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Conservation Agriculture newsletter

Getting Agriculture to Work for People and the Environment

Conservation Farming, Productivity and Climate Change

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A Slow Burn

Across Africa. tens of millions of poor families depend on soil and rainfall to provide the basic necessities of life. Many occupy land they do not own, have little or no collateral, minimal education and eek out an existence at the whim of nature on shrinking portions of land. Productivity is dwindling, food insecurity is spreading and alongside is increasing dependency on aid.

At the apex of the development industry these trends have been the subject of mountains of research, of academic theses, and even bestsellers. They have caused the emergence of powerful lobby groups, myriads of NGO's and have attracted the attention of philanthropic behemoths. For decades they have provided lucrative careers for consultants and experts who clog the conference halls and lobbies of Africa's fancier hotels.

Yet despite all this attention the indicators continue to plunge inexorably downward. Surplus producers generally the minority, teeter on the edge of subsistence and those who could at least feed themselves in the past have become intermittently or regularly dependent on aid. In general we associate food relief with biblical disasters manufactured by man or nature, but in recent years the relationship between severe food shortages and such disasters has become tenuous. Hunger can be found thousands of miles from these catastrophes and is experienced by families that have never heard of them. It exists whether the rains are adequate or otherwise and advances or retreats relative to the proximity of the previous or forthcoming harvest. It has become commonplace and independent of dramatic causes.

Poverty is spreading, land degradation and deforestation are accelerating, and millions of farmers are busy depleting the soil upon which they and future generations depend. For as long as most of us can remember and beyond, these trends have been accumulating like a slow burn that on occasion draws our attention by igniting into a fire. Distracted by symptoms of these emergencies it is clear that we have failed to attend to their origins.

The Alms Industry

The social consequences of hunger and poverty are too numerous to repeat but suffice it to say that the hungry must be fed and that feeding them is extremely expensive. The cost of administering the delivery of one bag of maize to a needy family is normally between 3 to 4 times its market value and determining who is sufficiently impoverished to qualify for it is a complicated and imprecise business. Food aid often overflows into the buckets of those who do not require it to appear on the market where it depresses prices and discourages those who had the foresight to invest their energy and modest assets to produce a surplus. In recent years, the organization and delivery of food relief has become big business and the interdependence established between 'givers and receivers' of food is one of the least attractive features of multinational development industry.

Trade

Iniquitous terms of trade and subsidies enjoyed by farmers in the west are often cited as reasons for this decline. However, even if the playing field was levelled tomorrow it is unlikely that the majority of African farmers could respond. Much of the continent's soils are severely degraded and few farmers have the resources or knowledge to resurrect their fortunes. If farmers are ill prepared for the challenges and opportunities ahead then development agencies and national governments are equally so.

Smoking Mirrors

Over the past 30 years and well before the advent of HIV/Aids, the science of agriculture which has provided so many benefits on other continents has been demoted and replaced by complicated and unmanageable social welfare programmes sponsored by donors and implemented by NGO's. The English language itself has been rendered almost meaningless to advance this shift of emphasis. Community mobilization, community coordination groups, safety net management capacities, focus group assessment, positive deviance enquiry, trigger indicators, strategic incrementalism, livelihood frameworks etc have found usage amongst practitioners. Among these, the word sustainable is commonplace yet if sustainability (whatever the definition), is the standard by which these initiatives are measured, never mind the more ambitious goal of progress, they have left few if any imprints. Social advocacy has evolved into a culture where expressions have become the masters rather than servants of thought reminding us of John Quincy Adams who remarked that 'slovenly language corrodes the mind'. It is no surprise that thousands of earnest young graduates sucked into this virtual world become confused and disconnected from reality.

IN THIS ISSUE

Humanitarian undertakings are motivated by the need to respond to symptoms of communities in distress, and it is obvious that collective enlightenment is the best approach where entrenched traditions or a lack of knowledge have negative consequences for entire societies such as the transmission of HIV/Aids, the repressive treatment of women, or the unnecessary loss of infants. But initiatives of this nature are of little value when it comes to advancing economic progress from farming irrespective of the fact that the concepts and ideologies they have spawned are promoted so earnestly. In recent years the jargon associated with these efforts has infiltrated the agricultural lexicon bringing in their wake a mishmash of unintelligible theory and muddled thinking. Programmes are excessively complicated, objectives are unclear and results if any, unquantifiable. What are we trying to do? What is there for farmers to grasp, and where are these close knit communities eagerly waiting to be mentally collectivized toward the achievement of prosperity?

When farmers are exposed to these ephemeral concepts it is their most pressing needs that crowd their thoughts and fragment their attention. Is there sufficient food to carry the family through to the next harvest? How will they pay for school uniforms and books, contribute toward the cost of a funeral, purchase that bicycle, or solar panel so the children can study in the evening, replace that thatched roof with iron, find enough money to buy fertilizer and seed as the planting season approaches, or recover money lent to a distressed relative? Mostly they come because of the promise of a meal or a sitting allowance, knowing that what is on offer will have little impact on their lives.

Farming is about mastering innovation, it's about timeliness, precision, attention to detail, about judging and spreading risk and conserving assets, the most important of which are provided by nature. And when farmers plant and tend their crops they are alone in their fields with only their immediate families to rely on.

Communities and Cooperatives

The rapid spread of mobile phones to the remotest outposts reminds us that progress thrives on the solution of individual needs. The frequent collapse of agricultural cooperatives in Africa is not necessarily due to political interference, corrupt officials or because the concepts are alien. It is often because there is insufficient production to sustain them and therefore

nothing to cooperate about. Urban agitation over escalating food prices grasps the media's attention but in many parts of rural Africa, less demonstrative consumers far outweigh producers and cooperatives where they still exist, are often used for the purpose of delivering subsidized inputs or food.

Productivity Must Come First

Since late 60's, millions of dollars have pursued the idea that in order to access markets, farmers must organize, learn the principles of business and establish hierarchies to administer their activities. Fair enough, but all too often this idea has failed because it is productivity that must come first, there must be something to sell, a collective surplus generated by individuals. Where production has not been ousted by philanthropy or misguided agrarian reforms, the private sector will navigate the longest and dustiest roads to find it and with

a little prompting the producers will eventually recognize the economic benefits of closer cooperation.

King Maize

While NGO's have been casting their nets to arrest the submergence of rural communities, what have governments been doing? Here we must turn our attention to the crop Maize. Domesticated in Mexico over 7,000 years ago and introduced to Africa in the 16th century along the slave routes, it has for over 60 years been the object of extraordinarily skilful genetic manipulation. It is almost unrecognizable from its wild ancestors and has the highest yield potential of all grains. From the borders of Kenya's northern frontier to the Cape, Maize is king. A meal without it is no meal at all and for decades, the threat of social unrest arising from shortages or increasing prices has fuelled political anxiety.

In general, African politicians are suspicious of free market economics, of the theory that with the removal of trade barriers commerce will flourish and smooth out any bumps along the road. They have some justification, the west does not abide by these rules and they know that events such as the southern African drought of 1991/2, the collapse of Zimbabwe's agricultural industry, or the sudden intervention of the World Food Programme in neighbouring markets can diminish reserves and overwhelm the logic of free trade. But mostly politicians know that occupants of shanties that surround their overburdened cities, mainly escapees from the grind of subsistence farming, live hand to mouth, spend most of their income on food and are easily swayed by populist opponents.

