely handled environment

285	Other (please specify)	Incentives to increase the productivity of water across a variety of situations.	The problem addresses issues of poverty, food production and the environment in an increasingly water scarce world. Given that water supplies are limited, doing better with that water through water productivity gains, is a key to solving water scarcity and associated environmental problems. However, water productivity gains are often not favorable to producers, unless incentives of broad society are aligned to producers.
286	Other (please specify)	Technologies and supportive policies and practices that provide equitable and sustainable access to water for rural poor for agriculture and other multiple uses.	For many rural poor, especially in sub-Saharan Africa and South Asia, access to water would be a key to increasing productivity, generation of income, as well as other benefits such as improved health from household water supply. In more water stressed environments, policies to secure access for the poor are important to sustain livelihoods.
287	Food safety	Traditional food processing improvement Starter culture development Food safety and Nutrition	Saving foodstuffs Improving nutrition statement Improve food transformation and diversification
288	Livestock/veterinary	Improving smallholder dairy production using Shea nut cake (SNC) in the Northern Region of Ghana for poverty reduction.	1. Low milk production in small holder cattle 2. Environmental pollution (presently there is no proper use for the agro-industrial by-product and is being dumped any how in the communities 3. Low income of women engaged in Shea butter processing from which the SNC is generated. 4. Inadequate milk processing technique
289	Management	Networking farmers and out growers to harness oppotunities.	Problems of lack of sufficient capital and bargaining power for good prices for farm products.
290	Biotechnology	Production, technology and added value	Consider the development of reasoned agriculture by introducing near the producers, the basis knowledge on the crop demands and the quality of the substrata. Introduce basis knowledge on soil variability related to crop production and food quality. Improve food safety and variability by introducing new species - known for their high nutritive properties - in the population behaviours.
291	Food safety	Post-harvest processing and value addition by increased knowled about technological use of different local crops	Knowledge on how to use local crops for production of edible products of increased quality and availability
292	Natural resources	Changing the photosynthetic process for rice from a C3 to a C4 pathway	Limited rice yield as a result of energy limitations for the rice plant, reduced respiration of the plant
293	Natural resources	Herbicide tolerant rice	Herbicide tolerant rice would enable effective zero tillage rice systems, potentially under aerobic conditions. This would reduce labour use, puddling and associated greenhouse gas emissions, soil degradation/erosion, and fossil fuel inputs into rice production.
294	Natural resources	Rice germplasm tolerant to drought, salinity and submergence	Yield losses due to drought and flooding, unusable areas affected by salinity

295	Other biological sciences	Application of semiochemicals for pest and disease vector management. Natural sources of semiochemicals have been found to be highly effective at controlling maize stem borers (push-pull, Dr Khan ICIPE) in Africa and have been used as baits for banana weevils and to some extent fruitflies but in the many other parts of the world, and including South Asia synthetic equivalents are being found useful for controlling pest species. There is considerable scope for their use in disease vector control notably ticks, mosquitoes and bed bugs that is poorly exploited, although more advanced success has been achieved with tsetse. Their potential has been exploited for monitoring African armyworm and larger grain borer but no work done to control stored product pests such as <i>Callosobruchus maculatus</i> . The potential in combination with NE and parasitoids is enormous for vegetable and fruit crops. Particularly in for mass trapping, one example of this work in South Asia recently won an award from the International IPM Symposium in Portland Oregon.	Semiochemicals have enormous scope for use in pest population monitoring and control. They are particularly effective at monitoring movement of invasive species and can be employed in networks with appropriate Bayesian networks for assessing risk to crops. There are clear opportunities for control of storage pests (bean weevils) and tick pests of livestock.
296	Agronomy	Conservation Agriculture in small holder farms will contribute to sustainable land management and improved livelihood of poor resource farmers.	The innovation is supposed to address land degradation and low productivity in rural communities. The land use challenges in smallholder include soil degradation, deforestation resulting from increasing population pressure and improper crop management. Land degradation in the area is often associated with lack of replacement of harvested nutrients from crops and poor crop husbandry. The innovation will enhance the use of sustainable land management to restore soil fertility and reduce soil erosion.
297	Other (please specify)	Using so far unused areas for bio fuel crops that grow in these places. For example switchgrass.	The innovation can both stop desertification and provide additional income to small scale farmers.
298	Livestock/veterinary	Production, productivity and technology could consider Increases in yield, resource use efficiency, stability, reduced pests or diseases or improvement in the health and safety of producers for livestock and aquatic resources. In this sector the majority Africans uses Livestock or fish as their primary food. Hence, the area importance to consider for research.	Good breed of animals which can withstand the current climate change, Education among the producers, Land use management, capital and market
299	Fisheries	Maximizing aquaculture water productivity	How to maximize aquatic food production while minimizing demands on ecosystem services. Increasing water productivity is likely to depend on increasing use of off-farm resources, especially fertilizers and feeds, which in turn will produce greater wastes. Wastes are often discharged into the wider environment where they are dispersed and assimilated, and as a result can compromise the provision of ecosystem services (e.g. provision of potable water; fish) for others.

300	Other social sciences	Joint climate scenario development and disaster risk mapping at community level for sustainable agricultural and weather-indexed insurance schemes; involving local government, <u>scientific institutions and communities.</u>	Severe production losses due to natural disasters; lack of reliable climate predictions at local levels; lack of insurance for small-scale farmers.
301	Agronomy	Conservation agriculture practices (resource-conserving technologies): minimum tillage, residue retention, diversified <u>crop rotation, proper weed management</u>	low soil fertility, low agricultural system productivity, wind and water erosion, secondary soil salinization, low <u>water use efficiency</u>
302	Other (please specify)	linkage of health and agriculture. This could mean eg vector born diseases for instance through increased level of irrigated agriculture in Africa; also food contamination through mycotoxins (often vectored by insects); zoonotic diseases	Looking at the lives of people and not only the commodities they might eat.
303	Forestry	Creating regional platforms around important biodiversity hotspots aiming at an economic development that takes social and ecological aspects into consideration. Focus on off-farm employment (export processing zones, call centers, ...) and gradually increase financial returns and legal protection of biodiversity hotspot to avoid the paradox of poverty (when income of people increases also their impact on the biodiversity hotspot increases).	Current approaches to development in buffer zones are limited (small projects, short term projects, limited scale): for instance butterfly farming, honey production, agroforestry, ... Several case studies indicate that lost income to be replaced at household level if the population would manage biodiversity in a sustainable way is high (up to 5/6th of their current income). Target 1 = to replace about 75 % of current household income to reduce pressure on biodiversity hotspot Target 2 = further increase household income for development
304	Biotechnology	to address research toward nutraceutical values of some crops	
305	Economics/Agricultural Economics	Production, productivity and technology (e.g., upgrading of <u>existing seed technology</u>)	Food security
306	Other (please specify)		
307	Other (please specify)	Methods for facilitating interactions among a wide range of stakeholders (already investing in agricultural innovation), but need to coordinate actions in a better way	Limited interaction and communication among public and private stakeholders, which reduces opportunities for inter-organizational learning towards agricultural <u>innovation</u>
308	Other (please specify)	"Cross-scale" participatory methods to share information and opportunities among-small scale farmers and other members of the value chains, locally, regionally or globally.	Lack of interaction among small-scale farmers with other actors at regional, national or global level. This makes difficult to communicate relevant information, perspectives and possible actions across scales.
309	Crop breeding/pathology	increased capacities for plant breeding for well adapted crops and strengthen breeding teams to cover all aspect from <u>genetic enhancement to product utilization;</u>	Adapation to climate change
310	Agronomy	Increase safe vegetable consumption for children, women and men	Would address nutrition problem for children, women and men; while increasing income to vegetable producers. This innovation implies that all the value chain of vegetable production to transformation, marketing and consumption is improved.
311	Agronomy	Increase multipurpose tree cover, through a wide use of agroforestry systems	Improve environmental issues such as land degradation and natural resource management; adaptation to <u>climate change</u>
312	Forestry	1. Micro-Rainwater harvesting	1. Increase or prolong rainwater availability to plants

313	Forestry	2. Botanical extracts as pesticides	2. Avoid contamination of the man, animals and the environment
314	Economics/Agricultural Economics	Integrating women into all aspects of agricultural research and development.	Inefficient use of human resources when women are not able to make their full contributions.
315	Other (please specify)	Rural Climate Information Services: Routine provision of climate information (historic observations, monitoring, prediction at multiple lead times); including value-added information in the form of agricultural production forecasts, and training and guidance on interpretation and management implications; targeting rural communities and institutional stakeholders. Climate information should be part of a package with, e.g., market and soil information and technical guidance.	Climate information services address the negative impact that climate risk has on adoption of innovation, efficiency of production input use, costly ex-post coping responses, credit supply and market development. Several options for managing climate risk; including use of seasonal forecasts for adaptive management and to coordinate input supply, weather index insurance, food crisis management, and trade to manage price volatility; depend on climate information. A climate-informed crop and forage monitoring and forecasting platform; which provides continuously-updated, probabilistic information about climate impacts at a suitable spatial resolution; could enhance the value of climate information for these multiple interventions. By reducing uncertainty associated with climate variability and change, Addresses the
316	Other (please specify)	Localizing and Regionalizing Crop Production. This simply means repositioning crop production process to incorporate cultural practices and methods feasible in a particular community or region. The process requires two main aspects: First, improvement of the productivity (yield) of the local varieties and species of crops already accustomed with by the local farmers. Second, adopting the local farming practices and methods with a view of modernising them in order to achieve improved productivity. In doing the above mentioned, the knowledge of local or regional crop production processes is required. This is because every locality or region has some particular crop species and varieties that thrive in that environment as well as the best methods of farming them. Therefore, there is a need to first identify the crops, including the traditional methods of farming them. Then, attention can be given to how to improve the productivity of such crops without out necessary tempering with the genetic makeup. This is because crop production in most communities of West Africa is informed by cultural preferences of the linguists	1. This will bring back the attention of local farmers who prefer the local varieties than the genetically improved varieties due to their accustomed taste. 2. This shall go a long way to solve the massive problem of crop failures due to adverse weather condition recently experienced by farmers to some extent. 3. The problem of pests and diseases shall be abated to some degrees 4. This widens the farmer's choices and selection of crops to cultivate instead of over depending on cultivation of crops such as rice, maize, beans, etc. which most a times do not produce well. 5. This shall assist in environmental management especially land degradation and continuous fuel wood use as a result of annual expansions of cropped areas. 5. This system shall encourage small scale farming and as such boost the income of local farming. 6. The problem of adaptation of farming methods and species shall be abated if not eradicated.
317	Other biological sciences	Improved knowledge and information systems for natural resource management	Much of what is known is not applied because of institutional constraints. Many influential actors are locked-into hierarchical command and control approaches that are preventing innovation and are creating a dangerous situation that will make it very difficult for NR managers to respond to challenges such as climate change etc

