People-centered Information Management & Surveillance System (PIMSS) to address the climate-change induced vulnerability on Food Sovereignty and Agriculture

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People-centered Information Management & Surveillance System (PIMSS) to address the climate-change induced vulnerability on Food Sovereignty and Agriculture:

The Prospects of APNFS Facilitation at Asia-Pacific and National level

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1. Introduction

The term "*Climate change"* according to the Intergovernmental Panel on Climate Change (IPCC) refers to *any change in climate over time, whether due to natural variability or as a result of human activity*. However, United Nations Framework Convention on Climate Change (UNFCCC) has defined *climate change* as a *change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods*. The degree to which people are vulnerable to climate change depends on the extent to which they are dependent on natural resources and ecosystem services, and the extent to which the resources and services they rely on are sensitive to climate change.

Table 1.1: Vulnerability of key sectors to impacts of climate change for Tropical South Asia

Regions	*Food & Fiber*	*Biodiversity*	*Water resources*	*Coastal Ecosystems*	*Human Health*	*Settlements*
South Asia	*Highly Vulnerable*	*Highly Vulnerable*	*Highly Vulnerable*	*Highly Vulnerable*	*Moderately Vulnerable*	*Highly Vulnerable*

Source: IPCC 2001, Climate Change 2001: Impacts, Adaptation and Vulnerability. A report of working group II of the Intergovernmental Panel on Climate Change (IPCC)

It has to be noted that climate change will have a huge impact on food security. Warmer temperatures will affect crops and crop production, changes in rainfall patterns will be as important. Climate change will also influence the availability of water for human consumption and for food production. Loss of land through sees level rise and other consequences like erosion caused by wind and water will also affect the agriculture production.

2. Climate Change Impact on Food Sovereignty

Food sovereignty is the right of peoples to define their own food and agriculture; to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives; to determine the extent to which they want to be self reliant; to restrict the dumping of products in their markets, Food sovereignty does not negate trade, but rather, it promotes the formulation of trade policies and practices. All of these are being undermined by the increasing emphasis on neo-liberal economic policies promoted by leading political and economic powers and realized through global institutions, such as the World Trade Organization (WTO) and the World Bank (WB). Instead of securing food for the peoples of the world, these institutions have presided over a system that has prioritized export-oriented production, increased global hunger and malnutrition, and alienated millions from productive assets and resources such as land, water, fish, seeds, technology and know-how.

Poverty will be more prevalent if threat of increased hunger arises from reduction in agricultural production. IPCC have already recognized agriculture as on of the most vulnerable sector to climate change impacts. Agriculture and related activities provides the major portion of the income and the main source of nutrition for the rural poor. Any negative impact of climate change over agriculture will reduce food security around the world by decreasing yields of major food staples (wheat, rice and maize). And consequently, food prices will be hiked, thus increasing the number of people at risk from hunger. Poverty and food insecurity may create more social conflict regarding resource ownership and use.

3. People-centered Information Management & Surveillance System (PIMSS)

Perhaps never before the dawn of the third millennium, external knowledge and information were such important for the livelihood of the rural people. Information is a basic and fundamentally important element in any development activity. Finding ways to harness it more effectively to assist those making decisions affecting the sustainability, productivity and profitability of their livelihoods is a priority concern (DFID 2000[i], 2002[ii]). The World Agricultural Information Centre (WAICENT) Outreach Programme of the FAO had recognized the capacity development need to improve the efficiency, quality, and relevance of information and knowledge exchange among the various stakeholder groups involved in agricultural development and food security, with a focus on the most vulnerable and deprived groups' (FAO, 2000[iii]). Richardson (1997) in a report for the FAO stresses the need for an integrated, participatory, people centered approach to information management for rural and agricultural development. The lack of information available to the rural poor is a major constraint to increased agricultural productivity (Robert Chapman, Tom Slaymaker and John Young, 2003)[iv]. Previous studies have pointed out that most of the future agricultural technologies will become available to will be 'information intensive', thus will press on farmers to acquire increased levels of knowledge for appropriate management (Tripp's 2001[v] & Jafri et al., 2002[vi]). Consequently, agriculture Information systems must be people centered so that farmers can be empowered to initiate dialogue and questioning as well as they also know where to go and who to ask for different types of information.

