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Conservation Agriculture newsletter

Getting Agriculture to Work for People and the Environment

IVth World Congress on Conservation Agriculture: Innovations for Improving Efficiency, Equity and Environment

4th - 7th February 2009, New Delhi, India

The Fourth World Congress on Conservation Agriculture (CA), deliberated on issues vital for sustaining high-growth agriculture without clashing with the environment, based on the theme "Innovations for Improving Efficiency, Equity and Environment". The major objectives of the Congress included the exploration of future global partnerships and policy initiatives, and developing a road map with broad sets of strategies and actions to promote conservation agriculture practices and technologies. The meeting was hosted by Indian Council of Agricultural Research (ICAR) and National Academy of Agricultural Sciences (NAAS). FAO (Food and Agriculture Organisation), along with IFAD (International Fund for Agriculture Development) and other Indian and international organizations being sponsors and co-organizers of this largest global gathering of the CA community. The Congress aimed at bringing together stakeholders, researchers, farmers, extension workers, policy planners, corporate leaders and non-governmental organizations to address innovations in agriculture to realize improved efficiency, equity and environment. Nearly 1000 delegates from 48 countries participated in the Congress.

Dr. Mangla Rai, DG, ICAR, addressing the Plenary

Mr. Sharad Pawar, Union Minister of Agriculture and Consumers Affairs, Food and Public Distribution formally inaugurated the Congress and termed the event very relevant and timely with the whole world seriously concerned about the challenges posed by demands of the burgeoning population, a steep decline in global food stocks last year and sky-rocketing prices of food commodities due to a number of supply-side constraints, including deteriorating production environments and growing menace of global warming.

Prof. M.S. Swaminathan, Member, Rajya Sabha, emphasizing the role of CA in alleviating hunger and poverty regarded conservation farming as an attitudinal change towards natural resources to increase the productivity, especially of small farms, on a perpetual basis without harming the ecological balance. He lauded the role of the Congress in bringing farmers to the forefront, as farmers' participatory knowledge management was the key to success in Indian agriculture. He appreciated the efforts of government in releasing the first ever National Policy on Farmers. Dr. Mangala Rai, Chairman, International Steering Committee, emphasized the need for an intelligence system that would provide inputs on production of essential commodities while increasing pest surveillance and enhancing climate literacy. He stated that agriculture sector would continue to be a losing proposition, unless there large investment is committed to water management and technology adaptation for mitigating the impact of climate change.

Dr. Rodney Cooke, Director, Technical Advisory Division, IFAD, elaborated on the role of IFAD as a specialized agency to enable poverty reduction that requires long term solutions such as greater investment in small holder farmers/organizations, and building on capacity of rural farmers through favourable policies. Dr. Shivaji Pandey, Director, Agricultural Support Systems Division, FAO, endorsed the role of CA *vis-à-vis* food security. Conservation agriculture according to him is an essential part of the change that would require farmers of the world to quickly switch to more sustainable and productive farming systems to grow food needed by a swelling world population and as a response to climate change. This was followed by statements from four CGIAR Centres: CIMMYT, ICARDA, ICRAF, and IWMI. A vote of thanks was extended by Dr. P.K. Joshi, Organizing Secretary of the Congress. The Congress, he remarked, provided a platform to the private and public sector, farmers and non-governmental organizations, researchers and policy advisors in developing an alliance on conservation agriculture for sharing innovations and experiences, and evolving partnerships for the future to jointly address needs of the sector.

Plenary Sessions

Plenary sessions on the first day were marked by key paper presentations from organizations involved with CA and were divided into three sessions. The first plenary session was chaired by Prof. Swaminathan and included presentations by Dr. Mangala Rai, DG, ICAR and Dr. Katherine Sierra, Vice President, The World Bank.

Dr. Mangala Rai, elaborated on the role of CA in improving efficiency, equity and environment in the Indian perspective. He began by stating that ancient wisdom to attain sustainable agriculture is the basis for certain key precepts such as living in harmony with nature. In fact customs, traditions, culture, festivals and folklore are intricately linked with agriculture. He emphasized that when resources and inputs are used inefficiently, both costs of cultivation and threat of biosphere pollution increase, resulting in decrease in production. Available estimates indicate that 10% increase in water use efficiency can help the country gain more than 50 million tonnes of food grain from the existing irrigated area. Dr. Rai noted that the time has

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come to infuse new technologies for further enhancing and sustaining productivity, other than tap new sources of growth in agricultural productivity. Whereas, green revolution provided for national food security, conservation agriculture/resource conservation technologies are an important component of the food security and poverty alleviation strategy, to provide for needs of health for all, rural development, enhancing productivity, improving environmental quality and preserving natural resource. Highlighting the role of resource conservation technologies, he suggested that an ideal farming approach should aim at increasing agricultural production, soil conservation, productivity of water, ensuring livelihood, generating employment and above all to ensure much needed *Sujalam* (clean water) *Suphalam* (clean food) *Malayaja Sheetlam* (fresh air).