318	Other biological sciences	Better understanding of how forests are important and to whom	There is an underlying assumption in much NRM - and especially concerning forests - that global and local environmental values are identical or at least convergent - the reality is that this is not true and studies of the real values to different sectors of society are essential to allocate costs and benefits.
319	Economics/Agricultural Economics	1. Foster, help to organize rural leaders among lower income households with the objective of identifying key constraints from a list of well worked out possibilities. While on farm technology is a component, this must also include constraints to the opportunities that exist outside their familiar environment; such as: employment in the more modern component of the farm-retail marketing/food processing chain, access to other off-farm employment opportunities, (recall, in most middle and high income economies, non-farm income makes up a very large share of farm income even on larger commercial farms).	The challenge is to "pull" human resources into areas of economic activity yielding higher returns than in the areas where they are currently active; this naturally focuses on lower income families, however, a strategy that increases opportunities through policy and institutional reforms of middle income can also create opportunities for the lower income profiles of society. Finally, we recognize that a large portion of the world's poor reside in the rural economy that tends to provide relatively low cost living but also fewer economic opportunities.
320	Economics/Agricultural Economics	2. Provide resources for these leaders to pursue in more depth a subset of feasible alternatives (for sure this will include education, some job training, the need for those rights that permit small farmers to rent out their land or share crop if they find employment off farm, issues of transportation, some form of unemployment insurance (even if in kind like meals) if terminated from employment. This may also include availability of public transit, improved rural infrastructure to better connect workers to markets, and in the case of large low income (or "slum") areas around major cities, seeing this as an opportunity whereby potential workers are "closer" to the labor market and develop plans accordingly (This is part of the story of South Africa).	The challenge is to "pull" human resources into areas of economic activity yielding higher returns than in the areas where they are currently active; this naturally focuses on lower income families, however, a strategy that increases opportunities through policy and institutional reforms of middle income can also create opportunities for the lower income profiles of society. Finally, we recognize that a large portion of the world's poor reside in the rural economy that tends to provide relatively low cost living but also fewer economic opportunities.
321	Economics/Agricultural Economics	Significant yield increase in key food staples consumed in the developing countries.	the fact that consumption is growing faster than production for many food staples and that the world may not be able to feed itself in 2050 given current yield and available land.
322	Economics/Agricultural Economics	Small-scale mechanized and multipurpose equipments that run on renewable energy (solar, biofuel, etc..) and can be used by smallholder farmers for agricultural tasks including post-harvest.	the widespread use of hand-held and rudimentary tools by smallholder farmers.
323	Economics/Agricultural Economics	Elimination of Developed countries' export subsidies, domestic price supports and trade barriers that harm developing countries' farmers	The artificial unprofitability of farming in many developing countries because of the distortions created by the exports subsidies and domestic price supports of OECD countries and other major exporters Agricultural products
324	Agronomy	Breeding for drought and heat tolerant solanaceous vegetable varieties (tomato, peppers etc.)	The rising temperatures and drought caused by climate change affect flowering and fruit production (can reduce yield by 50 -100%)
325	Agronomy	Organic agriculture	1. Environmental pollution 2. Climate change 3. The need for safer and higher quality food products

326	Crop breeding/pathology	Restoration of agricultural Soil fertility utilizing organic matter recycling,	Continued degradation of sub-saharan agricultural soils. Improved crop varieties fail to perform to their potential due to poor inherent soil fertility - leading to hunger.
327	Agronomy	drought and salt tolerant varieties	Sub Saharan farmers are facing water shortage and high evaporation conditions. In thsi context having drought tolerant vaieties for most commodities is crucial. Lack fo fresh water worsen salinity problems that are gaining mometum.
328	Other (please specify)	A more broader use of diversity in agricultural and food systems (beyond just breeding)	Overspecialization in agricultural and food systems (excessive reliance on a few crops, breeds and foods) leading to less capacity to adapt to change, lower productivity in the long term and under conditions of high environmental heterogeneity and temporal variability, poorer nutrition
329	Agronomy	research in the areas of Sanitary and phytosanitary Measures (SPS) in the continent will be innovative since this area goes across the above mentionned domains (crop production, porst harvests processing, food consumption, natural resources and environment, policies and institutions. the research proposal and or topic will be selected, based on the damage it causes to the population.	Problems of pests (insects pests, diseases, and weeds) as limiting factors to crop production, productivity and trade. Food safety and security.
330	Other (please specify)	Small Scale Urban Agriculture with Income Generating Activities (Like small live stock (shhep and goat) fatening)	Urban poverty is widely spread in Developing countries like Ethiopia, my MSc study also indicated this situation.
331	Economics/Agricultural Economics	Agricultural Grain Credit Inventory Scheme	Supply of credit to small scale farmers to facilitate the production of grains, Absorb farmers grain products in silos for some holding period in silos, make money available to them for the waiting period, market their products at peak periods to maximize profit, net out balance and farmers are provided with reasonable income for the farming season.
332	Other (please specify)	Cooperative or collective production and marketing of medicinal and aromatic plants.	There is a huge demand for Medicinal and Aromatic Plants. But they are in short supply as Forest Dept. puts lost of restrictions on collection and Biodiversity erosion

333	Other (please specify)	Bamboo application development program "A National Level Program on Bamboo Application Development to Initiate Socio-Economic Value and Alternative Energy Production"	Product: [Producing a Filter to Eradicate Water born diseases by Heavy metal (Cadmium) and Fluoride poisoning. Filter is made by 100% bio degradable materials and without using any external energy. 1. Primary filter agents are Activated Carbon produce by Bamboo Plant and a soil type called Laterite to compose the contamination in water and filtered in a natural technology, the area which the benefit is remote and rural parts of South Asia where they doesn't required external energy (Electricity)]Concept Project Implementation To produce foreign revenue and to develop capacity building to emphasis the communities by economically benefiting and sustain the industrial agriculture throughout the region To practices the need of renewable energy and updated technologies to implement revolutionized methodologies to up lift the life standers of the community Production of 100% Chemical Free (Ecological) water filter to irradiate water born diseases in the North Central and North Western regions; the popular water born disease called fluorosis Socio-Economic Benefits Supplying Bamboo Shoots as f
334	Other (please specify)	Quantitative and Qualitative analysis of Hydrology, Biomass and Biodiversity of Forested Areas (Wet Zone) in Sri Lanka Socio - Environmental Responsibility Audit	To obtain quantitative and qualitative data to analyze the Hydrological Parameters, Biometrics and Community Characteristics of the Forested Areas in order to evaluate long-term Environmental Benefits
335	Other social sciences	Measure the gap between tenure rights "on paper" and actual enforcement of these tenure rights in community forestry in developing countries.	In many countries where access to or ownership of forest lands is a right, rights of exclusion are not enforced by governments, meaning that the intent of the forestry tenure reform and of the law is not being met. If this problem is measured and publicized, remedial action would be taken that will work to the benefit of people who are in community forestry.
336	Other (please specify)	Dissemination of simple and practical informations that can make tremendous changes in lifes of poor farmers in rural areas in short period of time.	Food security and Health
337	Crop breeding/pathology	Higher land productivity and higher labour productivity by - efficient use of nutrients, water and labour, - control of plant pests, diseases and weeds, - healthy stock material adapted to the local needs.	1) More regional food production, 2) Economic development.
338	Other (please specify)	Increase efficiency of resource utilization especially soils, fertilizers, and water	There is considerable loss of nutrients added to soil due to leaching, denitrification and volatalization. Nutrients such as N which are freely available are not effectively used. For example Biological Nitrogen Fixation can be used to a greater extent. Water use is also not effeicient manly due to ineffective systems of water management. Flood irrigation is practiced in many parts of South Asiaand this is not an effective system of irrigation.

339	Other (please specify)	Post harvest technologies	There is considerable waste of crops produced
340	Economics/Agricultural Economics	gains from exploring diversity of species and varieties, forest trees and animal breeds	innovation will address divergent needs of poor households, availability of diversity for crop & livestock improvement research to meet challenges and opportunities, and exploration of forest trees diversity to target different markets and expand economic opportunities
341	Economics/Agricultural Economics	conserving biodiversity and agrobiodiversity and using conserved biodiversity to help people adapt to climate change	loss of biodiversity, providing options for immediate adaptation to effects of climate change
342	Economics/Agricultural Economics	use of agrobiodiversity to improve nutritional quality and health through dietary diversity	malnutrition (imbalance and inadequacy in macro and micro nutrient supply to meet body requirements) and increasing incidence of poor nutrition related diseases such as diabetes, stroke and cardiac arrests
343	Crop breeding/pathology	PRODUCTION, PRODUCTIVITY AND TECHNOLOGY- Reduction of crop production costs, increasing yields and profitability through holistic and integrated approaches (using cultural methods like organic amendments, use of legumes for provision of N in the systems, enhancement of Mycorrhiza performance for P uptake, agroforestry, etc) eg sound management of pests and diseases, soil resource, water etc within the context of dwindling resources, high human population, environmental degradation, climate change.	The great crop losses that are experienced by farmers due to pests and diseases, low agricultural inputs. currently most of the food production is in the hands of illiterate and semi-illiterate rural poor. Having this handled by literate people will address the challenge of Know how and spill over to impact the illiterate ones
344	Crop breeding/pathology	Developing a new crop of growers with some formal education. Generating interest among our students to engage in agriculture as a career and an economic activity and creating an enabling environment for this to thrive.	(see above)
345	Crop breeding/pathology	AGRICULTURE AS A PROFESSION- Agriculture is the economic mainstay of most of sub- Saharan African countries. Hence agriculture should be introduced at the primary level with a strong emphasize as a professional career. This should continue through to secondary and tertiary educational institutions. The selection of students who take agriculture should be based not just the performance as is the case in Kenya but also others factors like interest, working in rural set - up should be considered. The entry points should also be raised to match those of other professions. As it is now, the lower the entry requirements, the less important is the profession The agriculture Curriculum at the tertiary institutions should be reviewed to make it relevant and presented as a business enterprise	farming is in the hands of semi-illiterate farmers. Having literate practioners in agriculture will transform the agricultural sector and also impact greatly the existing farmers.
346	Crop breeding/pathology	ESTABLISHMENT OF PLANT DISEASE DIAGNOSTIC CLINICS that are easily accessible to the farmers. this will enable quick diagnosis of pests and pathogens and prompt application of sound management strategies	inaccessibility and high cost of available plant diseases diagnostic services to farmers hence great losses due to pests and pathogens lack of awareness of the impact of some crop pests such as plant parasitic nematodes by the farmers
347	Management	Development of new varieties & hybrids in the various crops.	Improvement of yield, giving assured yields by way of tolerance to biotic and abiotic stress.