There is nothing new about the politicization of Maize. The 'Maize Control Acts' of 1930 in Southern and Northern Rhodesia and the 'Native Produce Ordinance' in Kenya in 1935 created state purchasing centers in European farming areas, enforced a two tiered pricing scheme that favoured the settlers and established restrictions on the movement of grain from African farming areas to towns, mines and other major consumption centres. The motivation for intervention in Maize markets may have changed but the instruments still exist. In Zambia, the Food Reserve Agency and Fertilizer Support Programme represent the most recent derivatives of policies inherited from the British.

The threat of rapidly escalating prices arising from shortages will always trigger government intervention. Price fixing, export bans and inefficiently administered fertilizer subsidies are applied and national coffers are emptied while the true causes of pitifully low productivity are ignored.

Maize Production in Zambia

In southern Zambia the predominance of Maize was highlighted by an aerial survey in the wake of the 1991/2 drought which showed that it occupied 95% of land cultivated by smallholders, an extreme example of the practice of mono-culture.

Despite its astonishing potential, Maize is not necessarily the best choice to feed a nation. It demands precise management, is labour intensive, increasingly expensive to grow and susceptible to dry periods. But history has lumbered us with this crop and farmers across Africa must get far more out of it than they do at present. American farmers relying on rainfall alone produce about 270 million tons of Maize a year and average over 8 tons

2005/6. One of the best seasons on record was of little use to this lady and many thousands like her

per hectare. African farmers get about 1 ton just enough to feed one family for a year and even in seasons of reasonable rainfall they often get nothing at all. But this is also good news, because our farmers are nowhere near the potential of this thoroughbred staple and there is more than ample room for improvement. Some extraordinary Maize statistics from Zambia are worth mentioning here. Of the total 4,410,000 hectares of Maize planted by smallholders between 2000 and 2008, 1,440,000 hectares or 33 per cent was abandoned.

Zambia is an interesting case because smallholders are about as poor and unproductive as elsewhere and even when the rains are fair, NGO's can be found clustered around local crises dishing out – yes Maize. Even in 2005/6 one of the best rainy seasons on record, farmer's abandoned 155,800 hectares or over 20 per cent of the Maize they planted. Equally significant is the fact that 70 per cent of smallholders sell no Maize at all while 80 per cent of all sales come from only 10 per cent of them. And yet rural Zambia is relatively empty, 15 persons per square kilometre compared with 150 in Malawi, and only 15 per cent of the land could be farmed.

Most rural Zambians like their urban counterparts are consumers rather than producers and are similarly distressed by sudden price hikes. Zambia's experience questions the assumption that population pressure, shrinking parcels of farmland or even adverse climatic conditions are the principle impediments to growth.

Increasing Productivity and Adapting to Climate Change

Overshadowing this gloomy backdrop we have the threat of climate change. As this article is written, we hear that 22 million families across parts of Ethiopia, Somalia, Uganda and Kenya need feeding. Is this a portent for worse to come as increasingly unpredictable weather patterns squeeze more and more rural families to the wall? It would appear so because the majority of smallholders are already incapable of feeding themselves. With the fastest population growth rates in the world mostly urban, how will the continent feed itself in future, and are the sporadic crises we face today the early

Across East Africa smallholders have plots of 1.5 acres upwards ploughed by contractors or dig their soil over with hoes

symptoms of an irreversible calamity that climate change will trigger in the next decade or three?

If the meteorologists predictions come true, it is to a large extent how one family, and through extension how millions of families husband their land, that will determine their prosperity if not survival.

Soil is a living medium and the intervention of farming can either sustain or destroy its ability to produce healthy plants. Estimates of soil depletion and land degradation in Africa range from alarming to catastrophic and are difficult to verify. Some suggest that 70 per cent of agricultural land suited for raising livestock and crops is already severely degraded. Whatever the facts, any astute observer travelling across the continent cannot but notice the injurious treatment of soil on a massive scale. Compared with temperate soils, African soils are fragile, relatively infertile and more prone to rapid deterioration when farmed.

The Turning and Churning of Soil

From East Africa to the Cape, millions of tons of top soil are turned and churned with hoes, ploughs and harrows every year before or after the onset of the rains in a hugely destructive and wasteful effort to establish crops and eradicate weeds. For almost a century it has been like this because this is 'farming', this is what we do because our fathers did and our grandfathers before them. Indeed, the plough introduced to Africa by colonists at the turn of the 20th century predates Christianity by nearly 2000 years!

In Malawi smallholders split ridges each dry season moving over 500 million tons of soil with hoes or about 300tons/ha.

The combination of continuous soil inversion, burning of crop residues and mono-cropping of Maize are principle causes of declining productivity and the degradation of arable land. Some ideologues like to add fertiliser to this toxic mix. This is

Continued on page 6

The Big Quandary Facing Nitrogen Fertilizer Management for Conservation Agriculture Based Seeding Systems

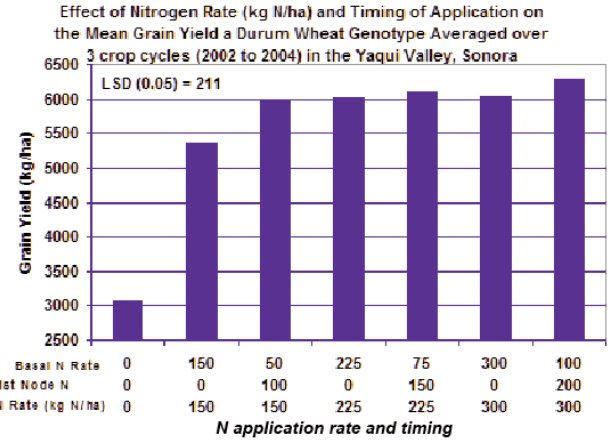
Use of the Normalized Difference Vegetative Index Sensors to Enhance Nitrogen Use Efficiency

Dr. Ken Sayre

The cost of nitrogen (N) fertilizers applied to crops like wheat, maize, sorghum among others, represents one of the major production expenditures facing farmers, especially when these crops are grown under high-yielding, irrigated conditions. And one of the most aggravating issues related to N fertilizer management/cost is the fact that, in many cases, the efficiency in the use of applied N fertilizers, again especially for irrigated crop production systems, tends to be low primarily due to inadequate and ineffective management practices (mainly related to the use of incorrect fertilizer formulations, inappropriate timing, and methods of fertilizer application) that most farmers use to handle the N fertilizer application.

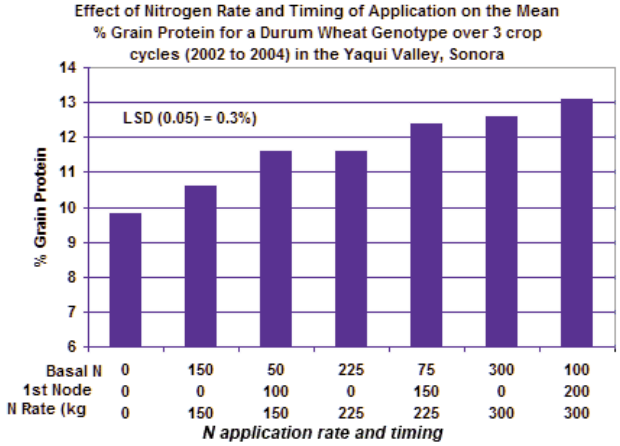
In a presentation that was made by Prof. Dr. Wang Pu at CAU in Beijing in September 2010, he indicated that the Nitrogen Use Efficiency (NUE) for irrigated winter wheat in the Yellow River Basin was 30-35 per cent and, incredibly, the estimated NUE for irrigated summer maize was only 10-20 per cent. These inefficiencies are apparently mainly related to excessive N application rates associated with government fertilizer pricing and food security policies, local governmental officials pushing farmers for high yields regardless of cost combined with poor application practices.