Dr. Katherine Sierra, in her presentation "Improving equity and environment through conservation agriculture", referred to the "World Development Report 2008: Agriculture for Development" that looked at multiple ways in which agriculture can advance efforts of poverty reduction with a renewed consensus on the positive role that agriculture plays at three levels: as an engine of growth, an instrument of poverty alleviation and a provider of environmental services. She considered CA as an important and prime tool for improving equity and environment. She also mentioned about a recent approach "A Strategic Framework on Development and Climate Change" designed to move the World Bank to a new level of global partnership. She apprised the audience regarding various programmes of the World Bank for encouraging research and development in CA.

Plenary Session II was chaired by Dr. R.S. Paroda, President, Trust for Advancement of Agricultural Sciences (TAAS) and included five presentations.

Dr. Mahmoud Solh, DG, ICARDA, looked at the scope for improving equity and livelihood security through CA. He referred to FAO studies indicating that roughly 80% of the increase in future food production up to 2030 will have to come from intensification of production systems through increase in productivity per unit area. This will be detrimental to natural resources and environment if intensification is not practiced in a sustainable manner. Globally, the trend will be towards expanding conservation technologies to develop improved sustainable production systems. CA appears a prime candidate in making that happen. ICARDA's approach to CA follows a broad perspective beyond zero-or minimum tillage to include an integrated approach involving natural resource management and inputs; improved and adapted crops; and enabling policies and institutional support including participatory approaches involving all stakeholders, particularly farming communities. He also described collaborative efforts with various organizations in different countries with respect to CA.

Dr. Thomas A Lumpkin, DG, CIMMYT, regarded CA as the means of enhancing resource productivity and efficiency. He noted that CA must be brought into the mainstream of crop management research and be closely linked with crop breeders and other agricultural disciplines to ensure the development of tactical management practices suited for CA-based crop management technologies. CA must not to be sidelined as an alternative development pathway as in the past as it represents the best option for a sustainable future.

A view of the audience at the Plenary Session

Dr. Paul Vlek, Centre for Development Research (ZEF), University of Bonn, dwelled on the need of CA to address issues of reduced land productivity, land degradation and reduction in biodiversity. He pointed to the exhaustion of forest and soil resources while assessing the processes and rates of land degradation based studies which were conducted in different places of the world. CA has shown to improve, conserve and use natural resources in a more efficient way through integrated management of soil, water and biological resources. He emphasized the need for a better understanding of its performance and requirements across wider geographical regions and environmental conditions to enable the diffusion of the technology. For its successful implementation in developing regions where it is needed most, design and dissemination of cost effective farming tools, access to herbicides, and economic incentives will also be needed to be addressed.

Dr. Y.L. Nene, Asian Agri-History Foundation, used Indian classic literature on agriculture to explore indigenous knowledge in CA. Aspects of conservation that were used included management of soil, water, crop diversity, animals, storage of produce (seed, fertilizers, inputs), and maintenance of tools, implements and machinery. He reproduced various paragraphs referring to relevant content from scriptures of India such as Rigveda, Krishi-Parashara, Kautilya, and Gita.

Dr. Dennis Garrity, DG, ICRAF, drew attention to CA and agro-forestry in the context of environmental change. He reiterated that the Congress had come at a critical moment when the global debate on a new climate change agreement was being taken up actively. A few years ago, agriculture, forestry and land use were virtually excluded from that debate. The potential role of incorporating trees in agricultural systems to enhance CA is also now widely appreciated through the dedicated efforts of many scientists who have investigated the possibilities of agroforestry. He emphasized the need to increase tree cultivation in agriculture in practical ways that would make good sense on the farm, particularly in smallholder agriculture.

Bulk of landholdings in the tropics ranged in size from less than one-hectare to a few hectares, with its owning population affected by poverty. There were many constraints with one of the barriers for smallholders being competition for crop residues. The pressure on alternate usage for this resource is very high in smallholder agriculture. For most smallholders, their crop residues are such a valuable resource for livestock fodder, that to forgo its immediate use to apply it to enhance the long-term health of their soils would be too much of a sacrifice. Resolution of this dilemma would be central to any expansion of CA in the tropics. Radical new approaches were needed and agro-forestry could provide some of these and should thus be playing a much greater role in the debates and research directions on the future of CA. The recent World Forest Report shared both, some bad news and some good news that we could take to heart. The bad news was that the number of trees in forests continued to decline at an alarming rate, but the good news was that the number of trees on farms throughout most parts of the world were steadily increasing. We thus need to be more aware of this phenomenon and more engaged in

enhancing it for the benefit of conservation agriculture.