348	Crop breeding/pathology	Production, productivity and technology	Food security
349	Livestock/veterinary	Modeling for the optimal combination of agricultural practices and development which would ensure efficient and sustainable increase in productivity is an area worth giving attention. This may need a lot of input in a form data and that can be supplied by national research and development systems and also be tested by the same. In the optimization process rehabilitation of degraded areas and use of both farmer's varieties/breeds and improved ones need to be considered. Degraded areas represent areas where the natural resource is lost and/or invaded by invasive species. CGIAR may not be in a position to develop a model for all 'pocket' areas but sufficient capacity building for NARS will help to expedite the work.	Presently increase in population pressure and associated problems of food insecurity and resource degradation are serious threats to Sub Saharan Africa. Ways to restore the natural resource along with increased productivity in a sustainable way is critical to the future of the people in this area. Developing optimal systems would help in solving the multifaceted problem faced by millions in this area and also in the other part of the world.
350	Agronomy	Environmentally sound and safe pest management options	Reduction of use of Organic pollutants in pest management
351	Crop breeding/pathology	A large number of under-utilized legume crops are grown in fragile ecosystem without much agronomic interventions. These crops possess certain traits which help them to grow reasonably well under the conditions where the well established crops like rice, wheat, etc., are difficult to survive. Proper evaluation of existing germplasm of these under-utilized crops and their utilization in breeding program to develop appropriate varieties with resistance to key biotic stresses provide an opportunity for innovation.	Production of continuous cereal based cropping systems like rice-wheat, rice-rice and rice-maize is becoming increasingly unsustainable because of declining factor productivity and associated problems of increasing pest and diseases, rising cost of production, declining soil health and genetic uniformity at crop level. Underutilized legume crops provide a window of opportunity for their introduction in cereal based cropping systems for increasing agricultural sustainability.
352	Agronomy	Converting African, Asian and Australasian indigenous vegetables from weeds/landraces to improved varieties and making non-hybrid seed available broadly to disadvantaged farmers across the globe to diversify their diets and agricultural enterprises.	This innovation will have a substantial beneficial effect in overcoming under- and overnutrition in the developing world which is a problem effecting the health of well over one billion people, particularly that of vitamin A deficiency as a result of their present imbalanced diets dominated by carbohydrates and fats.
353	Agronomy	The need to ensure Safe and Healthy Food Systems through the elimination of the injudicious over use of pesticides, food adulteration from using composts and manures with excess heavy metal concentrations, contamination of food products through poor storage resulting in mycotoxin production, avoidance of bacterial contamination through the abuse of grey water in peri-urban environments and thus the overall need for not only the articulation but putting into effect Good Agricultural Practices	Food adulteration with a range of toxins and contaminants

354	Livestock/veterinary	Delivery of Vaccines either in plants or as sub - unit proteins in water or feed.	During the last outbreaks of Rift Valley Fever in Kenya and of Peste de Petit Ruminant (PPR). The experience was that one of the main problems after diagnosis was control of the outbreak to NEW areas due to slow vaccination. The current vaccines depend on a well established cold chain and delivery to individual animals by injection. Mobilization of vaccination teams and getting the cold chain in place and the vaccine valuable time has been lost. This is expensive, slow and by the time one area has been covered the outbreak has spread to other areas causing huge losses.
355	Other (please specify)	Productive use of saline soils in developing countries due to: 1) inadequate use of irrigation water 2) reduction of irrigation water 3) reduction of rainfall 4) rising sea levels 5) aquifer depletion	loss of food production, migration, impoverishment
356	Other social sciences	The funds proposed for use related to climate change could be tied to training to be required of influential policymakers, on the importance, process and skills required to obtain holistic understanding of local systems. Additional funds could be provided to universities and technical schools to strengthen lower level capacities for observing, analyzing and working with the variety of local systems in their countries.	The problem is a global world view that focuses on economic indicators to the near-exclusion of other important factors. Country-wide solutions are typically proposed that fail to take into account the diversity that exists on the local level. This diversity is both the source of a problem for standardized 'solutions' and at the same time an under-utilized resource for location specific, effective solutions that can enhance local people's capacities and self-confidence and give them a greater stake in the development of solutions that can be of global benefit.
357	Economics/Agricultural Economics	The Canastas Comunitarias: Building an urban-rural platform for food security Over the last several decades, a revolution of 'modern food' – characterized by industrial era production, agri-food processing, supermarkets, and fast food chains – has spread across Latin America. In Ecuador this system has come to mean new layers of intermediation between rural-based producers and urban-based consumers. As a result, it has become increasingly difficult for urban populations, in particular the poor, to access affordable, healthy food, and for smallholder farmers to receive fair prices for their commodities. 'Externalities' of this tendency have included harmful public health consequences, in particular the emergence of a child overweight and obesity epidemic (Waters, 2006) as well as environmental decline (Sherwood, 2009). We propose learning how to address the complex causes of the obesity epidemic in Ecuador from the grassroots up, through a strategic alliance with a growing urban-based, poor people's movement: the Canastas Comunitarias.	According to the latest census, Ecuadorian consumers spend more than \$5 billion on food, through direct purchases in markets and at restaurants, which represents more than 10 times the amount of international development cooperation invested in the country. We see this market as a great opportunity to transform agriculture. We have identified a very viable alternative to transform agriculture: the Canastas Comunitarias - a voluntary movement of more than 50 neighborhood groups of buyers (more than 1,500 families) in six cities. The movement was initially motivated by the economic advantages of purchasing commodities in large quantities, which usually results in savings on the order of 30 to 50 percent. Recently, the municipalities of Quito, Cuenca, Guayaquil, Ibarra and Riobamba have expressed interest in investing in Canastas Comunitarias.

358	Economics/Agricultural Economics	Katalysis: farmers surviving climate change through innovative management of water and biological resources. Climate change threatens livelihoods in the semid-arid highland Andes. Studies show that climate change will increase the variability of rainfall, commonly leading to fewer, more severe events, thereby increasing risks to agriculture. Meanwhile, we found a dominating cultura de secano in the region, blinding people to much of the water that surrounds creatively bring water to bear on climate change. Through helping people discover new sources of water and through the creative utilization of plants as on-farm sunlight and nutrient sinks, this innovation will enable rural families to dramatically increase on-farm sustainable production and overall food security. To assure financial sustainability, the project will establish locally-managed technology innovation funds, with built-in capitalization mechanisms. Through ties with peer organizations in the Andes, the project aims to influence how other agencies organize to help rural people tackle the challenges of climate change.	To date, the institutional response to climate change has centered on externally-based solutions, such as forecasting models and drought-tolerant crops, which are of limited use in highly variable mountain environments. In contrast, we went directly to farmers and their communities for ideas on how best to address climate change. After studying the pending threats, farmers prioritized an initiative that would help them break through the conceptual barriers they had constructed for themselves around water scarcity so that they could gain new control over existing water and biological resources
359	Economics/Agricultural Economics	Community Management of Seed Systems: The Biological Foundation of Food Security in the Andes. This will be run by resource-poor farmers in rural communities located in the mountainous region of Bolivia, Ecuador and Peru. Collective action among these countries to develop such a system is urgently needed because genetic erosion is a constraint that is affecting in similar manner and simultaneously populations of indigenous and peasant farmers in the region.	The issue to be addressed is Genetic Erosion both through loss of local availability to seed and disappearance of varieties. The loss of biological diversity, in this case because of the lack of access to and availability of seeds in communities, increases crop vulnerability and undermines immediate and long term well being, closing windows of opportunity and denying people a resource fundamental to survival in rural communities.
360	Fisheries	Production, productivity and technology; processing and marketing; Food safety, consumption and nutrition	Food security and poverty alleviation problem
361	Livestock/veterinary	Improve livestock productivity	Innovation should address vector borne disease control
362	Economics/Agricultural Economics	Innovation in the areas of soil and water conservation in view of the climate change challenges	In Sub Saharan Africa, there is an increasing frequency of droughts related events which are affecting many farmers agricultural production through decreasing crop yields and increasing food insecurity in the region.
363	Other (please specify)	Methods for institution building within producer organizations	Increase local capacity to manage natural resource and to interact with policy makers that influence natural resource policy.
364	Institutional development	Platform for gender-responsive agricultural R&D	absence of effective mechanisms to develop and deliver technologies that rural women want, need, and will use to increase nutrition and income.
365	Institutional development	Consolidation of local democratic government.	This addresses the lack of institutionalized forms of rural representation across the developing world. While local democracy has been legislated and is being enacted (theatrically) in many places, there are very few examples of where it has been truly tried.

366	Livestock/veterinary	Conservation of indigenous sheep and goat diversity in Nigeria	Loss of diversity through traditional free-range production system resulting in indiscriminate mating and high mortality due to inadequate husbandry practices (housing, feeding, health care).
367	Livestock/veterinary	Conservation and sustainable utilization of indigenous poultry diversity (in Nigeria)	Loss of ecotypes of domestic fowls, ducks, guinea fowls, turkeys, pigeons etc
368	Other social sciences	Develop working models for linking scientific analysis to decision-making, whether by policy makers or development practitioners. Would include empirical research to question common myths or assumptions guiding policy or practice or to establish the relative merits of different courses of action (for policy). Would include action research to develop and disseminate working approaches for addressing common but intractable development and NRM challenges.	Too much energy being given to unproductive approaches to development, and to policies that defeat development objectives.
369	Other social sciences	Quantifying the impacts and trade-offs (social and biophysical, short and long term, tangible and intangible) of large-scale investments in land, and support policy and scenario analysis to enable countries to leverage more meaningful benefits from these investments while reducing ecological and social costs.	1. Large in-flux of investments without adequate governance mechanisms to minimize social and ecological consequences, or to capture potential value of these investments or the natural resources behind them. 2. Lack of collective action between receiving countries to set the terms of investment so as to avoid "investment flight" that could be caused through improved regulatory frameworks.
370	Other (please specify)	postharvest processing	being out of range Loss and wast in agricultural products
371	Agronomy	Working with farmers	That technology is developed (top down) that is not appropriate for farmers in developing countries, notably SSA, notably smallholder farmers (95% of food production)
372	Agronomy	Low input agriculture	That it is addressed by foreign external inputs
373	Fisheries	Initiate monitoring station along the coastal areas of the concerned states (e.g., GCC countries) to monitor fisheries of a migratory species (Spanish mackerel) through identified tools (catch rates, fish lengths) in standard or agreed sampling format.	Managing fisheries of migratory species requires cooperation between the concerned countries. The lack of such cooperation will make these fisheries susceptible to collapse. Cooperative monitoring will provide data/information which will able the concerned countries to take the right actions.
374	Other (please specify)	impact of climate change	The impact of climate change on agricultural and environment system is being felt widely due to the variability in rainfall pattern. This is particularly affecting the agricultural production in the hilly region where agriculture is the main occupation of millions of people. Therefore, addressing the impact of climate change is rural agriculture and identifying the appropriate coping strategy would be beneficial for the large population dependent on agriculture.
375	Agronomy	Increase use of GMO crops with several traits, such as those referred to herbicide and drought resistance would increase yield in marginal areas. Also the "piling" of genes that add resistance to most important diseases will be a key opportunity for innovation	Lack of crop productivity in marginal areas and areas where disease pressure is too high. In the latter case the use of GMO pest resistant crops will reduce use of pesticides.