The NUE estimate above for irrigated winter wheat in the Yellow River basin is similar to what has been estimated for irrigated spring wheat in farmer fields in the Yaqui Valley, Sonora, Mexico and is also comparable to the estimated average world-wide NUE of 33 per cent made by *Bill Raun et al* in their chapter 10 in "Making the Wheat Crop".



Above is a graph showing the effect of N rate and time of application of N fertilizer on the grain yield for a durum wheat, advanced line averaged over 3 crop cycles at Yaqui on tilled raised beds. As can be observed, there is a marked yield advantage to apply 1/3 of the N as basal and 2/3 of the N at the 1st node stage, especially for the 150 kg N/ha rate as well as, to a lesser degree, the 300 kg N/ha rate as compared to applying all N as basal. In any event 150 kg/ha N applied as a split application was similar in yield to the 225 kg/ha N rate.

Likewise as can be seen in the graph on top of next column, the split application produced very clear increases in grain protein content for all N rates. The graphs illustrate the benefits of split applications to improve NUE and grain quality in wheat and observations which have provided the main incentive for many organizations/commodity programs to recommend split N applications for wheat and other crops, especially for irrigated production conditions. And split application of N fertilizers also provides the main support for the use of leaf color charts, Spad meters and especially the NDVI sensors like the Greenseeker etc



as useful tools for improving N management – less basal N, more post emerge N application.

The main rationale for the use of the Greenseeker NDVI sensor is that, if farmers can be convinced to reduce the amount of N fertilizer that they apply pre-plant or at planting to no more than 15-30 per cent of estimated total N requirement, then the growth status of the plants at a critical stage of development for N-uptake (normally around 1st node stage for wheat) can be assessed by the NDVI sensor to more precisely determine the amount of N fertilizer that is needed to be applied at the more opportune time to meet yield and/or quality targets and reduce N fertilizer losses.

For various reasons (low, subsided N fertilizer costs, lack of efficient implements to efficiently and effectively apply substantial amounts of post-emerge and, most likely, the fact that farmers are unaware of the advantages of split applications among others) many farmers tend to apply most or all N pre-plant or at planting. This has been a very common practice of farmers growing irrigated wheat in the Yaqui Valley, the Bajio and other areas in Mexico as well as in other parts of the world. Farmers in the Yaqui Valley have commonly applied average total N rates between 250 to 300 kg N/ha (even more in the Bajio) with 80+% applied pre-plant which has led to the low NUE observed in the Yaqui Valley . Unless farmers like these can be convinced to reduce their basal N application to less than 70 per cent of total N applied with the remainder of the N applied in an appropriate, efficient manner with the most appropriate N fertilizer sources (banded or if broadcasted under tilled conditions, immediately before irrigation), the common post emerge application practices to inject NH_3 as gas or dissolve in irrigation water are unlikely to be very effective. Nor will foliar applications be effective, with most existing products if applied at the needed, higher post emerge N rates compared to what is commonly applied as foliar sprays in rainfed production conditions. due to phytotoxic effects.

The key to successful and common sense use of the Greenseeker, however, is to clearly demonstrate to farmers the benefit of reducing pre-plant N so that it can be used to program more relevant N post-emerge applications when the plants are taking up N at a more efficient, higher pace. Otherwise the utility of the Greenseeker to increase NUE and reduce N fertilizer costs will be dramatically diminished if farmers continue to apply high pre-plant N rates and then use the Greenseeker to only "fine tune" their post emerge application of the remaining relatively small proportion of total applied N.

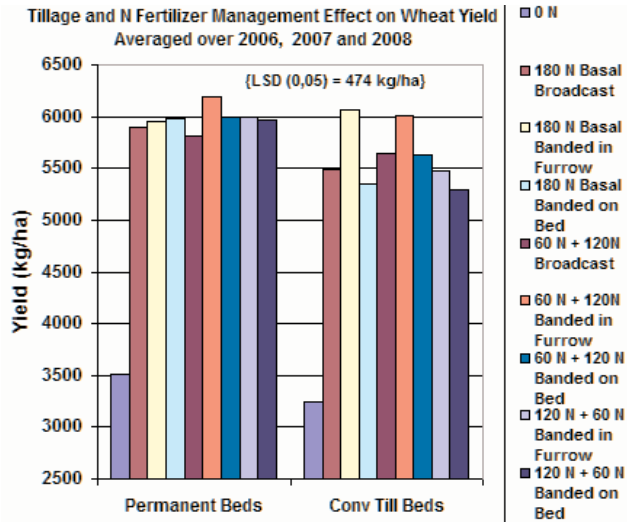
I have always wondered why this strategy that clearly demonstrates to famers that dramatic reductions in the basal N rate combined with the application of a much larger proportion of total N post

emerge in order to use the Greenseeker more effectively was not more prominently explained and demonstrated to irrigated wheat farmers in the Yaqui Valley as the Greenseeker was initially being demonstrated to farmers. I would think that the main focus of the initial efforts should have been to introduce the Greenseeker over the past few years instead of apparently giving much more emphasis to going along with the existing, continued inefficient use of high pre-plant N rates as farmers use the Greenseeker to fine-tune the much smaller post emerge N applications. Hopefully this approach to the development and delivery of the Greenseeker N management technology to farmers in Mexico and other countries now concentrates more on achieving immediate reductions in basal N applications where farmers are using high pre-plant and planting N applications.

Essentially what I have discussed above is related to conventional till situations and mainly to irrigated production conditions where markedly higher N rates are used as compared to most rainy conditions. As has been seen with the use of the Greenseeker for rained winter wheat in places like Oklahoma, the total N applied may not be more than 70 to 80 kg N/ha so when 15-30 per cent total N is applied as basal (probably banded at seeding), the remaining amount to be applied at the 1st node, for example, can be effectively applied by foliar application without phytotoxic effects.

But when farmers decide to properly use Greenseeker technology by reducing basal N applications to 15-30 per cent of total N, the amount of N needed to apply post emerge will likely be too high to apply in a single foliar application and multiple applications may be too costly or inconvenient. However with irrigated, conventional till wheat seeding systems, many farmers may already have the equipment to band apply granular fertilizers or they can even broadcast granular N fertilizers onto the tilled surface if they can irrigate very soon after the broadcast application or by hand broadcast very soon after the irrigation that is common in South Asia.

And so now we come to the big quandary in relation to the use of N management systems like the Greenseeker to improve NUE and reduce N fertilizer costs in combination with CA-based seeding systems that seed into retained crop residues on the crop surface (a good example is zero till seeding of wheat into 7-10 t/ha of surface retained rice straw in Northwest India). If we want to reduce basal N application rates to apply a much larger proportion of total N post emerge, how can we apply these rather large N rates and effectively use sensors like the Greenseeker to improve N fertilizer management with CA-based practices? Since the main N fertilizer source for post emerge applications in most developing countries is still normal urea, and post emerge broadcasting this urea on top of the surface residues is the most common practice in many countries, what approaches should be used for CA-based systems where broadcasting on top of crop residues will likely lead to potential large increased losses by N volatization?



One relevant factor that I have observed in trials with irrigated wheat at CIANO which compare N management strategies for seeding on tilled raised beds with incorporation of crop residues versus seeding on permanent raised beds with crop residues retained on the soil surface is that there is more stability in wheat yield for the different N management with the permanent raised bed as compared with tilled raised beds as can be observed in the graph at the bottom of the earlier column. Raj Gupta has indicated that he has observed very similar wheat yields when all N is applied as basal to zero till wheat after rice compared to split N applications. And I believe that Raj is advocating application of all N as basal by banding at planting as opposed to split applications where the only alternative is broadcasting urea onto the surface residues.