Plenary session III was chaired by Dr R.B. Singh, Former Asst. Director General, FAO, and had three broad presentations that addressed the relevance of water use efficiency, global partnerships, and the need for assessment of conservation agriculture.

Dr. Colin Chartres, Director General, International Water Management Institute (IWMI), examined the role of green water and rainfed agricultural production in facilitating production increase required to feed the world's growing population. He presented data that suggested that wider predominance of rainfed agriculture necessitated it to significantly increase its productivity. The increase was potentially attainable in terms of available land and water resources. However, in some closed river basins, any increase in green water use will have serious impacts on other sectors of the economy and the environment. He emphasized the need for green water productivity as well as developing new irrigation programmes and ensuring policy settings that are conducive to the trade of virtual water.

Dr. R. S. Paroda, President, TAAS, provided an overview and future plans of global initiatives through conventions, congresses and partnerships for forestalling the degradation of natural resources through adoption of CA practices for sustainable development, food security and poverty alleviation. He stressed on the need for concerted efforts to promote CA globally in order to get greater benefits in the future.

Dr. S. S. Johl, President, Indian Society of Economics, emphasized the need for evaluation as an integral part of the research system through feedback for research administrators or programme implementers. According to him, impact analysis or assessment is unfortunately the last priority that enters into the calculations of our policy makers and research administrators. Such reports on well planned assessments should serve the crucial purpose of reviewing impact of research output on a continuous basis and such feedback should be used to correct the pathways adopted in order to steer the research and extension programmes for optimal results. He emphasized that conservation practices have to be viewed in an all inclusive manner involving soils, water, environment, efficient resource use, economic viability, equity issues and social implications. The perception of CA begins and ends up in zero tillage because the practice has been accepted on a visible scale. As a result, other practices such as levelling, bunding, and mulching seem to have been put on the back burner and are operative at only a level of demonstration plots mainly maintained as show pieces by extension agents at public cost. No doubt zero-tillage has its own advantages in terms of savings of labour, costs and time, yet the purview of CA goes much beyond soil and zero tillage per se. The CA technologies must be synchronic and inclusive in nature. Only then such techniques will come up with perceptible impact. He called upon the national agriculture & research system and extension agencies to focus on technologies aimed at achieving sustainable resource management, while monitoring and assessing the impact on soil health, water balance, environment and economic ability of the farmers.

These plenary sessions set the stage for the technical sessions that focused on the following four themes for the remaining days of the Congress: (i) Resource productivity and efficiency, (ii) Institutional innovations and policies, (iii) Environment, and (iv) Impact assessment & equity issues. These themes were discussed over the next three days of the Congress through presentations and discussions facilitated through parallel sessions organized to deliberate on the specific issues related to CA. Forthcoming issues of this newsletter will highlight these.

The New Delhi Declaration on Conservation Agriculture

The 1,000 delegates, gathered in the 4th World Congress on Conservation Agriculture, held from 4 to 7 February 2009 in New Delhi, India, among them farmers, private sector enterprises, scientists, development organizations, donor organizations and policymakers from all world continents, recognizing the urgent need

- to double agricultural production over the next few decades,
- to reverse the trend of degradation of natural resources, in particular soil, water and biodiversity,
- to improve the efficiency of the use of ever scarcer production resources,
- to address the fact that agriculture and agriculturally induced deforestation cause 30% of the actual green house gas emissions,
- to answer the increasing threats of a changing climate to agricultural production,

agreed that Conservation Agriculture based on the three principles of

- minimum mechanical disturbance of the soil
- permanent organic cover of the soil surface, and
- a diversified sequence or association of crops

is the foundation of a sustainable intensification of crop production, being as such the necessary condition to achieve, along with other complementary technologies, a sustained increase of world agricultural production and at the same time a recovery of the natural resource base and environmental services.

The delegates therefore urge all stakeholders involved at international, regional and national level in agricultural production, research and policy making to mainstream Conservation Agriculture as the base concept for agricultural production.

Governments of the world are requested to

- harmonize their policies in support for the adoption of Conservation Agriculture
- introduce mechanisms which provide incentives for farmers to change their production system to Conservation Agriculture
- pursue the case of Conservation Agriculture as the central mechanism for agricultural sector climate change mitigation in the international negotiations for a post Kyoto climate change agreement
- include Conservation Agriculture as a base concept for the adaptation of agriculture to the challenges of climate change in the National Action Plans for Adaptation
- support the UN Food and Agriculture Organization in the endeavour to establish a special programme on Conservation Agriculture to facilitate this process in its member countries.