376	Crop breeding/pathology	participatory research and development by the people on the spot (eg. villagers, farmers etc), afterwards matching with scientific expertise	it contradicts to the still usual top-to-bottom approach of too many external experts from industrialized countries. avoid inappropriate technologies such as genetic engineering (and other emerging, converging and corporate driven risk technologies) and private sector involvement (like TNC) and privatization like patenting of life-forms.
377	Crop breeding/pathology	[1]Judicious use of water resources, developing a sustainable recharge system to recover 'lost' water.	[1]..Optimum use of the scarce resource,
378	Crop breeding/pathology	[2] Production and distribution of good quality, disease & pest free Planting material including its delivery system to reach the farmer at a convenient location.	[2]..Harvesting a healthy crop,
379	Crop breeding/pathology	[3] Increasing cropping intensity by relay cropping wherever feasible.	[3]..Full use of the arable land,
380	Crop breeding/pathology	[4] Providing minimal processing facilities for perishable food like tubers, vegetables & fruits at the farm-gate level and then a buy-back arrangement & minimum support price.	[4]..More economic benefit and a better hope for the farmer to make agriculture as livelihood security.
381	Economics/Agricultural Economics	Post-harvest processing and value addition could include improvements in storage, processing and utilization that will reduce losses, improve food safety, nutritional quality of food, or improve the efficiency of processing , including both homestead, commercial processes and improved marketing functions	To address the problems of food insecurity and vulnerability of the marjority of farmers in micro, small scale and medium enterprises.
382	Economics/Agricultural Economics	Post-harvest processing and value addition could include improvements in storage, processing and utilization that will reduce losses, improve food safety, nutritional quality of food, or improve the efficiency of processing , including both homestead and commercial processes and improving market functions.	Huge loss from harvest and more income and food security for micro, small and medium scale entrepreneurs.
383	Economics/Agricultural Economics	Post-harvest processing and value addition could include improvements in storage, processing and utilization that will reduce losses, improve food safety, nutritional quality of food, or improve the efficiency of processing , including both homestead, commercial processes and improved market function.	Huge losses after harvest, problems of food insecurity, and vulnerability of farmers
384	Natural resources	Involving local communities in tree nursery operations and management (in which they are able to raise indigenous seedlings suitable for the area), coupled with tree planting on their farmlands, adjacent forests and public lands to enhance tree cover in Kenya. so far, they are doing it so well and results are commendable. furthermore, I have embarked on a project to ensure that school children (primary and secondary levels) are involved and they are able to plant seedlings in their schools and nurture them to maturity	Climate change mitigation over the long term through reducing pressure on existing forest for firewood, charcoal, poles, timber among other forest products.

385	Natural resources	Capacity building of local groups in gender and integrated water resources management and using youth groups to perform (acting/theatre) in local languages, english, swahili, for communities to understand current problems and appropriate suggested solutions	environmental awareness building of the local communities to enhance their knowledge in environmental matters so as to ensure environmental conservation is done at the domestic level
386	Other (please specify)	Marketing innovations of production systems of various agricultural products (crops/livestocks/fisheries) is paramount to development in all developing countries. The last three decades have concentrated on production but most of poor farmers when they adopt the technic find that it creates a surge but through poor marketing knowledge and skills these products are wasted. The farmers are the losers because they cannot compete in the marketplace with the middlemen/women who serves as their marketers.	One of problem this innovation will address is promoting quality products that can compete with global trade issues in terms of competitiveness of developing countries status in the free trade environment.
387	Other (please specify)	Real education of the Farmers' cooperatives is also important. Some of them in the 21st century have access to cellphones but they need knowledge skills in ICT to enable them read and use the futures market information that will increase their opportunities to be very competitive in their choice of agricultural products for sales. CG Centers need to develop skills in Gender issues so that the poor farmers understand why they need to involve their wives in many of the production decisions as well as other issues. In all developing nations both male and females play significant roles in agricultural production and in some cases, the women tend the farm after planting all the way to harvesting, processing and marketing, hence, if the men are given skills without the involvement of the females, the whole process becomes skewed and causes personal/individual conflicts in farming families. However, if innovative strategies are developed that uses various social and anthropological knowledge in dealing with farmers and their families, then the scientific/technical skills from the CG centers shared with poor farmers will become	One of problem this innovation will address is promoting quality products that can compete with global trade issues in terms of competitiveness of developing countries status in the free trade environment.
388	Other (please specify)	The issue of GOVERNABILITY in all the developing nations is a key innovation. Every nation tried to develop, except in ASIA has improvement been gained, but not so in other Continents. Brazil in South America is beginning to make a difference, but others in Central America etc are still in working progress, so too in other places. So if innovations take into consideration the role of governance either in terms of Scientific Innovations or Monetary Independence the opportunities for development would be different from what it is presently	The problem that this innovation is supposed to address is TRANSPARENCY and HONESTY
389	Other (please specify)	Optimizing green water use (water from the soil profile) and water use efficiency across crops likely to be exposed to water deficits	Drought
390	Other (please specify)	Rural Information Technology supported networks	Bottom up initiatives, top down policies

391	Management	Increasing productivity through scientific innovation and discovery in an environmentally friendly approaches. CGIAR Centers have not been productive for the last 20 years due to mainly the lack of prominent scientist and long-term plans and budgets	Increasing productivity will help to alleviate poverty which is increasing due to rapid increase in population and urbanization. The right science and development can help in greatly reducing poverty. CGIAR should be smaller (fewer Centers) and much better quality scientists to focus on the real issues rather than spreading thin with no visible impact.
392	Natural resources	Use of saline and low quality water for food production.	Tolerance to high salt concentration in soils and water affecting the performance of food and forage crops
393	Natural resources	heat tolerant wheat and legumes	Climate change will affect yields of main grain crops
394	Crop breeding/pathology	3	2
395	Agronomy	Partnership for impact on poverty at scale	having significant impact at scale
396	Natural resources	Institutionalizing the research and development, conservation and dissemination of Indigenous Knowledge systems at university level	Funders are not seen an large and quick impact in a short period.
397	Management	Expansion of conservation agriculture in east Africa through eq Acacia Albida	Soil infertility, crop production
398	Agronomy	Mycoherbicide for the management of Striga applied as seed treatment. The Striga pathogen Fusarium oxysporum f.sp. strigae is highly effective and specific to control the two Striga species S. hermonthica and S. asiatica. Cereal seeds (sorghum, maize) are treated before planting and the roots are protected by the fungus from Striga attack since it grows along the rhizosphere.	Striga is a parasitic weed and the largest biotic constraint for the African cereal production. The incidence and severity of the parasite in cereals is particularly high in the savannas of West and central Africa. The annual yield losses due to Striga in the savanna regions alone account for \$7 billion and are detrimental to the food security of over 300 million African people, and consequently aggravate hunger and poverty.
399	Agronomy	Innovative insect phenology modeling and risk mapping to understand the effects of rising air temperatures caused by climate change on the future distribution and severity of major insect pests on important food crops.	Any increase in temperature, caused by climate change, coupled with a decline in rainfall will have drastic consequences on the production of crops. This will exacerbate existing vulnerabilities of the poorest people who depend on agriculture. Insect pests represent major constraints to agricultural production. Warmer temperatures will have substantial effects on these pests resulting very likely in greater frequency and severity of outbreaks, changes in abundance and distribution. Therefore, if adequate pest management strategies are not developed and made available to farmers it could, ultimately, lead to greater crop and quality losses. Pesticides are out of reach to poor subsistence farmers in Africa, who depend on natural control of pests provided by a range of natural enemies. Some of these natural enemies have been successfully naturalized in classical biocontrol programs for a wide range of pests and crops. Future pest management will very likely depend on the resilience of agricultural ecosystems and how natural enemies will control pests under changing environmental temperature

400	Agronomy	Use of insect sex pheromones in an "attract-and-kill" approach, which is a co-formulation of the pheromone with a contact insecticide, vegetable oil, UV protectors and others. Male pests are attracted by the pheromone and are killed by the contact insecticide. The formulation is very stable and reduces the male population effectively and hence the pest population and infestation. Also applicable for storage pest management. Low amounts of pheromones, ease of application and ideal for IPM, since it only affects the target pest and not natural enemies or the other fauna in agroecosystem.	It can be potentially applied to pests (e.g., Lepidoptera) for which pheromones have been identified and synthesized.
401	Agronomy	Use of Agro - industrial wastes to improve animal protein availability. This will reduce the problem of waste disposal, competition with man and monogastrics for cereals and also produce animal protein cheaper for all especially the children that are highly malnourished.	Health hazard due to accumulated waste and cheap feed for ruminant animals
402	Agronomy	Development of improved varieties of pearl millet	The need for replacement for maize silage in a competitive environment.
403	Other (please specify)	Fish post harvest processing in sub saharan Africa based on appropriate local technology.	This is to arrest the waste resulting from inadequate preservation/processing affecting food security in Africa
404	Other (please specify)	development of local fish species for culture in Africa	Improving genetic make up of local species
405	Crop breeding/pathology	Access to technical and market information: nowadays, information is power, and to be connected to the market, to generate incomes from one's work, it is essential to share information (inform what you produce or process, when, how ...) and to access information (what is needed, in quantity and quality, standards or locally). Institutional information is also essential to allow groups or farmers or retailers for instance. These hubs for information shall be sustainable at regional level and make value of ICT and traditional media.	Lack of technical, economic and institutional information, or dispersed, or not easily accessible for small scale holders in rural and urban areas. This is crucial in particular for perishable crop produce like vegetables and fruits.
406	Crop breeding/pathology	Micro-irrigation in small scale farms	Water management, input management (varieties, fertilizers), pest and disease management are all influenced by good practice of micro-irrigation. The reliability of the production and the quality of the produce are improved. Production period can be extended, and income generation increased.

407	Economics/Agricultural Economics	Develop a CGIAR consensus on uses and limitations of the Agricultural Innovation Systems Approach as 1) a diagnostic tool, 2) to design interventions where sufficient diversity of experience exists, and 3) as a way of developing self-aware and self-correcting systems. This requires the development of both information and analytical tools, learning and adaptive management, and institutional arrangements.	This would help address several problems: 1. It legitimizes the idea that innovation is the application of knowledge and technology to achieve improved performance in some technical, economic or social domain 2. It would allow the Centers to work collaboratively through the Consortium to address the range of technical, economic, policy and institutional constraints that hold back innovation; 3) It would allow the CG to pursue links (and in some cases fill gaps) to ensure that innovation does take place. (It is essential to invest adequately to maintain the CG's comparative advantage in research and research-related activities but equally necessary to ensure good linkages at the boundaries with other actors in the system. The CG's competitors for donor support are not constrained by the need to treat research as a "fugitive and cloistered virtue" (with apologies to John Milton).
408	Crop breeding/pathology	High yielding varieties or Hybrids, with resistance to major pests/ diseases	This will address the perennial problem of low crop productivity (yield per hectare)
409	Other (please specify)	Food production system consisting of low cost [appropriate technology] greenhouse operating on minimum power demands [with solar photovoltaic electricity]; low input hydroponic crop production system using local resources for root zone substrate, nutrients and water; recycling of water and plant nutrients; minimizing environmental impact from water and fertilizer run-off; while dependably producing high quality, safe, nutritious food products for single family consumption or sale in local markets; requiring education and operations support.	dependable, quality, safe, locally-grown food production effective use of local resources (water, fertilizer, energy) uneducated, illiterate readily overcome with operations support (reduce potential for failure) family smallholder farmers can benefit
410	Other (please specify)	Encouraging all activities related to Agricultural researchs and focused on food security area.	The lack of any projects adressed to this area nationally where the
411	Other biological sciences	L'adaptation du dispositif de solarisation de Murdock et Shade à l'arachide donne des résultats intéressants pour l'élimination des œufs de la bruche de l'arachide.L'utilisation de ce dispositif dans le traitement des semences d'arachide présente des avantages liés à la propreté de la méthode. La faculté germinative n'est pas significativement altérée par le traitement. Le coût du traitement est très faible et les matériaux utilisés disponibles. Cette méthode, bien conduite est une alternative intéressante à l'emploi des pesticides chimiques	En stockage, l'arachide est attaquée principalement par les insectes et les moisissures du genre Aspergillus. Les lourdes pertes subies par l'arachide sont principalement du fait d'un ravageur, Coléoptère Bruchidae du nom de Caryedon serratus (Olivier). Cette technique permet l'élimination des œufs et des adultes de la bruche de l'arachide.