Information about food and agriculture is vital for both individuals and institutions in developing countries in order for them to make effective decisions on issues ranging from household level food security to local, district and national rural development strategies. Accurate and up to-date information is needed to understand the manifestations and causes of poverty as well as climate change and how they vary between and within geographic entities. This information can then be used to design policies and programs adapted to local circumstances. A surveillance system can provide the data needed to inform, guide and evaluate this process. Information collected through monitoring and surveillance must be analyzed and transmitted to decision-makers in an appropriate format and in a timely fashion if it is to be of real value. In order to manage sustainable agriculture for ensuring food sovereignty during the climate change regime; it is necessary to have adequate but easily accessible knowledge base for better understanding of the climate change-livelihood-agriculture linkage.

People-centered Information Management & Surveillance System (PIMSS) can be designated as *an iterative communication and information sharing process, in which acquisition; review, modification; dissemination and application of experience or knowledge, information and data are considered as an ongoing mode.* PIMSS aims to reduce the 'one-way' flow of information from a scientific, information-rich center to a remote information poor community. PIMSS can offer better way of sharing information management responsibilities, more efficient use of the information and facilitate better knowledge transfer. It has to be noted that Multilateral Environmental

agreements such as the United Nations Convention on Climate Change (UNCCC), United Nations Convention to Combat Desertification (UNCCD) and Convention on Biodiversity (CBD) etc imposes importance on knowledge sharing process.

In PIMSS, data is processed into information in a way which is meaningful for the intended user. PIMSS as an integrated system of surveillance and vulnerability analysis could offer rapid detection and timely predictions of the causes and consequences of changes in climate that affect people's capacity to sustain livelihood. However, a surveillance system to track down climate change induced livelihood vulnerability requires developing & monitoring a dynamic public database with socio-technical system approach. People's surveillance on the climate-change induced vulnerability could play a crucial role for sustaining Food Sovereignty and Agriculture by providing information necessary for decision-making as well as for verifying the benefits of the implementation of those decisions. At the same time, people's surveillance can facilitate community-based climate change adaptation techniques incorporating traditional knowledge base.

Examples of data requirements to develop PIMSS benchmark for Food Sovereignty	
Socio-cultural data	• Knowledge of the food culture • Changes in patterns of food selection and consumption • Cultural attitudes determining the edible portions of foods • Quality perceptions, meal patterns, and preferred food preparation • The psycho-social aspects of food and food consumption • Child-care food practices
Food Security	• Food supply & availability • Food consumption patterns • Changes in the composition of the food supply • Potential nutritional inadequacies • Food habits, activity patterns and nutrient intakes of the Poor
Domestic Food Security ***(Food security* at household level)**	• Quantity and quality of food that family members are eating • Food handling, storage and preparation in the home • Ability of household to access food • The ability to change in food practices • Coping strategies in times of food stress • Normal means of accessing food
Market influence on food culture	• Trends in food technology innovation and the potential introduction and consumption of new foods • Food safety and food hygiene practice • Hygiene in food preparation and storage • Access to food & price of food • Ability to purchase food & food expenditure • Dependency on market for agriculture

4. PIMSS as a tool against intellectual anarchy of corporatism

Democratically elected governments are empowered by the majority members of societies to administrate the financial markets and corporations that are blind to the socio-cultural and ecological effects of their actions. At the present global context, the progressions of economic globalization by the global corporations have altered and corrupted the democratically elected governments for serving up only for their private financial interests. It will not be an overstatement if we change the name of democracy as "corporacy" or "democorpocracy". Whatever the name we give to the existing governance, it is now clear that conventional democracy of people and people centered democratic values are almost washed out by the corporate money. As a result, the human values are on the way of annihilation by market oriented monetary values. The Bretton Woods institutions (the World Bank, the IMF, and the WTO) are the most powerful campaigners for a new world where only money can rule. In their new world, there

will be no place for the word "People". The hidden dogma of the new world is that every person will be considered as a consumer and the class of the consumer will be categorized in terms of purchasing power.