New Delhi on February 6th, 2009

Conservation Agriculture: Horticulture Systems for Enhancing Productivity, Profitability and Sustainability

Dr. K.L Chadha
Former DDG and National Professor (Horticulture), ICAR

There is now an increasing realization that injudicious use of natural resources is leading to deleterious effects, both on farmland and crops. These effects include depletion of topsoil, and contamination of groundwater which result in high costs of production and result in disintegration of economic and social conditions in rural communities. This calls for the need of conservation agriculture, which is an application of modern agricultural technologies to improve production while concurrently protecting and enhancing the land resources on which production depends. It is based on the principles of rebuilding the soil, optimizing crop production inputs including labour and optimizing profits.

Conservation agriculture promotes minimal disturbance of the soil by zero tillage, balanced application of chemical inputs, and careful management of residues and wastes. This reduces land and water pollution, soil erosion, and long-term dependency on external inputs. It improves water quality and water use efficiency, reduces emissions of greenhouse gases through lessened use of fossil fuels, and enhances environmental management. CA can be achieved by growing horticulture and agroforestry crops, besides permanent cropping systems that in turn promote food sufficiency, and value-added production through improved crop production and market opportunities, and consequently help in poverty reduction.

Some issues in CA which require attention are soil erosion and degradation, soil salinity, increasing or decreasing water tables, and pesticides residues toxicities. With increasing emphasis on horticulture and better understanding of the production systems, growers are increasingly adopting management approaches that result in safe, quality produce while maintaining conservation of resources. Some ways in which horticulture crop production is able to achieve objectives of conservation agriculture are briefly mentioned.

Horticulture systems, particularly perennial crops, contribute to protection of soils and minimize mechanical soil disturbance, reduce erosion, soil salinity and prevent water loss from occurring within the soil. Sustainable horticulture also helps in protecting and enhancing soil health. Tree growing also protects soil loss due to erosion by wind or water. Poplar is one of the most commonly used windbreaks grown by the farming community. Deep root systems of fruit and plantation crops and perennial grasses hold the soil firmly, prevent erosion and improve its water-holding capacity. Several horticultural crops like beach rose, jasmine, bougainvillea, and winter berry are of strong salt resistant nature and could be successfully grown in salt affected areas.

The water requirements of horticulture crops have not been systematically determined. A properly planned and managed irrigation and drainage system, besides a healthy and vigorous crop results in minimum loss of water and lays emphasis on fertigation options, and drainage management. Another factor in efficient water use is the delivery system. Water use efficiency increases with increasing precision of water delivery, which could be met through micro-irrigation systems. Micro-sprinklers or dripper systems target the root zones of the crop, and are the most efficient irrigation systems. These systems can also be used with advantage for fertigation where dissolved fertilizer is supplied to the crop through the irrigation system. Micro-irrigation and fertigation systems are ideally suited for horticultural crop production and are covering increasing acreage as a result of programmes launched by Government of India under the National Horticulture Mission. It facilitates frequent small applications of fertilizer that supply nutrients to the root zone as needed, and reduces the risk of nutrients being transported off-site by runoff. This also results in saving of labour.

Cover crops are also one of the possible ways in preventing soil erosion and for improvement of soil tilth. Besides, cover crops also aid in nutrient cycling, reduce soil temperature fluctuations, provide habitat for beneficial insects, and suppress weed populations. Most of the perennial horticultural crops have provision for inter-row cover crops between the trees, which, among other benefits, protect soils from erosion by wind or water. Some of the cover crops are, field pea, strawberry, clover and lupine. Incorporating green manure crops in vegetable production systems and mulching under tree crops protect soil from wind and water erosion as well as add organic matter to the soil. Organic matter is vital to sustain the productive life of the soil and improve aeration and drainage and structure of the soil. It also provides a slow release form of nutrients, and helps in holding large amounts of nutrients in the soil so that applied fertilizers are better protected against leaching.

Organic matter level in horticulture plantation can be maintained or increased through a number of practices. Cover crops make a valuable contribution; particularly those with dense fibrous roots are more useful than those, which have fewer fleshier deep roots. Inter-row cover crops in orchards can also be mown and put into the crop row to supply leaf matter.

Several systems of conservation agriculture are now being advocated worldwide. Besides improving soil health, plant products from organic farming are substantially better in quality like, bigger size, flavour, and aroma. Animal products are of better quality when fed with feed and fodder produced organically. The underground water of the area under such farming system is generally free of toxic chemicals. It ensures optimum utilization of natural resources for short-term benefit and helps in conserving them for future generation. Vermicompost, which is a preferred nutrient source for organic farming is eco-friendly, non-toxic, consumes low energy input for composting and is a recycled biological product. It enhances the decomposition of organic matter in soil, improves soil structure, texture, aeration, water holding capacity and prevents soil erosion. It is rich in beneficial micro flora such as N-fixers, P-solubilizers, cellulose decomposing micro-flora etc. besides improving soil environment. Organic farming systems are most suited for high value horticultural crops. The area under such crops is increasing globally and thus indirectly adding to the concept of conservation agriculture.