These examples may indicate that there is potentially more flexibility for N application methods/timing for irrigated CA-based seeding systems than tilled systems and especially for flood irrigated, flat solid stand planting, it may be more efficient for CA-based seeding systems to apply all N as basal as compared to splitting if broadcasting on top of the residues is the only feasible option.

The all basal application approach may be further reinforced for both conventional tilled systems and CA-based systems if the progress that is being made with controlled release N fertilizers really comes to fruition. I recommend that you read the recent article in the Agronomy Journal from China testing a new controlled release urea for irrigated wheat in Shandong, China. (*Yue-Chu Yang et al (2011), Controlled Release Urea Improved NUE, Yield and Quality in Wheat; Agron. J. 103:417 – 485*). The results presented in this paper indicate an apparent tremendous potential for single basal N applications with this controlled release from urea for irrigated winter wheat as compared with split application or normal urea which should also be applicable for CA-based seeding systems.

Please note that any strategy that relies on efficient and effective application of all applied fertilizer N as a basal application completely eliminates the feasible use of sensor technologies like the Greenseeker – thus the quandary.

Obviously it will be some time until the controlled release urea described in the article or from other sources is widely available (if ever – I have been waiting a long time for the promises of slow release urea etc) but this new product from China looks very promising and CIMMYT should try to contact and develop collaborative activities with this group.

In the meantime, for irrigated CA-based systems, especially for seeding on the flat, all basal, band N application may be more efficient that broadcasting post-emerge N applications onto large amounts of surface retained crop residues, which largely obviates the use of the Greenseeker. However, another feasible strategy is to develop and deliver to farmers CA-based, permanent raised bed planting systems whenever possible especially for surface irrigated, diversified crop production systems including those that include rice. The field access provided by the permanent raised beds offers the straightforward opportunity to band apply post emerge N fertilizers.

Raised Beds Rule!!

Contribute to Knowledge Sharing on Conservation Agriculture

PACA Newsletter welcomes contributions on the subject of conservation agriculture from different regions of the world. The newsletter has a wide circulation around the globe and very many readers can benefit from the learning shared. Do write in with your experiences at info@conserveagri.org.

Hiring oxen to plough costs about $60/ha and the investment is often fruitless. Time required 14 hours/ha. 100% disturbance

delusional. In Zambia 67 per cent of smallholders use none at all and across the region excluding large scale producers, utilisation averages about 10kg/ha. Fertiliser is an essential ingredient for production of Maize and other cereals but it is the manner and farming systems in which it is used that matter. Many experts agree that without fertiliser, the carrying capacity of our planet would be less that 50 per cent of the current population.

There are other equally important reasons for abandoning the plough. In Zambia, Corridor disease has decimated cattle herds and at least half the farmers in the country's Maize belts rely on hiring animals to plough. Owners begin ploughing at the onset of the first rains; in mid to late November; relatives come next, and after them the less fortunate. And so ploughing continues through December and even into early January. For each day of delay from the first opportunity to plant, farmers lose 1.5 per cent of final yield. Each year across Zambia, farmers can be found ploughing long after there is any chance of producing a crop as was the case in this photo. 'We are farmers so we plough'.

Conservation Farming

Conventional tillage methods were first questioned in the aftermath of the dust bowl in the US mid west where the combination of drought, removal of natural vegetation and excessive soil disturbance from ploughing and harrowing destroyed over 100 million acres of farmland and caused extreme hardship for over half a million families. Around the world Conservation Farming (CF) is referred to by other names, such as No-Till, Residue Tillage, Conservation Tillage and Zero Tillage depending on the amount of soil disturbance, the degree of soil cover and crop rotation.

Whatever names are used, the most important principles are constant and relevant to all arable farmers whether they use a hoe, oxen or a tractor with satellite navigation – reduce soil disturbance to the minimum possible, maximize soil protection to the degree possible by preserving the previous harvest's residues, and rotate. Achieving these elemental goals in different farming conditions is the subject of continuous

Hoe minimum tillage in Zambia

refinement. Today nearly 130,000,000 hectares of the world's crop land is farmed using these methods, with 85 per cent in the US, Brazil, Argentina, Canada, Australia and Paraguay, yet Africa a continent that could benefit so much from these practices, contributes less that 0.5 per cent of the total.

Conservation Farming in Zambia

Conservation farming (CF) has been continuously promoted by the Conservation Farming Unit of the Zambia National Farmers Union (ZNFU) since 1996 with the support of the Norwegian Government. More recently the Ministry of Agriculture and other organizations have become involved and today it is estimated that between 160,000 and 180,000 families apply the basic forms of CF on portions of their land. Adoption is increasing year by year and it is expected that by 2012 there will be 240,000 adopters. This is good news because ask any of the many thousands of farmers who have adopted CF and they will tell you that they are more food secure, they have surpluses'to sell, can avoid labour peaks, reduce costs and produce good crops in all but driest seasons.

Hoe minimum tillage allows farmers to complete land preparation in the dry season, plant on time, reduce soil disturbance from 100 per cent to 10 per cent, reduce labour peaks and apply nutrients more accurately. Crops establish more evenly, harvest rainfall and survive long dry periods that are common during the rains. The same planting positions called 'basins' may be occupied by different crops, but are returned to each season.

Animal Drawn Minimum Till

The principles of ADP minimum tillage are the same; instead of ploughing, ox farmers rip planting furrows in the dry season and when they have completed their own land preparation they can rip for neighbours. Ripping takes 4 hours per ha. compared with 14 hours for ploughing and can be done throughout the dry season making better use of scarce oxen. Costs for farmers hiring in these services is much less than ploughing and they can also plant on time. Soil disturbance is also minimized and the furrows concentrate early rainfall. Skilled farmers can rip the same furrows each year increasing depth and maintaining the same rows to establish different crops.

Animal Drawn Zero-Till

ADP Zero Till is becoming popular with farmers in Zambia who cultivate 5 hectares and above with examples of farmers who have estabished up to 20 ha. of crops. Wait for the rains, drill fertiliser, seed, and even lime in 1 pass. Apply glyphosate to kill weeds before the crop emerges. Its just a matter of careful training, attention to detail and a reliable local agent with a stock of spare parts.

Farmers with tractors who rip instead of plough reduce diesel consumption from 15 litres/ha to 6 litres/ha thereby cutting costs and can make a profitable business out of providing this service to customers at a lower price. In east Africa tractor operators already exist, they just need to convert their equipment. Supporting the emergence of privately owned mechanised minimum till services is an obvious priority.

Basic mechanised minimum-till. Cost to client about $50/ha. Time taken one hour per hectare

Farmers Don't Have to Wait

Equally important is the fact that smallholders do not have to wait for the benefits of CF. More precise application of nurients whether organic or inorganic, early and accurate planting, rainwater harvesting in planting zones, improved crop emergence and more optimal plant populations combine to provide a dramatic effect on crop yields in the first year. Independent research in Zambia and Zimbabwe has shown that yield increases range from 25 per cent to over 100 per cent for all crops in the first year. In seasons of poor rain distribution (as in year 2009-10), CF can make the difference between total crop failure and a reasonable yield. The medium term benefits including improvements to physical and chemical properties of soils in planting zones and the reversal of soil depletion and land degradation that arise from rotations, minimal soil disturbance, and residue retention (where possible); are equally important but would not alone entice farmers to adopt.

Perhaps a better name for Conservation Farming would be Common Sense Farming because it is practical, relatively easy to adopt, costs less, produces more, improves soils and performs better in dry and wet seasons (ask the many thousand adopters).