The profit oriented corporations only focus on quick and as much as possible monetary returns and liable only to their shareholders. Their "profit" value is taking precedence over all other values. The present trend of corporate control on global economics is leading us toward a world where some gigantic corporations will control the people's access to food, water, shelter, education and health care; probably everywhere. They will devise laws by controlling politicians and control access to news and information (more from media control). The concept of free market economy will turn into the concept of "market monopoly". The recent merging experience of similar corporations indicates that the race of "market monopoly" has already instigated. Most transnational corporations are headquartered in the United States, the European Union or Japan – the so-called Triad, which also accounts for the largest share of foreign direct investment worldwide.

Changes in agricultural pattern in Bangladesh

The culture of seed preservation totally lost. Now all the seeds have to buy from the market or government and NGO run agriculture sales office. The high-breed seed trading culture of compels farmers to buy seed every year as well as also compels to shift agricultural crops in the same land and buy seeds of another crop after every three years. This vicious seed trading cycle created a compulsive demand for hard cash during the cultivation period. At present special loan arrangement for seed purpose is quite prominent which have encrusted poor people with additional loan burden.

The presence of grain traders and processors as owners of some of the largest livestock feeding and slaughter operations contributes to the dominance of closed, vertically integrated markets. In a vertically integrated market, the different stages of production – from corn to the crushing plant to generate animal feed, high fructose corn syrup and ethanol, to the feeding of cattle on a feeding lot – are internal to a company's operation. A company may make so much money from its feedlot that it can afford to make a loss on the high fructose corn syrup it generates turning corn into feed.

The economists and trade officials often do argument that eventually the market will force an end to the practice, since a company cannot operate forever at a loss, and in the meantime, consumers of the product concerned can benefit from the lower price for their inputs. This ignores the potential for structural development for market monopoly removing new or small counterparts. For example, in 1998 U.S.-based multinational companies sold U.S. wheat abroad at an average price of $34.00 per metric ton ($1.43 per bushel) below the cost of production. U.S. wheat exports totaled 28,332,000 metric tons in 1998, which means the companies sold the wheat at a discount worth a total of $963,288,000 (almost $1 billion).[vii] Exports shipped at prices below the cost of production create an unfair trading advantage because they depress international prices and narrow or even eliminate market opportunities for producers in other countries. [viii]

Cheap imports undercut the ability of local farmers to stay in business, often driving them off the land and into cities; this undercuts long-term national food security and creates dependence on imports. Self-reliance in basic necessities gives countries and communities a stronger bargaining position in the global economy. Boggs (2000[ix]) argues that capitalism has produced a world of chaos and fragmentation, where democratic participation has become a daydream. Giroux and Kellner (2000[x]) cautioned that democracy might suffer unless a new theoretical

paradigm complete with a new language of political activism filters into the learning process. In the corporatism could be recognized as dehumanizing process in which each individual, even the infant are branded as consumers with the right to purchase commodities. Social justice is the emotional foundation for freedom and participation for a shared vision. The tolerance between people in their socio-cultural space creates scope for greater solidarity. Corporatism, all around the globe has already shown its wrath against social justice and solidarity. The experience of Coastal Development Partnership (CDP) in Bangladesh has revealed that if traditional knowledge on livelihood survival mechanism, practices and innovations of a region which is vulnerable to climate change is properly mapped, many untapped livelihood options could be identified, extended and popularized as sustainable livelihood option. However, such initiative requires the collaborative effort to work with the local community, not merely providing service delivery to the targeted beneficiaries. Geographic Information Systems (GIS) can be used for food security mapping, mapping of program implementation and coverage, and analysis of the determinants of malnutrition. CDP experience envisages that it is possible to devise a GIS supported PIMSS. PIMSS could monitor trade bills which provide subsidies to TNCs that allow them to market their products in other countries at prices that undercut local producers.