Achieving sustainable production also depends on protecting crops from the threat of various pests and diseases and resulting toxicities. Horticultural crops attract a large number of pests and diseases and require a large number of sprays often with systemic insecticides. Following a balanced approach in

pest control in these crops which maximizes the use of natural control agents and minimizes pesticide use, resulting toxicities can contribute favourably to conservative agriculture. Integrated pest management programs are now available for a number of crops using a combination of biological, physical, cultural, genetic and chemical control methods to manage pests.

In addition, many horticultural crops also utilize rootstocks that are resistant to key soil-borne diseases or pests or other abiotic stress. Ensuring planting material which utilizes good quality resistant rootstock is an important step to sustainable production like salt creek rootstock in grape, trifoliate orange in citrus and Malling and Malling - Merton rootstocks in apple. In vegetable crops a large number of disease-resistant varieties now exist in several crops. Another method of disease control is the use of weather data to predict high-risk conditions and allow growers to take prophylactic measures. These strategies are now available for predicting disease incidence in apple (scab), grape (downy mildew), mango (powdery mildew).

In perennial horticulture, weed management, once a matter of routine spraying or ploughing, is now part of total orchard floor management. In general growers can use a combination of non-tillage methods such as mowing, selective herbicide application, cover crops and mulching for a healthy and protected orchard floor. Ground with a cover crop is less prone to weed establishment.

In view of the above, horticulture systems seem to be among the best systems to achieve the objectives of conservation agriculture and consequent environmental protection.

Source: IVth WCCA Souvenir

10 Principles of Sustainable Soil Management - Dr. Rattan Lal

From food security to climate change to energy demands, the world faces a myriad of critical sustainability issues, all whose potential solution may lie right beneath our feet. Rattan Lal, an Ohio State University soil scientist with the Ohio Agricultural Research and Development Center, suggests that soil and its resources are the answer, and sustainability can be achieved through the realization of 10 basic management principles.

"We are dealing with 10 global issues at the moment: food security; availability of water; climate change; energy demand; waste disposal; extinction of biodiversity; soil degradation and desertification; poverty; political and ethnic instability; and rapid population increase. The solution to all of these lies in soil management," says Lal, with the School of Environment and Natural Resources. "It doesn't mean that agriculture is the only solution, but it plays a major role in addressing these issues."

Lal synthesized years of scientific literature on soil degradation and the positive impacts of restoration and developed 10 basic principles of sustainable soil management. The principles, published in the January/February 2009 issue of Journal of Soil and Water Conservation, as well as the journal Agronomy for Sustainable Development, are meant to encourage policymakers to support soil amendment practices.

"I'd like to see policymakers implement policies which will encourage the adoption of such practices as conservation agriculture, integrated nutrient management, crop rotation, agroforestry - techniques that the scientific community knows would sustain soils and agricultural practices", Lal says.

Lal's principles of sustainable soil management are:

- Soil degradation is a biophysical process, but driven by social, economic and political forces. Minimizing degradation and enhancing restoration depends on addressing the human dimensions that drive land misuse.
- When people are suffering from poverty, they pass that suffering on to the land. The stewardship concept is important only when the basic needs are adequately met.
- You cannot take more out of the soil than what you put in it without degrading its quality. Outputs must balance inputs, says Lal.
- Marginal soils cultivated with marginal inputs produce marginal yields and support marginal living.
- Plants cannot differentiate between organic and inorganic inputs; therefore, it is a matter of logistics in making nutrients available in sufficient quantity, in the appropriate form, and at the right time for optimum growth and yields.
- Mining carbon has the same effect on global warming, whether it is through extractive farming (tillage) or through the burning of fossil fuels.
- Soils can be a source of carbon extraction or a sink for carbon storage, depending on how the soil is managed. If used as a sink, the soil has the capacity to store three gigatons of carbon a year, translating into a reduction of 50 parts per million of carbon dioxide in the atmosphere over the next five decades.
- Even the most elite crop varieties developed through biotechnology and genetic engineering cannot extract water and nutrients from the soil where they do not exist. "This principle is very important. There are those who argue that genetically engineered varieties will solve production problems. Not necessarily true", Lal says. "Improvements can only be realized if crops are grown on well-managed soils."
- Improved soil management is the engine of economic development in rural communities, especially in developing countries.
- Traditional knowledge and modern innovations go hand-in-hand. One cannot solve current global issues without the other. "We can develop upon traditional knowledge, but those who ignore modern innovations must be prepared to endure more sufferings", Lal says.

Lal says he developed the soil management principles to draw attention to the United Nations Millennium Development Goals — a commitment to solve and/or improve upon eight global issues by 2015. The issues include poverty and hunger, universal education, gender equality, child health, maternal health, HIV/AIDS, environmental sustainability and global partnerships.