412	Crop breeding/pathology	post-harvest handling, processing, or value-addition	Increasing food production without addressing the high degree of post harvest loss is not sustainable. There has been a lack of focus in this area and there is a critical need to bring new and adapt existing innovation to reduce production losses but to also add value for crops to farmers, private sector, consumers, and economic development
413	Crop breeding/pathology	Intensification of production systems, this will include output and input market development as well as sustainable land and resource management	The need for food is increasing, the new land available for cultivation is low and the land within cultivation in many places in the world is degraded or marginal. Much of crop production is still being done using traditional methods which can not meet the needs for the future. There is much know about intensification in the temperate regions of the world but not in the more tropical areas where you have mixed cropping and mixed crop-livestock systems. These are areas where poverty is greatest and population levels are high. There needs to be concerted effort made to sustainably intensify these.
414	Crop breeding/pathology	Management of biotic stresses through IPM, biocontrol, host plant resistance, diagnostics, epidemiology research, input market development, SPS, etc	One of the main impacts of climate change will to shifting environment for pest and their control. This is an area where there is a need to support the development of novel management options and see the increased role for the private sector to sustainably manage these.
415	Biotechnology	Improving maize productivity by developing and dissemination to farmers varieties tolerant/resistant to drought stress, acid soils with multiple disease resistance.	Maize productivity in East Africa and indeed sub-Saharan Africa is constrained by multiple environmental problems. The major problems are mainly drought stress, foliar and stem diseases. Others include soil acidity is a problem in the highlands and mid altitudes of East Africa. These are also agroecological areas where soil nutrients are very depleted due to continuous cropping and soil erosion. Thus the major element of this innovation would be to develop and disseminate maize lines and varieties tolerant to the above multiple stresses. The ultimate beneficiaries will be small-scale farmers and consumers of maize in eastern Africa.
416	Agronomy	improvement in crop productivity through coming up with innovations that can increase on crop yields for small scale farmers	The main problem is food insecurity caused by low yields that are attributed to low soil fertility, pests & diseases, poor varieties and drought

417	Other (please specify)	Integration of local/indigenous knowledge systems into science and conventional development Paradigms to enhance food and agricultural production without endangering the environment. In particular, ethnoveterinary practices of traditional livestock producers in poor and emerging economies could be blended with conventional veterinary practices to better cope with animal health problems of millions of pastoral producers in remote localities	Shortage and prohibitive cost of veterinary drugs and supplies. These are inaccessible to poor livestock owners especially in sub-Saharan Africa. The preponderance and diversity of local medicinal plants in the region has continued to support the large traditional livestock industry through provision of primary animal health care. This local knowledge can be stepped up and integrated into modern animal and veterinary scientific practices to produce veterinary medicaments that are readily available and affordable, without recourse to importation of veterinary drugs and supplies.
418	Agronomy	Chemical weed control for currently handweeded crops especially in Sub Saharan Africa	Painful handweeding by Mio of woman and children at a too late crop stage
419	Nutrition	Enhancing livestock productivity while decreasing detrimental effects of livestock on environment	Overcome nutritional, reproductive and health constraints of livestock. This will increase productivity and concomitantly decrease environmental pollution per unit of animal product produced.
420	Agronomy	Basic Plant population Requirement, Proper time to Sowing, Proper Seed & input application, Water requirement, Post harvest Techniques, Farmer yield contest.	Actually these are the problems and one can take the innovative action to cope these through several ways.
421	Economics/Agricultural Economics	Agriculture Microfinance: Microfinance addresses the small (micro) credit needs of families which are normally not included by mainstream rural credit institutions. Although hundreds of Microfinance Institutions (MFIs) have mushroomed globally very few of them have perfected the art of financing farmers with small loans. With Housing Microfinance already being recognised as a sub-sector of Microfinance, similarly we need to focus on Agriculture Microfinance also as a major sub-sector of Microfinance.	Just as microfinance is juxtaposed between the banker and the money lender in terms of interest rates Agriculture Microfinance will serve the agriculture finance needs of small and marginal farmers and farmers who cultivate on leased-in farm lands who normally are excluded by the bankers and exploited by money lenders. For persons who have been in the area of rural credit Agriculture Microfinance would look like another avatar of rural credit. When I got a chance to manage an MFI as its first CEO in 1998 I used my previous 18 years of experience in rural credit to include Agriculture Microfinance from day one. Over the next nine years of my service with the MFI, I had to do lots of tweaking of the loan product to make it more suitable to the poor farmer. I had also pilot tested financing of pump-sets for those category of farmers. In short, Agriculture Microfinance can address the short and medium term loan needs.
422	Institutional development	Whatever relates to organic farming. Organic farming includes all aspects, from crop production to biodiversity, from soil sciences to animal (real) welfare.	All problems, for a really sustainable development (economically, socially and ecologically)
423	Agronomy	Water Availability , Conservation of natural resources and biodiversity	
424	Livestock/veterinary	improvement of water productivity by modern water supply systems	Scarcity of water in a lot of countries

425	Economics/Agricultural Economics	farmers and the rural poors generally need be mobilised to form viable groups like the cooperatives and be educated too. These group need trainings on how to add value to the so many wasted resources in their countries. For instance, if they are trained on how to enhance the establishment of small-holder enterprises for Shea-butter extraction and packaging in the Savanna.	Presently, the shea-butter fruit is being processed under a wasteful traditional method. As such the fruit only serves for domestic purposes in Africa, yet in other countries like China, the fruit is better processed and packaged and it serves many purposes.
426	Other (please specify)	a) Linking agricultural development with improving human health; e.g ensuring good mosquito control to reduce incidence of malaria so that rural populations can work more effectively on their crops. b) Improving crop protection/ IPM to allow more production.	Significant crop loss due to problems of Insect pests and vectors of disease.
427	Natural resources	Natural Resources and Environment	Water scarcity, water quality deterioration, and land degradation Productivity enhancement from existing resources
428	Crop breeding/pathology	Scope for devloping superior products with high yields and resistant to biotic and abiotic stresses (especially drought) in crops like rice, corn	Alleviate human hunger, Increase productivity
429	Economics/Agricultural Economics	Building capacity of farmer leaders to source information, markets and thier ability to articulate thier needs to government staff and other stakeholders. This was done by establishing a platform with different stakeholders in the intervention community to ensure that community based organizations and other local organizations that have longer term interests and who are well rooted in the community should be part and parcel of the initiative for sustainability issues.	Inability of farmers to maintain links with markets when the lead NGO leaves a community.
430	Other (please specify)	Identifying technologies/management practices in low productive smallholder agriculture that can simultaneously yield multiple benefits of which increased productivity is one. For example conservation tillage increasing soil moisture holding capacity, carbon storage, erosion control and yields. Identifying practices that aim to deal with surprises and variability	Increasing food security while at the same time sustaining or even improving ecosystem services, and ealing with a very variable environment.
431	Biotechnology	Developing diseases and pests resistant banana and plantain varieties (using both convential and biotechnological tools)	Livelihood of millions of farmars is effected due to disease and pests of banana and plantain, one of the staple crop in Sub-saharan Africa. Disease and pest resistant varieties can solve this problem.
432	Other social sciences	Changing electricity tariff policies across India may be the best way of managing the anarchic groundwater economy the country has come to support. Research at IWMI shows that electricity policies may as well be the only lever for regulating groundwater economy of India.	Groundwater irrigation has become the lifeline of irrigated agriculture in South Asia and millions of people depend directly or indierctly on this resource for sustaining their livelihoods. However, in many places in the region, uncontrolled use of groundwater is leading to unsustainable outcomes. But, given the way the groundwater economy of the region is organised, it is nearly impossible to directly regulate groundwater pumping. Hence the importance of indirect regulation through electricity reforms.

433	Natural resources	Help SSA economic regions to set up a Common Agricultural Policy	Develop one internal agricultural market, observe a certain degree of protection at the joint outer border, do away with between-country tariffs inside the CAP area, and secure a certain, desirable degree of food sovereignty inside the area (also to stave off the sort of shocks we have seen during the 2008 food crisis).
434	Natural resources	Raise efficiency in production and consumption chains	When regarding agriculture as a chain of processes, there is an immense potential for efficiency gains. This has been highlighted many times by a.o. Vaclav Smil, and protagonists of Life Cycle Analysis. Reduce, Reuse, Recycle should be practised throughout the world.
435	Natural resources	Breeding for N-fixation in non-leguminous species	Soils are low in N; N fertilizers are energy-intensive, and too expensive in times of high fossil fuel prices
436	Agronomy	Truely integrated approach of research for development, that tackles local problems with the support of global knowledge pool. Research for development resources should not be used for research only aimed at filling the global knowledge pool.	Provide appropriate answer to support development in all its local expressions
437	Biotechnology	1. Research into the manipulation of meiotic recombination. Meiosis is the fundamental process which leads to the exchange of parental traits in the off-spring. All conventional crop breeding is dependent upon this process and manipulation to prevent (clonal seed), enhance (increased exchange to produce desirable gene combinations more rapidly) or modify the location of recombinational exchange (2/3 of wheat chromosomes are recombinationally almost inactive and genes in these regions are hardly ever exchanged) would revolutionise crop breeding. This is as relevant to major crops as to minor crops. Homologous recombination, which is the process underlying meiotic recombination, is also relevant for transgenic approaches, with the development of methods to target genes specific points in the genome potentially making GMOs more acceptable, biosafer and also representing a very important scientific tool for crop science	1. Current limitations to the ease with which new combinations of traits are made or important ones preserved. Gene targeting would permit precise modifications to genes, making the whole process less haphazard.
438	Other (please specify)	Organic viticulture concept effect of climate changes on distribution of horticultural biodiversity underutilized fruits utilization and conservation	Non acceptance of farmers methodology adoption value addition products