5. The Need for Food Sovereignty Indicators (FSI)

Information is useful only if it is available, if the users have access to it, in the appropriate form and language – i.e., if it is communicated, if it circulates among the various users with appropriate facilities, if it is exchanged (Mundy and Sultan, 2001[xi]) and a well-constructed indicator which is developed through participatory process can embed most of these characteristics, if not all. The empowerment of any group centers on its capacity to generate and use knowledge, and to share it on an equal basis with other groups (Siochru, 2001[xii]). Poverty is clearly linked to malnutrition and therefore policies and programs reducing malnutrition require combined efforts of national and international stakeholders. Especially in regions where households are continuously exposed to social and economic shocks, such as lack of employment and illness, even in non-disaster times, poverty alleviation present a constant challenge. Large-scale disasters such as floods and cyclones intensify household food insecurity and increase the prevalence of chronic energy deficiency and micronutrient deficiencies among women. Any poverty reduction effort through food sovereignty and sustainable agriculture will directly contribute on Eradicating extreme poverty and hunger, reduction of child mortality (MDGs 1 & 4); Improving maternal health (MDG 5); Ensuring environmental sustainability (MDG 7).

If Food Sovereignty Indicators (FSI) can be devised carefully, it could offer a way of empowering marginalized poor and may also serve as good tool for monitoring most of the MDG goals. The following indicators could be used as examples of Food Sovereignty Indicators (FSI):

a) **Stunting:** Stunting (low height-for-age) which expresses a lack of linear growth, can be considered as good indicator of food sovereignty as well as poverty since the main cause of the growth problem is a lack of both energy and quality of the diet.

b) **Trends in malnutrition:** Malnutrition which is generally measured by underweight, are highly associated with the food expenditure on non-grain products, which were in turn related to the market price. In view of that fact, malnutrition may not only be an indicator of food sovereignty but also an indicator for market control over food sovereignty. The following FSI can provide data on both food sovereignty and the market control over it:

I. Percentage of households that took a loan for food

II. Ability to purchase food according to choice and as per need

c) **The prevalence of night blindness:** Night blindness is an early symptom of vitamin A deficiency, and develops if the diet contains too little vitamin A and/or if an individual has certain infectious diseases such as diarrhea that drain the vitamin A stores.

d) **The consumption of grain and diversity of diet:** In particular, there is growing recognition that a deficiency of iron, which leads to anemia, among children between the ages of 6 months and 2 years can have a permanent impact on cognitive development, limiting the intellectual capacity of affected children. Productivity studies have also shown that iron deficiency anemia within an adult workforce can reduce physical capacity, and therefore productivity.

e) **Use of insecticide, pesticide, hybrid seeds and credit for agriculture production:** The use of additional insecticide, pesticide, hybrid seeds to cultivate hybrid crops has often forces the poor or small producers to be entrapped into credit burden. And thus keep them under chronic poverty.

f) **Dependency on market for production:** Use of hybrid or GM seeds, chemical fertilizer etc creates a dependency syndrome among the small farmers who has to purchase these things every year. This practice not only abolished indigenous agriculture but also snatched small farmers' freedom over seeds and methods of agriculture.

g) **Technology driven agriculture without considering the ecosystem characteristics:** The use of the modern cultivation tools (Power taller and tractor) gradually converting agriculture from labor intensive mode to capital intensive mode. Moreover, gradual loss of topsoil,due to technology driven agriculture might also damage the land in the long run.

h) **Trend in Contract firming:** Technology-driven & capital intensive mode of agriculture are converting small farmers into contract farmers. With the support of state and financial institutions, multinational companies are using GM seeds, chemical fertilizer and insecticide to rip the profit within the contracted time without considering the long-term/intergenerational production value of land. Besides, corporations in the name of profit and market turnover are exploiting contract firms/small farmers export oriented products like, wheat, tobacco, shrimp, which in turn increasing food insecurity. Because, if these farmers do not have money to buy food, they have to strive. If this farmer produce rice he at least s/he do not have to depend on market to purchase food. It has to remember that the fluctuations of market price and the dependency on market both act as dual sword for the poor who used to purchase food on daily basis though his/her labor wage is in stagnant position for years.

i) **Direct or indirect subsidies or favored status for transnational corporations (TNCs):** There should be no direct or indirect subsidies, or favored status for transnational corporations (TNCs) included in the bill or policy. That means no export credits or guarantees may be included that help TNCs penetrate Southern/developing country economies to the detriment of local businesses.