The Step to Conservation Agriculture

De-forestation in Zambia is reckoned to be the fourth highest per capita in the world and small-scale agriculture is the

A formally established stand of young Faidherbia albida over hoe CF at GART in Zambia

principle cause. When soils are judged to be exhausted, families in Zambia's Maize belts migrate locally or to long distances to fell virgin or rejuvenated woodland. The fact that over 60 per cent of smallholders do not use fertiliser on Maize aggravates this situation. The widespread planting of *Faidherbia albida* combined with CF can replenish soils, increase Maize yields, minimise dependency on fertiliser, and enable small-scale agriculture to become associated with re-forestation.

Faidherbia is the only known tree to display reverse phrenology. In mono modal rainfall situations it defoliates after the onset of the rains and re-foliates toward the onset of the dry season. This leguminous tree can be found across the Sahel from the Atlantic to the Red Sea, and from Namibia and Southern Angola, through Natal, Lesotho, Zimbabwe, Zambia, Tanzania, Kenya, Ethiopia, Somalia, Yemen, Israel and Jordan. Faidherbia is found 270 metres below sea level near the Dead Sea and up to 2,300 metres in Jebel Mara in the Sudan. Rooting depths of 40 metres have been recorded. In natural circumstances the seeds are disbursed by game and livestock eating the pods.

Most of the research on this tree dating back 60 years has been undertaken in the Sahel. Through leaf and pod fall and nitrogen fixation in association with micro-organisms, fertility accumulation per hectare under mature canopy is claimed to be in the region of: 75kg N; 27kg P_20_5; 183kg CaO; 29kg MgO; 19kg K_20 and 20kg S. This would be equivalent to about 300kg of complete fertiliser and 250kg of lime. Irrespective of the veracity of these claims, mature Faidherbia has a dramatic effect on Maize yields as trials in Zambia and Malawi have shown. The photo of the CFU trial on the right, 1 of 40 sites, highlights the difference between the Maize under and outside the tree, all with zero fertiliser. At harvest Maize yields under the trees averaged 5.12 tons/ha and outside 2.65 tons/ha.

Trial under and outside mature Faidherbia - all zero fertiliser

Experience from Malawi shows that farmers growing unfertilised Maize under Faidherbia over many years consistently achieve up to 2.5 times the yield of unfertilised Maize grown in the open.

In Zambia, the CFU started promoting establishment of this tree by smallholders in 2005. The aim is to have 25,000,000 trees established by 2012-13. In stands of 100 trees per/ha, this equates to 250,000 hectares. This goal is of course not easy, the benefits take 8 to 10 seasons to begin emerging, a long time for smallholders and the young plants can be damaged by livestock, be uprooted during weeding etc. Nevertheless the combination of Faidherbia with CF is probably the most effective climate change adaptation strategy available to smallholders in regions that are suited to the tree and if it takes considerably longer to achieve this goal, so be it.

Research into Local Adaptation

There will be researchers who read this and will propose that much 'local adaptation' will be required if CF is to take off in different agro-regions and countries, and that blanket recommendations are dangerous and more research will be needed. This idea confuses what happens before i.e. tillage with what happens afterwards i.e. cropping. 'On the ground' must be separated from 'above the ground'. Ploughing, harrowing, overall digging or ridge-splitting are the conventions that blanket what the vast majority of smallholders do to establish their crops. Minimum Till and Zero-Till are the 'non negotiables' on which CF/CA is built and they provide a foundation that can accommodate a wide range of agronomic practices, planting configurations, crops and cropping systems suited to local conditions including rotations, inter-crops, relays, and agro-forestry trees.

The Democratisation of Technology

An archaeological dig?

Institutions and NGO's have the habit of reinventing themselves to accommodate latest fads popularised by donors and Conservation Agriculture is becoming essential terminology for the proponents of 'climate change adaptation strategies' for the poor. The problem is that few understand what CA is and the description now encompasses just about everything and therefore nothing. Why bother with detail so long as you are familiar with the words? Pit farming, manuring, composting, fallow cropping, agro-forestry, collecting rainfall from roofs and much more applied individually or collectively qualify as CA. Indeed, CA now appears to justify opportunities to undertake all kinds of misguided impractical experiments with hard pressed smallholders. The above picture presents an example of a 'model CA pit system' for Maize production we were taken to visit recently by an NGO. One has to admire the extraordinary amount of unnecessary work the farmer, in this case a woman, undertook to oblige the promoters of this daft idea.

Where do these extraordinary recommendations come from? Most likely, a succession of multidisciplinary workshops, where in the interests of collectivism every specialist imaginable including the totally inexperienced are invited to contribute. The inevitable result is confusion followed later by widespread scepticism about a technology that if correctly applied could provide very significant benefits to smallholders.

Dead weeds provide a temporary 'in situ' mulch

Weeds are a big problem for all farmers irrespective of the way they farm. Used correctly, herbicides can reduce labour for hand weeding by 70 per cent or more, a task undertaken mostly by women and children. Herbicides reduce costs for farmers who hire in labour to weed, increase yields and enable them to expand production. In Zambia the CFU is training farmers how to use herbicides appropriately, a task that requires extreme attention to detail. Last season sales through agro-dealers jumped 400 per cent and sales are expected to quadruple again this year. Clearly farmers appreciate the many benefits and it is extraordinary that the green lobby clamours so stridently against products that are utilised universally in the west? How many of these idealists have ever picked up a hoe and tried to weed one hectare?

Getting to the Farmers with Training, Advice and Services

Across Africa the production of sufficient food from the land the most fundamental of all enterprises is in deep trouble. We know from our experience in Zambia that CF offers farmers many spectacular benefits, and that it is the best 'on farm' solution for farmers to increase productivity and adapt to climate change. However many questions remain. Where are the agriculturalists with the knowledge and field experience to appreciate the potential offered by CF/CA and where they still exist what influence do they have with the strategists, planners and policy makers whose knowledge of farming is often zero? After four decades of 'capacity building' where are the organisations on the ground that can deliver the necessary practical advice to farmers on a meaningful scale and focus exclusively on this objective? Drive down a side road anywhere in East, Central or Southern Africa and ask the farmers you meet if they have ever had any useful advice about anything to do with farming, the vast majority will say – 'never'.

The Private Sector

Any development activity (including the promotion of CF/CA) that is not established on the premise that it should eventually do itself out of business by constructing a foundation on which the private sector can flourish is doomed to failure. Unfortunately private enterprise has for decades been marginalised by philanthropy or politics and many small farmers have got used to the idea that agriculture is a subsistence enterprise and that the gap between what they produce and what they require to subsist, never mind advance, will in one shape or another be provided for. Ill advised and mismanaged loan schemes promoted by government institutions, projects and NGO's litter Zambia's past and have amplified the risks of extending finance to small farmers.

Nevertheless, increased productivity creates new opportunities to engage farmers in the delivery of financial and marketing services. The most promising include, (i) securitised lease/purchase deals to promote the growth of mechanised min-till, weed control and other specialised services, (ii) warehouse receipt systems that enable farmers to collatoralise stored commodity, (iii) the propagation of market information through mobile phone networks, and (iv) the establishment of commodity exchange platforms that provide more competitive and transparent marketing mechanisms. The financing of agro-dealer inventories to cater for increasing demand for equipment and inputs and the utilisation of electronic voucher systems to

streamline and secure the movement of funds related to the exchange of services and the provision of social transfers and smart subsidies.