439	Fisheries	To develop concepts, methods and sustainability indicators that will catalyze a fundamental change in small-scale fisheries (SSF) management in the developing world. This will require testing and refining methods for integrated assessment of SSF. It will then be necessary to build on these assessment tools to test and learn lessons from a range of alternative management interventions in a range of social and ecological settings. It will also require processing and development and testing of a range of livelihood diversification options that can be used to reduce dependence on SSF in those cases where this is required to reduce vulnerability and increase resilience.	Conventional fisheries management has largely failed to ensure sustainable fishery systems and livelihoods for the millions of people dependent on small-scale fisheries (SSF) in the developing world. Management at inappropriate scales, inappropriate property rights, inability to control fishing capacity, poor governance and other causes have conspired to block these fisheries from achieving their potential. Improving management of these fisheries requires a radical rethink of established theory, approaches, definitions of sustainability, and indicators of management performance. It also requires substantial improvement in post harvest handling to reduce spoilage and increase supplies.
440	Fisheries	Increasing the development of small and medium aquaculture enterprises. The experience of aquaculture development has shown that fish production only begins to have an impact on national fish supply where conditions foster the emergence of small and medium aquaculture enterprises. Where input and output markets are strong and the required technologies and expertise have been available, entrepreneurial farmers have seized the opportunity to specialize in fish production. To build upon these successes greater investment is needed to continue to develop and disseminate improved pond production technologies, together with improved seed and feed. Similarly investments to improve markets and remove barriers, together with knowledge support and capacity building, and development of the necessary regulatory frameworks and other institutional mechanisms, are required.	For aquaculture to grow sustainably and meets its potential for food and income, we need improved seed and feed technologies and dissemination mechanisms. We must also improve water and land use efficiency and minimize wastes.
441	Fisheries	To improve storage, processing and utilization of fish caught in small-scale fisheries in Africa. Disseminating approaches much more widely will benefit the majority of microenterprises in fisheries and fish consumers through reduced losses, improve food safety, and improved nutritional quality of food	Over 25% of fish caught and landed in Africa never makes it to the mouths of consumers. It remains unsold, it spoils due to poor handling and transportation, its nutritional benefits are diminished by poor processing, it is contaminated by bacterial and fungal infections, or it is eaten by insect pests.
442	Other biological sciences	Farmer Field School Farmer Field School (FFS) is a unique approach to educate farmers in the skills necessary for a modern, market-oriented economy.	FFS focuses on Farmer education which is a trans-sectoral theme that addresses several key development issues: *Poverty alleviation & sustainable livelihoods *Protection of the environment & natural resources *Food safety, safe trade & international treaties *Health & safety at work *Good governance, self-reliance & efficiency of state institutions *Education & gender

443	Agronomy	1. Targeted breeding- with both traditional breeding (including biotechnological tools) and genetically modified crops could help reverse the decline in yield growth by increasing drought, heat tolerance, salinity tolerance, nutrient and water use efficient, pest and disease resistant crops.	Mainly to cope up with increase in food/feed demand with growing population and climate change/variability
444	Agronomy	2. Integrated animal production systems involving small holders	Mainly to cope up with increase in food/feed demand with growing population and climate change/variability
445	Agronomy	3. Sustainable Farming methods such as composting, agroforestry, and increased legume crops/pastures in the systems; integrated pests and diseases management; improved soil health	Mainly to cope up with increase in food/feed demand with growing population and climate change/variability
446	Agronomy	4. Smarter irrigation could increase yields on the 80% of crop lands that is currently not irrigated, with water-saving techniques such as soil-moisture monitoring and trickle/drip irrigation. No-tillage techniques; mulching and cover crops.	Mainly to cope up with increase in food/feed demand with growing population and climate change/variability
447	Agronomy	5. System based adaptation strategies to climate change/variability	Mainly to cope up with increase in food/feed demand with growing population and climate change/variability
448	Agronomy	Development of GMO crops	Resistance to diseases, insects Cultivation in stressed conditions : drought, flooding, salinity
449	Agronomy	The development and implementation of eco-efficient mixed farming systems, in most cases involving annual crops, perennial crops, livestock, and, in many cases, forest management (for environmental services, NTFPs, and wood) that are well adapted to the biophysical and socioeconomic conditions, with strong links to markets (at least for some components) and with adequate biological and economic resilience to minimise risk, especially for the marginalised poor in upland areas. Sounds obvious, but there is great scope for much greater adoption.	Moving away from prescriptive technologies, that rarely fit all the biological, socioeconomic, and political constraints (especially in the highly heterogeneous uplands), towards adaptive strategies in which the adaptation and adoption phases occur together and are part of the scaling up process, and in which markets are part of the design and implementation.
450	Agronomy	Related to the previous Key Opportunity are important technological breakthroughs. One example of which is improved cassava varieties. The adoption of improved cassava varieties and agronomy in SE Asia has had significant impact on the livelihoods of smallholder farmers. The potential for further gains in these countries, from breeding, agronomy, improved processing and waste management, and improved marketing are very large. In the areas where these improvements have not been adopted (or only to a much lesser degree) the potential for gains are huge!	Low and unstable yields of cassava that does not (necessarily) match the market demands, be they for human food, animal feed, or the increasing range of processing uses for cassava. The vast majority of cassava is grown in very low yielding systems.

451	Agronomy	Related to the first example of a Key Opportunity another important technological breakthrough is the development of improved tropical and subtropical forages and improved understanding of necessary changes in the smallholder livestock management systems. With this combination of germplasm and production/management systems there is great potential for improved smallholder livestock management, with the associated benefits to farming systems in manure, the "insurance" value of livestock, and the value of a farming system component that can be a ready transitional pathway to more sustainable farming systems.	Low productivity, low reproduction, and high disease and mortality incidence of many smallholder livestock systems, much of it based on very low quantity and quality feeding regimes, with limited market incentives for improvement.
452	Biotechnology	Understanding plant water relations under conditions of water stress and high temperature by integrating genomic and physiological approaches	Understanding how plants (in general) mitigate against water stress will facilitate targeted approaches to developing varieties that can maintain yield under stress conditions.
453	Other biological sciences	Enhancing the nutritive quality of the predominantly starchy African diet by producing an array of affordable and convenient Legume Fortified Staples (LFS)	This innovation is to address unemployment, malnutrition and disease.
454	Forestry	Harmonisation of timber and non-timber resource production for sustainable forest management	Many important factors ensuring that production forests will be retained over time are largely political and socio-economic. However, this does not imply that silvicultural or management research is no longer needed. The last decade highlighted the concerted effort towards developing and implementing research on reduced impact logging (RIL) with some encouraging anecdotal reports of adoption. Yet RIL approaches do not sufficiently address broader aspects of ecology and silviculture. Prior research moved the agenda forward by concluding that RIL was necessary but not sufficient for attaining sustainable forest management. Thus to move "beyond RIL" requires a silvicultural regime that avoids local extinction of commercial timber species at the stand level, moves beyond "minimum felling diameter" rules, seeks to optimize/harmonize the extraction of timber compared with extraction of non-timber forest products (including bushmeat), and attempts to integrate biodiversity considerations and other environmental or cultural services in management prescriptions.

455	Forestry	Identification of efficient of public policies and market-based instruments to improve the social and environmental footprints of production forest harvesting	Public policies or market-based instruments implemented in tropical countries have an important impact on the evolution and dynamics of forest resources, on the sharing of the benefits resulting from their uses and on the collective capacity of societies to manage these resources and benefits. Designing appropriate policies or instruments that are applicable and effective is therefore a prerequisite for achieving SFM. This is unfortunately more the exception than the norm in the forestry sector in developing countries, where forest regulations are frequently violated. The innovation's purpose is therefore to address the cycle of public policy development in order to provide guidance to policy makers on the design of better forest and forestry policy regimes that will be implemented and accepted. In particular, the research should identify effective measures for addressing illegal logging through analysis of the determinants of illegal logging practices, as well as potential measures to verify legality. The recent global financial crisis is creating <u>new operating conditions for both governments, NGOs a</u>
456	Crop breeding/pathology	Storage and post-harvest processing of produce sweetpotato. fresh sweetpotato is available in about 3 to 4 months in a year due to prolonged dry season in Malawi. Yet orange fleshed sweetpotato are high in beta-carotene, a precursor for vitamin A whose deficiency is an important public health in Malawi. Storage facilities to prolong availability of fresh roots and processing technologies to retain beta-carotene in dried/processed roots will enhance availability and therefore more access to the vitamin A precursor.	The aim is to extend availability over time of produce through storage and secondly to process surplus during peak times where the prices become too low resulting from oversupply at markets. Storage and processing would therefore control prices of important commodities at markets as the fluctuation is too high due to shortage at some point and oversupply at another time.
457	Crop breeding/pathology	Tomato processing	Seasonal supply and price fluctuations

458	Other biological sciences	The CGIAR change process provides an opportunity to implement an integrated, holistic, ecosystem approach to agrobiodiversity conservation and use – embracing the genetic resources of microbes, fish, livestock, forest trees and crops. Aside from its solid scientific merits, this approach has wide appeal and applicability to NARS partners in all regions, who share production constraints and environmental protection challenges. The possibilities for upscaling and transfer between regions are considerable. The proposed approach builds on current partnerships and ecoregional experiences within the CGIAR, as well as presenting opportunities for engaging other national and international organizations and for integrating partnerships across the different sectors of genetic resources. This approach follows upon years of successful collaboration--collaboration that now needs to be lifted to a higher level to respond effectively to the new challenges before us. The in-trust germplasm collections held by the Centres represent some of the most vitally important global public goods that the CGIAR currently	The threats that currently imperil human wellbeing and ecological sustainability have been likened to a perfect storm – a scenario in which the combination of negative forces will, if allowed to develop, lead to an irreversible deterioration of the very systems that sustain life on this planet. Yet the basic knowledge to turn back the tide - and the means to do so - are at hand. What is needed is the will to make a bold and creative investment in the science, the people, and the genetic resources that together can chart a future in which agriculture is sustainable. The secure conservation and optimal use of agrobiodiversity – the building blocks of agricultural production and the basis for adaptation to change – has long been the concern of the CGIAR. It is clear that we must develop a state of readiness, not only to confront imminent threats, but also to take advantage of future, as yet undefined, technological and political developments. In brief, the antidote to the perfect storm of imminent threats to global food security is a convergence of ideas, materials
459	Biotechnology	Resequencing combined with genetic analysis of crop diversity panels	A host of challenges in production agriculture
460	Management	Landscape management for a full range of development and environment services	Improved and sustainable livelihoods
461	Fisheries	Mainstream fisheries-related livelihoods into development and climate change adaptation processes and policies	The fact that when organisations think of food and livelihood security they think only of agriculture and overlook the massive contribution of freshwater and marine capture fisheries to livelihoods in the poorest countries of the world
462	Livelihoods	Post-harvest processing and value addition: Use of low cost drying technologies. Farm gate intermediate process technology. Double packaging system in food handling and distribution.	Drying will reduce postharvest losses. By preserving food, shelf life will be ascertain, thereby giving opportunity to farmers, women, youth to be gainfully employed (poverty, employment, nutrition security) Farm gate processing is form of adding value to farm produce thereby increase profit, employment and promote group dynamism as well as cooperative sustainability Double packaging will solve problem of hygiene, contamination, increase shelf life, open up more markets.
463	Other (please specify)	Rangeland intensification and reforestation	decades or centuries of dryland degradation/overgrazing/firewood looting