6. Achievable Strategies for APNFS to address food sovereignty & sustainable agriculture integrating climate change

Thomson (2000[xiii]) argues that the best possibility for achieving a sustainable improvement in livelihoods policy is to allow for greater civil society and stakeholder participation in the setting of priorities and formulation of policy. Climate change, Food Sovereignty and Agriculture encompass multidimensional policy issues of human well-being, environmental management and good governance. It is not just farmers whose livelihoods are at risk from climate

change, but also those whose livelihoods depend on agricultural production such as suppliers of inputs, people who work in transporting and processing agricultural commodities, people who work as extension officers, and people who work in agricultural lending services. Consequently, any strategy to address food sovereignty & sustainable agriculture integrating climate change should consider livelihood as an integral component. For example, prevalence of malnutrition among children and mothers is alarmingly high in rural Bangladesh, hence, any action to achieve food sovereignty for the rural population in Bangladesh requires inclusion of children and women as stakeholder though they might not be directly involved with agriculture.

In general, to achieve food sovereignty critically requires promotion of food availability (e.g. agricultural diversification of agriculture production and food processing and storage infrastructure, pro-poor market mechanism, continual food access (income diversity, prices, employment creation, control of assets and resources), and reducing risk (improve coping mechanism, better risk management, adequate disaster shelters, household and community focused flood-proofed facilities development). Hence, the linkage between climate change and food sovereignty requires risk-reduction focused strategies.

APNFS can explore the feasibility of the following issues to accelerate Food Sovereignty movement in this region:

- **APNFS members might acts as focal point institution on monitoring climate-change induced vulnerability on Food Sovereignty in respective country through PIMSS approach:** Food sovereignty is a key strategic issue for maintaining sustainable development process. Poverty and food insecurity are closely linked and can be considered as the double-edged sword for the prevalence of malnutrition. Food sovereignty directly contributes to maintaining the proper health and nutrition, which are considered as cornerstones of a competitive workforce, particularly in the context of a global economy. APNFS can facilitate food sovereignty at three levels to address climate induced vulnerability:

    - **Global food sovereignty:** how much food can be produced globally with anticipated climate change and expected population size.
    - **National food sovereignty:** National balance between production and per capita demand at present and in climate change scenario.
    - **Household food sovereignty:** Detailed analyses of the most vulnerable groups at present and in climate change scenario.

- **Development of Food Sovereignty Indicators (FSI):** People respond to any environmental changes in their in many ways, though their responses often primarily reflected in changes in food related behavior & consumption and health status. Therefore, any deterioration in nutritional status can be an early indicator of people's hardship to achieve food sovereignty. Once data is available, appropriate emergency preparedness and response can be undertaken well in advance. However, if PIMSS to be used as an effective tool for early warning, it must incorporate both quantitative and qualitative aspects of data collection, analysis and interpretation. Malnutrition could be used as an indicator for food insecurity. APNFS might customize or even use existing indicators as Food Sovereignty Indicators (FSI) to keep track on regional and national development process in a concerted way. It has to be noted that prior to that APNFS has to incorporate knowledge building (education, world view & experience) and skills development (training) as important communication strategy for improving human resources.

- **Monitoring & Impact assessment of the Development Project of W B, ADB, IMF :** The financial speculators of the Bretton Woods (the World Bank, the IMF, and the WTO) and their supporting IFIs like ADB are highly active in their promotional campaign on "global economy is for global corporations" in the name of development Projects or policy documents like PRSP. For example, Peoples food sovereignty in the working areas of CDP is violated by the consequence affcet of Khulna-Jessore Drainage Rehabilitation Project (KJDRP) of ADB. The project reported their success in 2004 but CDP and some others coalition members through continuous monitoring raised peoples voice and as a result the ADB' evaluation team come to bounded for reevaluation the project.

- **Global solidarity but local action is required to cope with climate change:** The multidimensional causes and expressions of climate change, poverty and food insecurity envisages that it is difficult to generalize these issues. With the support of national partners, APNFS could identify regional food insecure hotspots linked with climate change.