Over-production

'If smallholders double their productivity what happens to prices?' We have all heard this question repeated endlessly at seminars and workshops. However is it not productivity that farmers the world over strive for to ride out the inevitable crests and troughs of market turbulence? If a farmer can maintain or reduce production costs and increase yields by 50 per cent or more, price becomes less significant. Overriding this time worn concern is the estimate by FAO that world food production needs to double by 2050

to cater for population growth alone. CF/CA farming systems are proven and need to be promoted as vigourously and widely as possible. What is the alternative, a future of ever increasing disaster relief, deepening poverty and knee jerk responses to crises that eventually overwhelm us all? The future of small-scale agriculture in Africa will depend to a considerable extent on how a family husbands its land and by extension how many millions do. We know that many rural dwellers are not farmers but a good proportion are and have the ability to respond to practical recommendations.

Climate-Smart Agriculture: The future of global food security

Climate change has pronounced effects in agriculture, such as shifts in temperature and precipitation patterns, and prevalence of pests and diseases. Developing countries that get by with minimal productivity and limited technology are in danger of enduring lower and erratic production, aggravating both the farmers' livelihood and the population's food supply.

As the Food and Agriculture Organization (FAO) projects the global demand for food to rise by 70 percent by 2050, farmers, especially in developing regions, need to take on resilient and adaptive "climate-smart" agricultural practices to ensure the future of food security.

"The needs of agriculture have to be encouraged in the international climate regime," Deborah Murphy of International Institute for Sustainable Development told MediaGlobal . "And poor, developing countries have to be involved."

In the 2010 report "Climate-Smart Agriculture," the FAO highlights the interdependence of climate change mitigation and food security, calling on developing nations to invest on climate-smart production systems that better equip farmers in transforming existing methods into more efficient, adaptive systems that ensure maximum yield with minimum carbon emission.

Conservation agriculture (CA) stands out among climate-smart practices that ensure productivity while building resilience to climate change.

"Conservation agriculture is the core of climate-smart agriculture for both mitigation and adaptation," said FAO Senior Officer Theodor Friedrich. "And it is worldwide, growing exponentially."

CA integrates technology in agricultural production and environmental management through three basic practices: crop rotatio, maintenance of soil cover, and minimum soil disturbance.

While the first two methods promote diverse and healthy produce, the third reduces manual and mechanical tilling and plowing, significantly cutting cost and consumption of fossil fuel.

Friedrich explains that this practice mitigates climate change by sequestering carbon in the soil, thereby reducing greenhouse gas (GHG) emissions from use of fossil fuel, fertilizers, and other agricultural inputs.

CA features adaptive technology, including a water infiltration system that adjusts to extreme weather conditions. In dry periods, it reduces the water requirements of crops by 30 percent, enhancing soil fertility to withstand extended droughts. During rainy periods, this method facilitates the course of rain water to prevent soil erosion and flooding. Today, about 8 percent of the global fertile cropland is being used for conservation agriculture. Farmers adopting this method use low-cost tools in rotating diverse crops while eliminating labor-intensive soil tillage.

In South Asia, where agriculture is dominated by the production of rice, wheat, and maize, CA has been instrumental in addressing the declining productivity of cereal systems. Indo-Ganges region, particularly, has suffered from terminal heat, drought during peak crop season, and loss of biodiversity due to climate change.

"We promote conservation agriculture as a vehicle that helps adapt and mitigate these stresses," shared Mangi Lal Jat of International Maize and Wheat Improvement Center (CIMMYT) in India.

Jat explained how CA has contributed in buffering the soil and canopy temperatures to improve soil moisture. Reduced GHG emission from minimum tillage also helped in moderating terminal heat to allow for better crop growth.

"In the long-term, we see lot of reductions in GHG emissions and facilitate carbon sequestration," Jat expressed to MediaGlobal.

The success in South Asia sets a feasible example of climate-smart agriculture. However, climate-smart strategies have yet to reach many farmers in developing countries who need to be informed of technologies that suit different climate change scenarios.

"Climate-smart agricultural concepts like conservation agriculture, which are knowledge-intensive and not blueprint-ready to copy technologies (as the green revolution was), require active farmer participation and organization," Friedrich said.

As climate change and food security pose increasingly urgent challenges, investing in climate-smart agriculture in developing countries must be at the forefront of today's climate change regime for the survival of generations.

Source - MediaGlobal 20 April 19, 2011

Happenings

Themes announced for Vth World Congress on Conservation Agriculture: 26-29thSeptember 2011 at Brisbane

As reported in our previous issue, the fifth World Congress on Conservation Agriculture (WCCA) and the third Farming Systems Design is welcoming scientists and practitioners to Brisbane to discuss current and future developments of sustainable agriculture. The conference program options and tours cater to various interest groups, and take advantage of Brisbane's proximity to intensive, extensive and sub-tropical farming, as well as to world leading research groups and facilities. The four themes of the Congress are – (i) Theme 1: Controlled traffic, permanent bed systems for more sustainable CA (ii) Theme 2: Adaptive Farming Systems for a Changing World (iii) Theme 3: Why Landcare? and (iv) Theme 4: The role of Conservation Agriculture in future Policy Environment. It has been expressed by WCCA that for Theme 1, participants for India, Pakistan and China are encouraged to attend. The keynote speakers for the workshops have recently been announced and are posted on the WCCA website at http://www.wcca2011.org/.

Save and Grow farming model launched by FAO

On June 13, FAO announced in Rome that it is launching a new initiative titled 'Save and Grow' intended to produce more food for a growing world population with sustainability. This approach incorporates the practices of Conservation Agriculture and is being labeled as an ecosystem effort and involves precision farming practices while reducing water use and increasing crop yields. This program pushes for significant support to farmers so they can learn new practices and technologies as well as governments to push for agricultural investment policies for boosting sustainable productivity. For complete article, please visit: http://www.fao.org/news/story/jp/item/80096/icode/

Government urges Conservation Farming

Agriculture Deputy Minister of Zambia, participated in a workshop that for CA that included a handover of 86 bicycles to lead farmers participating in conservation agriculture. Supported by the FAO, Mbewe urged that the lead farmers use the bicycles to recruit new farmers and help them equally adopt CA practices accurately and effectively. Mbewe conveyed that CA should be adopted widely to contribute to the country's food security. The complete article can be found at: http://postzambia.com/post-read_article.php?articleId=20898

CA in Gros Morne, Haiti

Help is on the way for farmers in Gros Morne, Haiti for improving crop production and in turn food security through the Gros Morne Agriculture Project, reports CARE. This 33 month long project will provide sub-grants to CBO's for practicing and implementing soil and water conservation practices, and among other things, help farmers, especially women, have access to technologies that can improve income and food security. The details of goals of the project are available at http://www.care.org/careswork/projects/HTI114.asp.

Wheat Production in Iran exceeds expectations thorugh CA practices

Iran's Director General of Agricultural Ministry's office Mr. Mehdi Kabouli stated at a one-day conference on implementation of CA in May that wheat and barley production this year is expected to surpass what was predicted. US-sanctioned state of Iran has been in desperate need for productive agrarian practices and they are choosing CA as a method to meet the need for self-reliance and greater overall independence. The complete article is available at http://www.zawya.com/story.cfm/sidZAWYA20110504050458/Iran_Wheat_Production_Will_Exceed_12m_Tons.

Second International Conservation Agriculture Workshop and Conference in South East Asia

Abstracts have been submitted for both poster and oral sessions at the Second International Conservation Agriculture Workshop and Conference at Phnom Penh, Cambodia to be held on July 4-7, 2011. While there will be emphasis on CA systems in South East Asia, abstracts will be discussed from all parts of the world. Registration can be done at http://conservationagricultureandagroforestry.org/index.php?option=com_content&view=article&id=47&Itemid=57.