464	Biotechnology	Improving the quality of symbiotic nitrogen fixation in cultivated legumes. It is generally asserted that the domestication of legumes has reduced the efficiency of symbiotic nitrogen fixation, and/or that growth of legumes in marginal environments reduces symbiotic efficiency. Focused efforts in breeding and biotechnology have the potential to remedy these situations. Such efforts are especially important in today's world, where agricultural nitrogen in developed countries comes from the energy of fossil fuels -- economic realities in the developing world preclude the widespread use of industrial nitrogen. Moreover, there is an increasing recognition of the need to develop sustainable practices, both in the developed and in the developing world.	Inadequate access to fertilizer; Marginal soils; Sustainable agriculture.
465	Crop breeding/pathology	Productivity: yield and yield protection	Demand for increased food supply
466	Crop breeding/pathology	Nutrition as central goal for plant breeding	Yield (and/or breaking the yield barrier, see Science Forum) is still considered as main goal for breeders, but where yield increase is most needed (SSA, SA) this depends on access to practices, resources, markets, etc. not breeding itself.
467	Natural resources	Widespread policy emphasis on local (community-based) natural resource management, along with governmental financial, logistical and capacity-building dedication to this initiative.	Failure of top-down management, along with a lack of local capacity and empowerment for effective natural resource management
468	Institutional development	Effective research for development models	Bring together necessary elements for impact. Elements like leadership, technologies, key stakeholders
469	Economics/Agricultural Economics	Regional trade in Africa will expand if all parties in the respective countries considerably reduce the across-the-borders constraints that characterise trade with their neighbours.	This innovation is supposed to address the problem of restricted movement of goods and services in a region, thus discouraging regional investors and undermining economic growth.
470	Natural resources	Precision Conservation Agriculture - a modification of the CA paradigm that focuses on the agronomy and precision use of available soil fertility amendments, with mulching and rotations coming second place once the essentials are adopted/adapted.	Timeliness of planting in semi-arid areas where rainfall is erratic Concentration of available nutrients in nutrient stressed environments Improve returns to labour input per unit area Reduce risk of crop failure and improve returns on investments
471	Natural resources	Ammonium nitrate tablets that facilitate the use of microdoses of fertilizer and aid in precision application. Also tableting improves storage of the fertilizer	Helps target the usage of small quantities of fertilizer Precision application rather than broadcasting
472	Economics/Agricultural Economics	Legume based rotations to enhance fertilizer use efficiency	Low productivity consequent on high purchased input prices
473	Biotechnology	Breeding a very early maize variety (that can take 2 months to mature).	It will provide food early in the season to millions of people

474	Fisheries	Use of locally available raw materials (that could be described as agricultural by-product, example, animal droppings, spent brewer's waste) or plant produce less commonly consumed by human (example cotton seeds, palm kernel meal, etc.), in the production of fish feeds.	Feeding costs represents the most expensive operation in any fish production venture (aquaculture), high cost of groundnut cake and fishmeal has also compounded this problem. This innovation seeks to produce fish feed at a much reduced cost for rural fish farmers who do not have access to the usually expensive imported fish feeds. This innovation will also reduce waste in the environment
475	Agronomy	Building the capacity of the poor to demand knowledge, services and feel comfortable to establish partnerships with organisations	To address the problem of research provision still being supply led
476	Agronomy	Increase the yield potential of rice through investing in three major directions: (i) increase the yield potential of rice inbreds through fine-tuned conventional breeding, (ii) increase yield heterosis in tropical rice hybrids, and (iii) re-engineer photosynthesis to create a C4 rice with 30-50% higher yield potential.	Food security and poverty. Breeders have had little success in increasing the yield potential since the major breakthroughs were made during the early stages of the Green Revolution. Another even small increase in yield potential is needed and would have huge impact. No other intervention is likely to come close to that. Higher-yielding rice would also increase the use efficiency of critical natural resources.
477	Crop breeding/pathology	First, IRRI needs to place primary research effort on improved development of hybrid rice varieties. The IRRI hybrids compared to the Chinese are not comparable, but increase cooperation with Chinese researchers and institutes could change that. Second, IRRI needs to implement a strategy or program that allows poor farmers access to the elite hybrids.	increased grain yield and improved grain quality across different environments
478	Other (please specify)	Both rural and urban vegetable farmers in most communities in sub-Saharan Africa experience lots of waste of their output and low income during harvest periods. This is mainly due to lack of technology and skill for preservation and storage for this vital component of human daily diet. A development of a supply-chain innovation between producers and processors could go a long way to salvage this situation	This innovation will reduce post-harvest waste, increase income and enhance increase production, access and consumption of vegetables among the poor. It will also create jobs for many local individuals
479	Crop breeding/pathology	Genetic transformation of banana for resistance to banana xanthomonas wilt being done by IITA and NARO, Uganda is expected to address the disease which has spread to all countries in the East and Central Africa region. Food and income of over 20 million people is threatened by the destruction of bananas by the disease	Stop spread of banana xanthomonas wilt

480	Agronomy	Increasing crop productivity and reducing negative environmental and human health impacts through adaptation of precision agriculture to small scale farmers. Precision agriculture uses satellite images to identify health status of crops and precision devices for application of agrochemicals.	This innovation helps to reduce current crop losses due to pests, diseases and weeds and thus contributes to increasing food security without expanding agricultural production to new land. It also helps to reduce environmental contamination through inappropriate application of agrochemicals and reduces the human health risks derived from pesticide application with inadequate equipment and products. It also avoids contamination of soils, waterways and agricultural produces and increases marketability of the latter.
481	Agronomy	Increasing food and feed safety and increasing exportability of agricultural produces through reduction of contaminations with mycotoxins by biological control of the toxin producing fungi and rapid cost-effective tools for mycotoxin detection.	Toxins produced by fungi make food and feed unfit for consumption. If contaminated food and feed are consumed on a regular basis as it is the case in most tropical countries serious health implications (cancer, retarded growth, malformations) are observed. See the 2004 outbreak of acute aflotoxicosis in Kenya which affected several hundred persons and had a mortality of 39%. Stringent food safety regulations like in the EU pose serious exports hurdles to mycotoxin prone produces (mainly cereals, legumes, dried fruits and nuts) from countries with high incidences and poor control mechanisms in place. This deprives small farmers and countries from vital income.
482	Other social sciences	This may sound odd, but in the broadest sense "policy change"	Research papers often end with "Policies should be put in place so that wonderful idea X can be adopted". But few people have any idea how policy in fact changes- especially outside of their own country- or how and when change can be influenced. Without knowing the likelihood of policy change, it is impossible to know the expected return to research. Now we typically assume that someone will change the policy. But this is not a great assumption.
483	Biotechnology	YOUTH ENGAGEMENT IN ARD	CREATING SPACE FOR YOUTH IN ARD
484	Economics/Agricultural Economics	value chains for exports	institutional/organizational/enforcement issues
485	Economics/Agricultural Economics	expert information for farmers on prices, weather, crop advisory	insufficient information to make correct decisions, especially on new crops

486	Other (please specify)	Improvement in the storage of fruits and vegetables in sub-saharan Africa.	<p>1. Proper storage of fruits and vegetables will enhance the availability of these produce all the year round. Currently in Africa (especially in Nigeria) the technology for the proper preservation of these produce are not available to resource-poor farmers and this has resulted into mass wastage of produce few weeks after harvest.</p> <p>2. Proper storage of produce can also help to improve nutrition of Africans especially the rural farmers.</p> <p>3. Also access to technology on proper storage and establishment of machineries in strategic places close to the rural farmers can result into creating jobs and poverty alleviation.</p> <p>4. Consumers will have access to fresh healthy fruits and vegetables months after the produce are no longer fruiting in the field</p>
487	Livelihoods	Strong local and national institutions, pro-poor policies, gender sensitive agenda - equitable and secure access to natural resources (including knowledge), reducing vulnerability to rapid and beyond-local changes that not only curtail agricultural productivity but reduces all forms of meaningful livelihood strategies among the rural poor.	Poverty cycle among farmers. Poverty is the problem, and the key obstacle in improving smallholder livelihoods. Knowledge (learning), building pro-poor institutions and providing gendered opportunities are minimums that need to be addressed if we hope to sustain poverty reducing strategies and success
488	Institutional development	Functional regulatory systems for biosafety and food safety established in majority of developing countries	Diffusion of promising, pro-poor genetically improved food crops (incl. maize, cassava, cowpea, banana) is still very slow and often stuck at field trial stages. Efficient regulatory policies will accelerate international technology transfer and farmers' adoption.
489	Biotechnology	Research and Development of plants used as food and as medicines as they face extinction due to double roles.	70-80% of people in the world are turning to herbal remedies in the bid to go back to nature. The plants are mostly tropical and little research is carried out on them in the areas of safety, conservation and sustainable utilisation.
490	Forestry	The use of microorganisms (Mycorrhiza and Rhizobia) as a bio fertilizer for increasing crop yield in africa.	The high cost of inorganic fertilizers has led to low application and low crop yield. Use of bio fertilizer can not only increase the inorganic fertilizer use efficiency but can also lead to increased crop yield and less environmental degradation.
491	Forestry	Use of soil microorganisms as biofertilisers for reduced environmental degradation and increased crop yields.	Many soils in the tropics are acidic in nature and farmers dont have money to buy inorganic fertilizer. Use of mycorrhiza and rhizobium can increase recovery rate of inorganic fertilizer and increase crop yields.

492	Other (please specify)	Water management for multiple use (so-called multiple use services). This is an approach for planning and management of water services for multiple purposes, both domestic and small-scale productive use of water.	On the one hand, it is supposed to address the need to provide more people in the world with access to domestic water supply. On the other hand, homestead-based production of vegetables and other food, could hugely benefit people's livelihoods. Access to irrigation water at this small-scale and low level is an area largely overseen in water engineering and water resources management.
493	Other (please specify)	Local Integrated Water Resources Management approaches	Although there is a wide recognition for the need to manage water resources in a more integrated manner, under the umbrella of Integrated Water Resources Management (IWRM), many of the practical implementation efforts have remained at the higher levels of scale of big river basins and national institutional reforms. There is a big potential for more integrated management of water resources at the lower local levels such as communities or smaller sub-catchments. At this level more synergy can be obtained in investments in all types of water infrastructure (for irrigation, cattle, domestic uses, etc) and management of available resources. This calls for further innovation in application of IWRM at the local level.
494	Crop breeding/pathology	Better crops for the ever dynamic climate changes. Crops that will be high yielders, less pests and disease attacks, harnessing biodiversity to explore under utilized crops for use as alternative foods. Improve production systems especially the sustainable agriculture commonly practiced in Kenya. Improving the agricultural policy frameworks, that allow adoption of agricultural innovations and at the same time safeguard bio safety issues.	In General food security and food sufficiency
495	Health/environmental health	Linking integrated pest management for crop protection to integrated vector management for human vector-borne disease transmission reduction. A comprehensive consideration of foodwebs, disease transmission dynamics in specific agro-ecosystems should lead to intervention packages aimed at optimally and sustainably managing pests while at the same time reducing the human disease burden to acceptable and feasible levels.	The barriers to completely combine pest and vector management are institutional (the intersectoral gap between health and agriculture), technical (more needs to be known of how vector and pest ecologies overlap and interrelate) and related to training (the boxed-in training of professionals implies that those trained as agricultural entomologists never actually interact with medical entomologists). A lot of the combined interventions will be non-chemical in nature, with a focus on improved water management in irrigated areas.