"The UN defined these goals in 2000 and now we know that none of these goals will be met by 2015. Why? Because soil and agricultural management are not being addressed", Lal says. "If we do not address these issues now by paying more attention to how we can sustain the soil, then 20 years from now we will be talking about the very same things."

Source: Journal of Soil & Water Conservation, January 2009

PACA and the World Congress

The World Congress on Conservation Agriculture held at New Delhi gave an opportunity to PACA to conduct two events that would have an important bearing on its future by contributing to its strategic planning. The first was PACA's Advisory Group meeting where deliberations over half a day helped develop PACA's future strategy to meet its goals. The second event was a session conducted as part of the Congress that brought together many delegates to define expectations for a platform such as PACA to take forward the agenda of CA in the region. Both events are herewith covered in brief.

First Advisory Group Meeting

The first meeting of the Advisory Group was convened on February 3, 2009 at PACA office at NASC Complex, New Delhi. The Advisory Group is to function as a technical backstopping group lending support to PACA for its technical needs. It is a great honour for PACA to have such an eminent team of professionals lending support to it to further the cause of conservation agriculture in the region.

The meeting of the Advisory Group helped address PACA's

PACA Advisory Group Members

I.P. Abrol, Director, Centre for Advancement of Sustainable Agriculture (CASA), an independent not for profit organization was set up in 1999 aimed at achieving goals of Sustainable Agriculture through promotion of resource conserving and environment friendly practices, technologies and policies. He has held several important positions including Deputy Director General at the Indian Council of Agricultural Research and Facilitator, Rice-Wheat Consortium for Indo-Gangetic Plains. His efforts have focused on developing and promoting a better understanding of issues and contribute to further the potential of Conservation Agriculture.

Theodor Friedrich, Senior Officer, Crop Production System Intensification, Crop Production and Protection, FAO is an expert in conservation agriculture with more than 10 years of practical work experience in this area. He has served as Senior Officer with FAO/Rome in areas of agricultural mechanization and crop production systems, with a focus on Conservation Agriculture. His specialization in the field of agriculture covers areas such as agricultural engineering and mechanization, agricultural extension, technical co-operation with developing countries, conservation agriculture and integrated pest management.

Raj Gupta, Coordinator, South Asia, CIMMYT, while serving as Facilitator of Rice-Wheat Consortium spearheaded a major effort to develop and promote Resource Conservation Technologies (RCTs) in the Indo-Gangetic Plains involving the four countries of the region. The positive impact of RCTs is being realized by several hundred thousand farmers of the region. His work in the area of management of salt affected soils too has resulted in improved tillage, soil and crop management practices. Recently he has served as Coordinator, Sustainable Land Management Research Project, ICARDA-CAC, Tashkent, Uzbekistan.

Larry W. Harrington, Research Director for the CGIAR Challenge Program on Water and Food, Department of Crop and Soil Sciences at Cornell University, is an agricultural economist who has worked with CIMMYT, particularly in the Asian region where he worked with national programs on farming systems research. As Director of CIMMYT's Natural Resources Group, he managed projects on sustainable agriculture and NRM in South Asia, Southern Africa, and Mesoamerica. For five years he also took up responsibility on behalf of CIMMYT for the Rice Wheat Consortium.

Amir Kassam, Visiting Professor, School of Agriculture, Policy and Development, University of Reading, United Kingdom consults for FAO and Bioversity International on sustainable agriculture development with a special focus on Conservation Agriculture. He was awarded an OBE in 2005 for services to tropical agriculture and to rural development. He has worked with several national agricultural systems and served various positions including Interim Executive Secretary of the CGIAR Science Council at FAO, Rome. He is Fellow of the Institute of Biology, London, Co-Editor of the Journal of Irrigation Science, and a member of the Platform for Agrobiodiversity Research Steering Committee hosted by Bioversity International, and of Agricultural Innovation in Dryland Africa project hosted by CIRAD.

Dr. Ken Sayre, Regional Agronomist, CIMMYT, Mexico has over 3 decades of experience in international agriculture in Latin America, South, Central and West Asia and China. He served as a Wheat Agronomist with CIMMYT responsible for crop management research activities. Ken has taken a leadership position in Conservation Agriculture at CIMMYT with a focus on development and extension of raised bed-planting technologies for both irrigated and rain-fed wheat production systems, and for zero till based technologies for rainfed conditions. He has contributed substantially to research and extension efforts in countries such as India, Pakistan, China, Iran, and Turkey.