Southern Africa Regional Conservation Agriculture Symposium

This Symposium was organised under the auspices of FAO, NEPAD, FANRPAN and ACT during 8-10 February 2011 at Johannesburg, South Africa. The symposium communiqué is accessible at http://www.fao.org/ag/ca/doc/Symposium_Communique_11Feb_2011.pdf .

Global Agriculture Campaign Launches Data Visualization Tool Ahead of G8 Summit

The Farming First coalition has launched a six-part online infographic called "The Story of Agriculture and the Green Economy," which uses data from leading research organisations to tell the story of agriculture's potential contribution to building a global green economy. Each section of the infographic contains statistics and explanations around topics relevant to the green economy, such as conservation agriculture and drip irrigation. The sections also demonstrate the central role of farmers as stewards of our natural resources, actors involved in building a more sustainable supply chain as well as how investment in women farmers may bring greater rewards and existing solutions to making the sector more sustainable, while enhancing yields. All of the images have been designed so that they can be tweeted and embedded on external websites and blogs so that others can share the data and participate in the discussions on the green economy. The Farming First infographic puts data into visually appealing narratives which facilitates the analysis of complex issues and can be understood by broader audiences. Read more at: http://www.farmingfirst.org/green-economy/.

Training on Role of Conservation Agriculture in Changing Scenario by PAU

The Directorate of Extension Education of the Punjab Agriculture University successfully organized a training programme for farmers on "Role of Conservation Agriculture in Changing Scenario" on 2nd June, 2011 at KVK Mansa, Punjab, India.

Inception Workshop for Conservation Agriculture Project in Irrigated Areas of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan

The inception workshop of the new project on "Conservation Agriculture in Irrigated Areas of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan" funded by the FAO/Turkey Partnership Programme (FTPP) was held in February 2011. The expected long-term impact of the project is to improve rural livelihoods and food security through increased productivity of irrigated farming systems in Kazakhstan, Turkmenistan, Uzbekistan and Azerbaijan, using the principles and practices of conservation agriculture (CA). At the end of the project, it is expected that improved water and soil conservation techniques and measures will have been sufficiently validated by a core group of farmers and an expanded programme will have been prepared for farmers in a broader geographic area.

During the two-day Inception Workshop, national project coordinators and consultants from Azerbaijan, Kazakhstan and Uzbekistan, Vice rectors of Agricultural Universities as well as experts from FAO, ICARDA, JIRCAS and ZEF-project participated. A total number of 40 participants attended. The participating institutions are the Ministries of Agriculture and through them the relevant technical institutions in all the countries.

The opening session highlighted the importance of conservation agriculture in Central Asian countries and Azerbaijan and the timeliness of the project inception because farmers are becoming increasingly aware of conservation agriculture as a new, promising approach. The project will help introducing the concept of conservation agriculture practices in the Region. Scientists – resource persons from FAO and ICARDA made presentations on the current status, previous experience, challenges and perspectives of conservation agriculture in Central Asian countries. This was followed by country presentations

made by the designated national project coordinators from Azerbaijan, Kazakhstan and Uzbekistan. The project work plan was thoroughly discussed including issues relevant to improving crop production and management through conservation agriculture, cropping system diversification, economic analysis and capacity development. Proposed sites for demonstration plots were also proposed and discussed.

Training Programmes on Conservation Agriculture in Bihar by CSISA

Two training programmes were conducted by Bihar Hub in Begusarai and Lakhisarai to create awareness on Conservation Agriculture (CA) based practices in the first week of April 2011. The first program on 'Residue management in Rice Wheat System' was conducted at Veerpur Village, Begusarai, on 4 April 2011. Around 32 farmers and professionals from nearby regions participated in the event. In this program farmers were given guidance on the importance of residue retention after the harvesting of rice. At the field, experts explained the role of natural resource management in improving soil fertility at the same time they also stressed on the importance of moisture retention capacities of the soil due to this practice.

The second training program on 'Relay of Green Gram in Wheat' was organised at Aure village of Lakhisarai district on 6 April 2011. The theme of the program was to create awareness on the role of this technology to protect wheat from terminal heat. Farmers realized that with this technology, pulse production can be increased on account of advancing in the seeding days of moong by 10-12 days. Farmers were taken to the field to see the standing crop of this technology. At the site they observed the organic matter accumulation which would later help the crop in case of scant rainfall.

Report on Conservation Agriculture in Sub-Saharan Africa by EcoAgriculture Partners

EcoAgriculture Partners was recently commissioned to assess the impacts and potential of conservation agriculture in Africa. The farming approach fosters natural ecological processes to increase agricultural yields and sustainability by minimizing soil disturbance, maintaining permanent soil cover, and diversifying crop rotations. The report, Performance and Potential of Conservation Agriculture for Climate Change Adaptation and Mitigation in Sub-Saharan Africa, shows that CA is a particularly timely strategy for rural development and conservation in Africa, with additional on-the-ground benefits. particularly for food security and sustainable rural livelihoods. In addition, there is great potential for practicing CA within a context of landscape-scale management to increase its benefits for climate change mitigation and landscape restoration. These benefits may be realized through new project and program designs and by addressing key barriers related to the policy environment, extension and technical assistance, and donor investment priorities. For more information, click here.

Conservation Agriculture highlighted in Pakistan & Afghanistan

University of Agriculture Faisalabad, Pakistan organized a workshop during 13 – 17 June, 2011 focused on Conservation Agriculture and titled 'Strengthening Extension Skills of Young Professional in Afghanistan and Pakistan' in collaboration of a consortium of American Universities - UC Davis, University of Maryland, Washington State University, Purdue University and USDA (United States Department of Agriculture) .

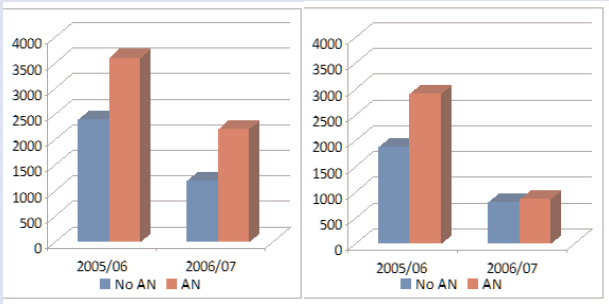
Representatives of US Universities, UAF faculty and trainees from Afghanistan and Pakistan attended the Workshop. Dr. Muhammad Aqil Khan, Country Coordinator, CSISA, Pakistan talked about CA in the inaugural session. He highlighted challenges farmers faced and why current agriculture practices and policies should be reconsidered in the wake of growing food demands, population growth and deteriorating agriculture scenario. The challenges of future agriculture dictate a new strategy, he emphasized. Rising temperature, depleting water resources and limited arable land are some of the challenges agriculture would be facing in future. Rising cost of crop production due to higher price of seed, fertilizer, herbicides and fuel would further complicate the situation. CA which reduces cost of crop production, and conserve water and energy would be the answer, he emphasized.