496	Health/environmental health	Incorporating health into agricultural extension programmes and into farmer field schools. Through their management of the environment, farmers influence environmental determinants of health. Yet in their choices between agricultural practices they lack the capacity to take human health into account. This is a research opportunity on farmer education that can greatly enhance the health status of farming communities and their productivity.	There is an institutional gap between the ag extension provided to farmers (which ideally is a bi-directional link between farmers and the ag research community) and the public health extension which comes in the form of services. There is a lack of awareness in farming communities about the health dimensions of ag activities and about the opportunities to improve community health through better practice. Ag extension workers are reluctant to take health messages on board because they cannot judge their quality and fear wrong messages may undermine their overall credibility with farmers.
497	Management	Increase in the Productivity of the small holder Farmer in the Gangetic Plain of North India	The decreased return on investment on land by the small holder farmer
498	Crop breeding/pathology	Legislation for introducing crops to non conventional areas based on the water requirements.	It will address the uncalled for water resource crunch for example that has occurred in north western India by introducing intensive rice cultivation
499	Crop breeding/pathology	Biointensification of the intensively cultivated soils with antagonistic microflora	The soil borne pathogens, availability of soil nutrients, soil health and soil texture reduced use of pesticides as it is an environment friendly technology for sustaining production, and quality produce.
500	Economics/Agricultural Economics	1. Significant technological change	Lack of appropriate technologies, lack of mechanisms for delivery of technologies, poor institutional arrangements and poor governance systems
501	Economics/Agricultural Economics	2. Institutions for organizing smallholders	Lack of appropriate technologies, lack of mechanisms for delivery of technologies, poor institutional arrangements and poor governance systems
502	Economics/Agricultural Economics	3. Policies	Lack of appropriate technologies, lack of mechanisms for delivery of technologies, poor institutional arrangements and poor governance systems
503	Economics/Agricultural Economics	Natural resource management, especially improving soil fertility, water conservation and utilization. Institutional arrangements for smallholders to make them viable	
504	Economics/Agricultural Economics	Biotechnology for those research which had poor probability of success	
505	Economics/Agricultural Economics	Improved policies for sharing benefits with farmers and consumers	
506	Natural resources	Implementing System of Rice Intensification(SRI) and Precision farming technologies/ innovations would alleviate poverty and hunger of millions of poor people. Water Saving through water management practices ie., Drip Irrigation, Drip fertigation and sprinkler irrigation.	Increase of Yield and quality of crop produce.
507	Other (please specify)	Mini-rice combine for wetland fields	High in-field losses when harvesting and threshing rice in small plots of Asia
508	Agronomy	1.1 Production, productivity and technology	1. Poverty 2. Decrease in Biodiversity 3. Climate Change

509	Agronomy	1.2 Natural Resources and Environment	1. Poverty 2. Decrease in Biodiversity 3. Climate Change
510	Biotechnology	Genomics-based crop and livestock breeding. Second-generation DNA sequencing technologies have dramatically lower down the cost of genomic research, making it possible to fully unveil the allelic variation of all important agricultural species. Association of this unprecedented resource with existing and coming phenotyping data will lead to defined relationship between genes and traits, a key knowledge for breeders to produce better versions of plants and animals.	1) Providing a versatile tool to improve breeding efficiency 2) A clear understanding of natural gene pool that are most locked to breeders
511	Biotechnology	C4 rice. C3 is the photosynthesis pathway that are used by most plant species such as rice, wheat, and potato. C4 is a more efficient way of plants to fix carbon, adopted by maize, sugarcane, and some other species. It was reported that if C4 were engineered into rice, the yield would increase 50%. As C4 plants also have better tolerance to heat and drought, they are likely better adapt to climate change. Increase of C4 acreage also potentially can mitigate the increase of CO2.	1) Food security 2) climate change 3) better water use efficiency
512	Biotechnology	Broad use of genetic engineering to tackle a wide range of production, pest and disease management issues.	Increase rates of genetic gain in breeding programs. Improve flexibility and responsiveness of breeding.
513	Biotechnology	Marker assisted selection in breeding programs	Speed and efficiency of animal and plant breeding programs.
514	Other (please specify)	Water for growing crops will be in short supply for many arid and semi arid countries in the near future due to the exploitation of population. Currently we are mining our resources (ground water table declines) or making it salty (Pakistan)	More crop per drop. We need to produce more with the available water
515	Livestock/veterinary	Local Food Systems - improving the productivity and utility of local/indigenous crops and livestock that are key to the livelihoods of billions of poor communities and families globally	Food security, food sovereignty and healthy living; improving the productivity and utilization of local or indigenous genetic resources in ecologically sound ways will provide the right incentive for their conservation and protect biodiversity.
516	Other (please specify)	institutional incentives to maintain crop diversity. A recent program on funding communities to maintain growing their cultural crops is an example.	to reduce dependency on cash crops and increase resilience and improve self-sufficiency
517	Livelihoods	Further applying tested stakeholder participatory methods and supporting tools (predominantly used at farm scale to date) - however, we still need to link these systems approaches better with policy domain in a meaningful way. The key opportunity of innovation is developing the boundary-spanning people and institutions to effect appropriate responses to multiple drivers. Critical elements include: avenues for stakeholder recognition and publication, clear career paths and reward systems for boundary spanners. Subsidiary innovation is around the methods for linking the farm scale with the policy scale.	Need better job of connecting (a) real world decision making with underlying farming systems expertise accumulated, and (b) broader policy decisions. I.e. making better decisions drawing on science and integrating decision making through multiple scales.

518	Livelihoods	Greater integration of crop and livestock production as a response to key drivers (e.g. climate change, rapidly rising food prices, global financial downturns), supported by the use of stakeholder participatory methodology and tools.	Numerous examples exist of agricultural systems that adopt a narrow vision of either cropping or animal husbandry opportunities, regularly seeing little potential for integration of the two practices either spatially or temporally. One example is the lack of crop/livestock production undertaken during the rabi season in Bangladesh.
519	Livelihoods	The key opportunity lies in building adaptive capacity within rural livelihood systems to reduce vulnerability to a broad range of drivers (including rapidly rising food prices, climate change, global financial downturns ...) through research techniques currently being developed and applied in both developing and developed countries across the world.	Understanding the vulnerability of individual/livelihood units/communities and identifying effective strategies for building adaptive capacity requires explicit knowledge of the multiple facets of livelihood activities, interactions and key drivers of change for stakeholders. A pre-condition for this is stakeholder participatory engagement. In many cases where a livelihoods approach has failed to be taken it has resulted in R&D outputs that are characterised by (a) being sectoral in nature and failing to progress integrated solutions; (b) a failure to be taken up by stakeholders due to inadequate consideration of context specific constraints and barriers to adoption; (c) non sustainability beyond the life of the project funding; (d) mal-adaptive.
520	Biotechnology	Provision of clean disease-free planting material of niche crops for which the country has a comparative advantage for the production of value-added products.	Small Farmers problem is gluts from growing commodity crops but they cannot expand into new crops because of lack of clean planting material and because the market lacks knowledge of the crop (yield potential and bioactives).
521	Natural resources	Water availability will determine our ability to support food production in future to meet increasing population demand in an environment of climate change. Current water resource management is clearly inadequate to cope with the flexibility necessary to satisfy multiple and changing demands (agriculture, urban, industry, environment) from a single source (freshwater). A framework that involves multiple water sources and quality (blue water, recycle water, urban runoff, etc) and multiple demands will be necessary. At present, existing water management models in most water stressed river basins around the world are obsolete and unable to cope with these challenges.	Water scarcity under competing uses including agriculture, urban, environmental demand.

522	Economics/Agricultural Economics	The single biggest missed opportunity in global ag. R&D has been limited CGIAR and other public-sector support for hybrid maize and other cereals in Africa; it was thought that low-income farmers couldn't buy seeds every year, and that open-pollinated seed systems could deliver similar yield gains, but wherever hybridization has been seriously pursued (e.g. in India) it has allowed much faster productivity growth than is possible with open-pollinated systems alone. No other single agricultural innovation even comes close to hybridization for its power, precision and sustainability.	Hybridization allows faster, more precise crop improvement to achieve almost any set of target characteristics. It then offers a robust path to dissemination, as parent lines are given to seed houses that contract with farmers for multiplication and sale of a uniform, trustworthy product. This in turn makes it worthwhile for seed companies to invest in their own ability to multiply and distribute new products, raising the sector's capacity to develop and spread future crop improvements. Trying to do food-crop improvement without hybrid cereals would be like trying to do road transportation without rubber tires. It's possible, just really slow and limited.
523	Economics/Agricultural Economics	A "prize rewards" program could pay innovators, including NARS and CG centers as well as private firms and NGOs, cash awards in proportion to measured impacts of their innovations after adoption.	Paying prize rewards would overcome the lack of credible information about impacts. Like justice, R&D impacts must be seen to be achieved. Offering prize rewards would induce innovators to document their achievements and submit the resulting data to the prize authority, whose awards would showcase successes in proportion to their value created among African farmers. Award-winning techniques would then attract even more adopters, and investors prepared to replicate and scale up those achievements.
524	Natural resources	Aquifer Storage and Recovery	Water storage in changing climate, reduce evapotranspiration, preservation of high value soils for food production instead of building dams and flooding these high value soils.
525	Agronomy	Efficient use and conservation of natural resources for food production to improve productivity, sustainability and resilience, while generating multiple ecosystem services (e.g. C sequestration, conservation of biodiversity, reduction of green house gases emission, soil water storage, groundwater amount and quality, firewood for house consumption)	Vulnerability on rural hillsides in the sub-humid tropics.
526	Other (please specify)	This involves post-harvest processing and value addition .These include improvements in storage, processing and utilization to reduce losses, improve food safety, nutritional quality of food, or improve the efficiency of processing , including both homestead and commercial processes	Mainly Poverty and and LOW Food Productivity

527	Other social sciences	Increasing the participatory nature of research on which projects are based, project design processes, project implementation, project monitoring and evaluation.	Many research and development projects end up primarily benefiting the initiating agencies and the institutions and people hired to implement and evaluate them rather than benefiting the so-called "target" (it always sounds like a bombing raid) population. This is in part because the people and agencies involved often know little, if anything, about local biophysical or socio-economic conditions and use their own (often erroneous) assumptions rather than work with local people to get accurate information.
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