Sanjeev Vasudev, Secretary, SocietySTADD, an independent not-for-profit organisation, has been involved with the subject of sustainable development for nearly a decade prior to which he was involved with the private sector. As a development consultant focusing on areas of rural livelihoods, markets, ICT and institution development, he has interfaced with the subjects of agriculture and forestry from a livelihoods and pro-poor perspective in the Asia region.

future plans and few important points that emerged are shared briefly below:

- PACA needs to define CA for its relevance at different levels; local, national, and international. Emphasis needs to be on creation of knowledge datasets by establishing "benchmark sites or hubs" that could be looked upon by farmers for learning and adoption and would also help in documentation.
- The organisation needs to move forward by advocating the three basic principles of CA, though with a less dogmatic approach to facilitate its introduction into agriculture practices. It also needs to synergise with existing local knowledge and efforts on soil and water conservation practices. As benefits of CA become visible to farmers, they would be motivated to go for its comprehensive adoption with practices such as retention of crop residues on the soil surface or even using the carbon credit mechanism to their benefit.
- PACA needs to ground itself in the region as a catalyst that would call for developing linkages/partnerships with academia and research institutions through projects. Similarly partners such as corporates, NGOs or farmer organizations could facilitate grassroots implementation leading to emergence of "CA champions", helping develop a roster of contributing professionals.
- Recognising that PACA's focus is to achieve national goals, the Advisory Group highlighted the need to establish a national group composed mainly of practitioners in the form of a National Operations Group. The promoters informed Advisory Group members that this process was already underway. The National Operations Group will take forward the vision of PACA with a strong national implementation perspective.
- With PACA strategically deciding to concentrate on rainfed regions, it would be important to put process, knowledge, datasets and design in place. This would allow it to move beyond the rice-wheat cropping system, with an emphasis on larger CA principles.

PACA hopes to adopt the suggested approach while pursuing its implementation agenda that would form its focus in the second year of operations, due to commence soon.

IV World Congress - PACA Session

This second event of consequence for PACA was pursued as a session at the World Congress and brought together many delegates to discuss their expectations from a regional platform such as PACA. The event was chaired by Dr. Theodor Friedrich, FAO and was well attended by over 40 participants who deliberated on recommendations made earlier at the National Consultation on Conservation Agriculture held on 11th December, 2008. As a result of deliberations, the following suggestions emerged on the path that PACA could adopt to engage all interested to collaborate for a cause of national and global importance.

- The existing available research data on "best practices" related to CA should be demonstrated on farmer's field conditions. This should be done by establishing strong linkages among the research-extension-farmer groups in order to gather feedback to improve and fine tune these practices. These actions on farmer's fields would demonstrate facilitation of policy incentives for these practices.
- To operationalise CA, the need would be to build on existing success stories in different pockets of the country and bring together innovative groups of farmers and organizations involved with agricultural R&D. Formal actions were needed to bring about the transformation at the field level by making CA work at a larger scale.
- This would need capacity building at all levels of stakeholders such as the scientific community, development professionals, field workers, machinery manufacturers, policy makers and other stakeholders involved. All these stakeholders could be linked through a common platform of membership to PACA.
- There is a need for CA based course curricula at PG level to form a basis that could be integrated along with current knowledge needs related to climate change, soil organic matter, soil quality, and water management to form a structured learning. This would require build up of human resource and preparation of learning material related to CA with relation to India. PACA can play an important role with regard to fulfilling this need.
- Clarity needs to be established on CA's cardinal principles. This is a major prerequisite for transformation of mindset leading to widespread adoption of CA. As such, considering the wide scope of CA's potential applicability and the stage of its induction, it may be better to not be too rigid about focusing on giving a tight definition to what constitutes CA.
- To bring about change, patience need to be exerted in equal measure at efforts working towards it. Such efforts needed to result in short term/immediate benefits accruing to the farmer through irrigation or fuel (energy) utilized, saving on reduced inputs (raw material), or on hiring charge for equipment such as tractors, forming the basis of comparison.
- Experiences with respect to CA will also vary and need time to establish over different locations. As an example, getting crop residues to be retained on the soil surface will have to be an evolving process. Only slow and rational management of crop residues will allow for results to be seen with economic benefits accruing over time. Efforts to propagate this philosophy should be made by institutions involved with farmers to take up this agenda whole heartedly. Lucrative crop diversification options also need to be offered with explanation of benefits, and processes spelt out to motivate farmers to bring about the change. Given the opportunity and support, farmers could bring about the change since they are sensible enough to take up best practices for their own good.
- There is a need to make an effort to generate common data sets related to edaphic conditions for the entire country. The need is also to bring about awareness and sensitise those involved on issues concerning land cover, land care – preventive and curative, reduced tillage intensity, water management, and organic matter. Simple tools needed to be developed to demonstrate to farmers and community members in community/tribal areas the impact of soil degradation and wind erosion, and need for increase in organic matter. There is a need to position a strong working group to address such needs.
- Learning from global experiences would be useful to operationalise CA to larger areas in India covered by rainfed situations and look for farming systems that are not only more lucrative but also lend themselves to higher resource conservation potential. In irrigated situations too, looking to the present situation where paddy straw is a problem, other cropping systems such as cotton-wheat, maize-wheat could offer higher returns. Looking to the agricultural crisis over the last 5-10 years it was imperative to make strategic choices about where we needed to go by identifying important areas of