- **Global initiatives to promote sustainable agriculture system by the participation of Farmers**: Actually farmers are practical scientist. Some time they are biased by the academic/corporate scientist. They are losing their updated and historically refined knowledge of agriculture. APNFS can highlight farmers like Hori Kapali of Bangladesh who developed indigenous and environment friendly seeds better than hybrid to encourage individual farmers to be proud of their knowledge.

- **Global digital solidarity through PIMSS to serve the local community:** The potential to transfer digital content to remote locations easily in the form of text, images, video and radio, combined with the vast storage capacity of PCs, CDs and DVDs, reduces many of the costs associated with barriers to broad-based information access. The impact of increased information flow on human capital development will depend equally on the effective translation of material into different languages and appropriate formats for the intended users and their local cultural context. The reduction in the cost and time taken to travel to collect information can also have a positive impact at a household level with family members spending less time away and less money on transport.

- **Food-based strategies to cope with climate change:** Food-based strategies could be considered as a sustainable process for empowering poor community/people to take decisive responsibility for growing their own nutrient-rich foods and making informed diversity of food availability & consumption choices. Diversity of food availability can be assured through agricultural production of fruits and vegetables and to promote home/hanging gardens, small livestock production, and aquaculture (fish ponds). Preservation and conservation techniques or production has to be devised to extend the availability of diversified food for the poor throughout the year.

- **Household-focused Food-based strategies should receive more attention to cope with climate change:** Home gardening enables households to consume micronutrient rich non-cereal foods more frequently, to diversify their diet and thereby to increase the quality of their diet. Vegetables and fruits are often the only affordable source of micronutrients in the family diet of poor households. The production of fruits and vegetables provides the household with direct access to important nutrients that may not be readily available or

within their economic reach. Homestead food production also provides a source of income for poor women, which is used to buy other foods. Integration of animal husbandry/poultry into existing home gardening programs using locally available resources is simple to implement and cost effective.

- **Capacity building for information management:** Capacity building for information management also needs to be strengthened in all countries of the region, even those that are recognized as having strong research capabilities. However, the types of institution building and training needs vary considerably among countries. Geographic Information Systems skills should be enhanced at the national level in most countries.

Strategies for People-centered Information Management & Surveillance System (PIMSS)	
Key problem	**Strategy**
Lack of awareness about climate change & food sovereignty	Mass media communication, cultural activities and advocacy
Lack of understanding about the context of the extent, causes and impact of climate change	Participatory Action Research, Spreading information in local language with an interesting way, using examples from local context. Involvement of the influential local groups or individuals as partners in the process.
Lack of understanding about how to cope with the climate change	Information sharing and/or discussion with people to identify solutions Provide capacity development assistance, if necessary. Follow up to maintain actions or lessons learned

- **Malnutrition of mother need to be considered in food sovereignty context:** In south Asia region, mothers in hardcore poor family tend to give priority to feeding other family members, particularly children and husbands, rather than themselves when access to food is poor. Mother's BMI is sensitive to changes in access to food and is an early indicator of household food insecurity. For this reason, it is a useful anthropometric indicator to assess the impact of disasters and climate change on household food security. The prevalence of night blindness in all mothers may be used as an indicator of recent or current vitamin A status in a population in times of crises that have a profound impact on household food security[xiv]. Maternal chronic energy deficiency and maternal night blindness could be used as early indicators of household food insecurity in Bangladesh as well as in other countries, whether following a disaster or related to current poverty.

- **Advocacy for small scale, traditional knowledge-based eco-agricultural:** Environmental disasters like water-logging, desertification, top soil loss, river silting and salinity are common occurrences in this region and these are causing unimaginable sufferings for the people. It is essential to have climate adaptation planning in such a way that conserves and sustains the ecosystems and support the poor and ensures food security for the growing population. For climate sensitive regions, the policy should take into account the unique natural characteristics of the region.