INFOPIX

This section will present research data from past studies in pictorial form for benefit of readers

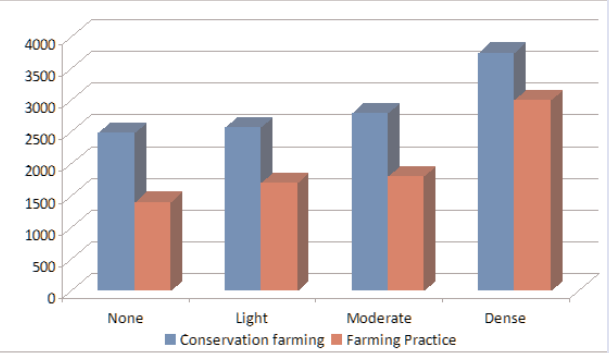
Effect of nitrogen application and crop residues on crop yield

Nitrogen Effect



In an impact study carried out by ICRISAT in 12 districts in the semi-arid areas of Zimbabwe it was observed that application of nitrogen fertilizer (Ammonium Nitrate, AN) at 5 t0 6-leaf stage in cereal crops has led to better water harvesting & infiltration. This improves nitrogen use efficiency which translates to better yield especially in seasons where moisture is limiting. Results show that there is better response to nitrogen application with conservation farming than with conventional farmer practice. This was recorded during the 2006/07 season which was classified as a drought year.

Crop Residues



One critical problem faced by conservation farming adopters is to ensure enough residues remained it the field to meet threshold of mulching. There is evidence available which shows that with increasing mulch density, farmers are likely to obtain additional yield benefits in both conservation farming and farmer practice plots. There is even high response to mulching effects on conservation farming plots *(Twomlow and Hove, 2008)*. Further details of the experiment may be viewed at the source below.

Source: Goddard, T., Zoebisch, M.A., Gan, Y.T., Ellis, W., Watson, A. and Sombatpanit, S. (eds.) 2008. No-Till Farming Systems. Special Publication No. 3, World Association of Soil and Water Conservation, Bangkok, ISBN: 978-974-8391-60-1, 544 pp.

SNIPPETS

SANREM CRSP & University of Hawaii team up for An Integrated Approach for Introducing CA Practices to Tribal Societies in India

Stemming from a USAID project, the Sustainable Agriculture and Natural Resource Management organization has collaborated with the University of Hawaii Dept. of Natural Resources & Environmental Management and other relevant departments to put together a paper that explicitly explores how conservation agriculture practices can be introduced in the state of Odisha. Using a farm household model the paper focuses on materials, methods, and intended effects of such practices. The paper is explicitly showcased in a poster that is available here:
http://www.oired.vt.edu/sanremcrsp/documents/meetings/AM2011/LTRA-11-poster2011.pdf.

Benefits of Conservation Agriculture highlighted in New York Times

In a NYTimes blog titled "Damaging the Earth to Feed Its People" food and agriculture associate editor Justin Gillis highlights the positive effects that can be achieved if Conservation Agriculture is adopted seriously. The article acknowledges some drawbacks to switch from conventional methods of farming to CA, but it also details the possible positive outcomes from such a switch. This article is part of his blog titled Green Blog, which is exclusively focused on topics about energy and the environment. Access this blog at:
http://green.blogs.nytimes.com/2011/06/04/damaging-the-earth-to-feed-its-people/

Farming First evaluates impact of CA in India and Africa

Promoting Green Agriculture, Farming First recently published "The Story of Agriculture & the Green Economy" that summarized why and how the developing world should be focused on agriculture to tackle future problems arising from global insecurities. Using graphics and interactive web tools, the article demonstrates how money invested in smarter agriculture can impact emissions and food production if wiser practices such as CA are incorporated. The article further highlights the positive effects of drip irrigation in India and CA no tillage practice in Ghana. For complete article please visit:
http://www.farmingfirst.org/green-economy/?open=6#cropland.

Concern Worldwide hopeful for CA efforts in Malawi and Zambia

Concern Worldwide is an organization focused on helping poor farmers against hunger. They recently implemented conservation agriculture in Malawi and Zambia for corn production and are awaiting exact results of their harvest. Estimates show there will be a 50% increase in the size. If this holds true, this will be a significant achievement and a case in point regarding the effectiveness of conservation agriculture in such rural and insecure communities. For complete article please visit:
http://www.concern.net/news-blogs/concern-blog/harvest-time-southern-africa.

Innovative No-Till: Using Multi-Species Cover Crops to Improve Soil Health

This webinar addresses multi-species cover crops that can be used to improve soil health, increase biological diversity, and benefit the bottom line in no-till grain operations. An increasing number of grain farmers are experimenting with these "cocktails" of cover crops such as legumes, grasses, and companion crops to keep the soil covered year-round. During this webinar, Jay Fuhrer, District Conservationist with the National Resource Conservation Service (NRCS) in Bismarck, North Dakota, shared his experience with this innovative no-till approach. Fuhrer presented four on-farm case studies to illustrate how to successfully use cover crop "cocktails" to enhance crop production and livestock forage in a no-till grain operation. The video is available at:
http://attra.ncat.org/video/#notill.

PUBLICATIONS

Book Update - Conservation Agriculture – Innovations for Improving Efficiency, Equity and Environment

The book titled Conservation Agriculture – Innovations for Improving Efficiency, Equity and Environment presents selected papers presented during the Fourth World Congress on Conservation Agriculture which was held in New Delhi in February 2009. The Congress was jointly organised by the National Academy of Agricultural Sciences (NAAS) and the Indian Council of Agricultural Research (ICAR). The publication contains wealth of information on diverse aspects of conservation agriculture.

This book embodies a set of thematic papers presented at the Fourth World Congress. These papers broadly cover four broad areas: (i) resource productivity and efficiency, which cover soil and residue management, input management (such as water, nutrients, seed, agro-chemicals), diversified farming systems, irrigated systems, mechanization and energy management, genetic strategies and indigenous knowledge and practices; (ii) institutional innovations and policies, which include participatory approaches and partnerships, integrated approach for technology development and dissemination, capacity building and enabling policies; (iii) environmental issues, which contain specifically climate change, biodiversity and environmental services; and (iv) impact assessment and equity issues.

The book is organised into three broad areas and covers case studies from different countries. It provides an account of the successes and lessons learnt on the introduction of conservation agriculture in varying farming systems and agro-ecological niches around the world.

No-till and rotation can limit greenhouse gas emissions from farm fields

Using no-till and corn-soybean rotation practices in farm fields can significantly reduce field emissions of the greenhouse gas nitrous oxide, according to a Purdue University study. Tony Vyn, a professor of agronomy, found that no-till reduces nitrous oxide emissions by 57 percent over chisel tilling, which mixes crop residue into surface soil, and 40 percent over moldboard tilling, which completely inverts soil as well as the majority of surface residue. To know more click here:
http://www.purdue.edu/newsroom/research/2010/101220VynNitrous.html.

Socio-Economic Analysis of Conservation Agriculture in Southern Africa. FAO Regional Emergency Office for Southern Africa (REOSA), Network Paper 02, January 2011 by Kizito Mazimavi

This Network Paper provides an analysis of the benefits and impact of CA in southern Africa. The paper focuses on the smallholder farming sector in three countries, South Africa, Zambia and Zimbabwe. To know more click here:
http://www.fao.org/docrep/013/i2016e/i2016e00.pdf

Climatic Risk Analysis in Conservation Agriculture in Varied Biophysical and Socio-economic Settings of Southern Africa. FAO Regional Emergency Office for Southern Africa (REOSA), Network Paper 03, January 2011 by Regis Chikowo

This Network Paper presents findings of a study that traces how CA has been implemented in South Africa, Zambia and Zimbabwe and presents results of simulation models of climatic risk and returns to investment in CA under varied biophysical and socio-economic conditions. To know more click here:
http://www.fao.org/docrep/013/i2017e/i2017e00.pdf

Visual Soil Assessment (VSA) Field Guides

VSA Field Guides on Maize and Pastures have been added to the collection. These are available at:
http://www.fao.org/docrep/010/i0007e/i0007e00.htm.

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We would appreciate hearing from you and look forward to your response through email at info@conserveagri.org