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SNIPPETS

NEWS

Advanced Course: Conservation Agriculture - Laying the Groundwork for Sustainable and Productive Cropping Systems 26th May to 26th June '09: The CIMMYT Conservation Agriculture (CA) course links advances and multidisciplinary approach to sustainable crop management with vast experience from developing countries of Asia, Africa and Latin America. The specific objective is to enhance the understanding of use and application of CA planting technologies and relevant agriculture implements (with an emphasis on planters/planter modifications) for irrigated and rainfed wheat and maize production systems. It will help strengthen the ability to synthesize and apply the information and knowledge related to CA. Last date for application is 31st March 2009. For more details please log on to the following web site link: http://www.cimmyt.org/english/wps/events/courses/pdf/announcement_CA_course_2009.pdf

LINKING AFRICAN AND BRAZILIAN CONSERVATION AGRICULTURE EQUIPMENT MANUFACTURERS: The East African and Brazilian Conservation Agriculture Manufacturers' Trade Mission Workshop was held at the training centre of the Instituto Agrônomico do Paraná (IAPAR) in Londrina, Paraná, from 19 to 21 May '08. Link: http://www.act-africa.org/publication/LAB/index.html

PUBLICATIONS

Proceedings of the IIIrd World Congress on Conservation Agriculture, 3-7 October 2006, Nairobi, Kenya: The report can be downloaded from http://www.act-africa.org/publication/IIIWCCA.pdf

Proceedings of the Conservation Agriculture Carbon Offset Consultation: Conservation Technology Information Centre (CTIC) has compiled material from the Conservation Agriculture Carbon Offset Consultation, presented by CTIC and FAO on Oct. 28-30, 2008. For more information, please browse http://www.conservationinformation.org/?action=article&id=46

New Extension Publication Available on Nutrient Management in No-Till and Minimum Till Systems: A Montana State University Extension bulletin is available on nutrient management practices for no-till and minimum till systems. Free copies of the Extension bulletin "Nutrient Management in No-till and Minimum Till Systems" are available on the Web at http://www.msuextension.org/publications/AgandNaturalResources/EB0182.pdf

Geertrui Louwagie, Stephan Hubertus Gay, Alison Burrell (Eds.) 2009 Addressing Soil Degradation in EU Agriculture: relevant processes, practices and policies. Report on the project "Sustainable Agriculture and Soil Conservation (SOCo)", JRC Scientific and Technical Reports, 229p. For further details please see link: http://eusoils.jrc.ec.europa.eu/ESDB_Archive/eusoils_docs/other/EUR23767.pdf

Palazzo dei Congressi, Piazaale J.F. Kennedy 2009 Research and innovation for smallholder farmers in the context of climate change. Discussion Paper for Round Table 3, Governing Council 18-19 February, 2009. For downloading the paper please log on to http://www.ifad.org/events/gc/32/roundtables/3.pdf

Factbook on Conservation Agriculture

This book produced by PACA explains concepts of conservation agriculture in a concise and easy-to-read manner and can be downloaded as an electronic publication from www.conserveagri.org/factbook.pdf

PACA and the World Congress *Contd from page 7*

agriculture production, and targeting the food production system. Farmers will adopt and adapt and will drive it further if technology is beneficial to them. This would require high priority to be given at the policy level coupled with financial support for up-scaling.

- CA could be facilitated for operationalisation as a scheme by the Government of India. Opportunities within the agricultural research system too could be explored, such as the World Bank funded National Agriculture Innovation Project (NAIP), by building a larger program that could involve various organizations such as HAU, PAU, CSSRI, DWR, PDCSR, and CRIDA. PACA could take the lead to take forward CA as an innovative approach to meet the goals of sustainable agriculture As there was sufficient interest on the ground with many organisations showing an active interest to strengthen this agenda. Discussions needed to be initiated with existing organisations involved with the subject.
- PACA can also look to opportunities to work with international organizations such as, FAO, CIMMYT. It could also approach other countries such as Australia and Canada, who had experience in the subject with an established track record.
- The need for PACA to become a legal body which has been functioning mainly as a platform of two not-for-profit organizations was also felt. The structure of the organisation would need to bear in mind that PACA has to work in a collaborative manner, build on low hanging fruits, and be extremely cautious of constraints that may hinder its efforts. It will be very important at this point of time to make a good beginning to showcase and demonstrate positive experiences of CA in selected regions through a system of contributory alliance.

This event at the World Congress was a success for the clarity it brought to expectations from those who wished to collaborate with PACA for the cause of national good.