- **Disaster should recognized as chronic signature of climate change on the Food Sovereignty:** One study has documented a strong association between poverty (income levels) and environmental problems related with pollution, water and sanitation, solid waste and the risk of disasters, e.g. floods[xv]. Research in South Asia has shown that people with sufficient assets can protect themselves physically and socially from the impact of a cyclone or flood even if physical defense barriers are absent or fail[xvi]. Disasters can threaten all the necessary conditions for Food sovereignty: they reduce the availability of food by damaging food stocks, destroying crops and homestead gardens, killing livestock and isolating communities from market centers; they reduce access to food by causing food prices and unemployment to rise so households cannot afford to buy the food they need; they damage sanitary facilities and sources of clean water, causing epidemics of infectious diseases such as

diarrhea; and they disrupt routine health services and cause serious disturbance to everyday life so mothers are unable to find time to care for their young children.

Asia Pacific Network on Food Sovereignty (APNFS) can take the role of multilevel leadership to highlight food security issues and advocacies around food sovereignty, farmers' rights and sustainable agriculture through establishing a People-centered Information Management & Surveillance System (PIMSS). Coastal Development Partnership (CDP), as an active member of APNFS is willing to extend her decade long people-centered information management experience to accelerate APNFS Food Sovereignty goals.

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[i] DFID, 2000: *Eliminating World Poverty: Making Globalisation Work for the Poor*, White Paper on International Development. London, Department for International Development.

[ii] DFID, 2002: *The Significance of information and communication technologies for reducing poverty*.. London: Unit for Policy Studies, Development Policy Department, Department for International Development.

[iii] FAO, 2000: *WAICENT Outreach Programme – Outline Strategy*. Rome: Food and Agriculture Organization of the United Nations.

[iv] Robert Chapman, Tom Slaymaker and John Young, 2003: Livelihoods Approaches to Information and Communication in Support of Rural Poverty Elimination and Food Security, Overseas Development Institute (ODI). A collaborative research project with the UK Department of International Development and the Food and Agriculture and Organisation of the United Nations

[v] Tripp, R. 2001: *Seed Provision and Agricultural Development. The Institutions of Rural Change*. London: Overseas Development Institute.

[vi] Jafri, A., Dongre, A., Tripathi, V., Aggrawal, A., Shrivastava, S. (2002) 'Information Communication Technologies and Governance: The Gyandoot Experiment in Dhar District of Madhya Pradesh, India' ODI Working Paper 160. London: Overseas Development Institute.

[vii] Total wheat exports from FAOSTAT, FAO's on-line database. http://apps.fao.org/lim500/wrap.pl?FoodBalanceSheet

[viii] Houck, James P. 1996. Elements of Agricultural Trade Policies. Prospect Heights, IL: Waveland Press, Inc

[ix] Boggs, C. 2000: The end of politics: Corporate power and the decline of the public sphere. NY: Guilford Press.

[x] Giroux, H. & Kellner, D. 2000: Public places, private lives: Beyond the culture of cynicism. NY: Rowan & Littlefield.

[xi] Mundy, P. and Sultan, J. 2001: *Information Revolutions: How information and communication management is changing the lives of rural people*. Wageningen, Netherlands: Technical Centre for Agricultural and Rural Cooperation (ACP-EC) (CTA).

[xii] Siochrú, S. 2001: *From Knowledge Management to Knowledge Empowerment*. Paper produced as part of the IFAD/ENRAP Project (Electronic Networking for Rural Asia Pacific Project) January 2001. Dublin: Nexus.

[xiii] Thomson, A.M. 2000: *Sustainable Livelihoods Approaches at Policy Level*. Paper prepared for FAO e-conference and Forum on Operationalising Participatory Ways of Applying a Sustainable Livelihoods Approach. Rome: Food and Agriculture Organisation of the United Nations.

[xiv] Torlesse, H., Moestue, H., Kiess, L., Thorne-Lyman, A., de Pee, S. & Bloem, M.W. 2003: Night blindness among women is a good indicator of vitamin A deficiency in a population experiencing crisis. Poster presented at the XXI IVACG Meeting, 3-5 February 2003, Marrakech, Morocco.

[xv] Smith D, Timberlake M 2002: "Global Cities" and "Globalization" in East Asia: Empirical Realities and Conceptual Questions. University of California. Paper 02-09. http://repositories.cdlib.org/csd/02-09

[xvi] Winchester, P. (2000). Cyclone mitigation, resource allocation and postdisaster reconstruction in South India: lessons from two decades of research. *Disasters* 24, 18-37.