A NEW CENTURY

As we enter the twenty-first century, we find ourselves surrounded by wonders. Astronauts construct an international space station. Biotechnologists unravel the human genome and talk seriously about cloning humans. Instantaneous and inexpensive digital communications connect the globe. In agriculture, farm equipment linked to satellite positioning systems allow farmers to fine-tune soil management practices for each square meter of their field. But all is not wonderful progress.

- In the western Indo-Gangetic Plains, farmers pump longer hours from deeper wells to obtain less irrigation water of poorer quality. Near Lahore, the dams are dry for extended periods.
- In Bangladesh and West Bengal, groundwater used for human consumption is becoming contaminated with arsenic, in part due to excessive pumping of groundwater for agriculture.
- In the hillside slopes of Mindanao, three crops of maize per year are grown, one after the other, resulting in a relentless upsurge in problem weeds and pests and diseases.
- In Zimbabwe, vivid satellite images show extreme degradation of communal lands. Many observers feel that depletion of soil fertility in eastern and southern Africa is the biggest barrier to achieving sustainable food security in this part of the world.
- In Guatemala, Mayan farmers shave their bare hillside fields with a machete in preparation for the next meager crop of rainfed maize.
- In Bolivia, farmers watch scarce rainwater run away to the river, along with a good portion of their soil. The see the crusting of their soils that follows from intensive tillage, but they are not sure what to do about it.
- In the Mexican Mixteca, many farm families simply give up on agriculture, and move to Oaxaca, Tehuacán, Puebla, Mexico City or farther north.
Finally, at a global level, additional challenges are emerging, among them global warming and climate change. These new challenges find their place alongside older and familiar ones – how to eliminate poverty, hunger, and the silent and invisible desperation of starvation.

INNOVATION IN THE NORTH, STRUGGLE AND SUCCESS IN THE SOUTH

Along with poverty and hunger, resource degradation is not new. Neither are many of the practices used to combat it – a large number of them featured in what has come to be known as conservation agriculture. However, some practices found to be useful in conservation agriculture were only developed over the past several decades.

A good example is conservation tillage or zero tillage. While the principles of zero tillage may be centuries old, their practical application to large scale commercial farms in the developed world waited on the development of suitable implements (to establish crops into standing crop residues) and suitable herbicides (to control weeds when plowing and cultivation are not options). The result in the USA and Australia has been a huge area managed with these practices, a «mainstreaming» of what began as a curiosity.

While the developed world moved conservation agriculture and conservation tillage practices into the mainstream (at least in some regions) developing countries have not been inactive. The amount of work done to tailor conservation agriculture practices to the circumstances of the South has been astonishing. And this work has yielded a good return.

Perhaps the best-known example is the spread of direct sowing and mulch systems across millions of hectares of cropped area in the Southern Cone of South America – especially Brazil, Argentina, Chile, Paraguay and lowland Bolivia. This has been the outcome of a combined effort by farmers groups, private enterprise, NGOs, extension workers, and national and international scientists, among them several truly inspired individuals. Yields have improved, costs have been slashed, and soil and water resources have been saved and renewed.

But other examples abound. Note the substantial work on:

- Green manure cover crops (especially *mucuna* and *canavalia*) and conservation tillage in Mesoamerica (southern Mexico and Central America). This features work by farmers, NGOs, NARSs, CIAT, and the PRM (the CIMMYT-led Programa Regional de Maíz).
- Rotations and stubble management in West Asia/ North Africa, with substantial input by NARSs and ICARDA.
- Agroforestry in East Africa, especially the enormous potential from biomass generated from *tithonia*. Much of this work has been fostered by ICRAF and the wide-ranging set of partners within the African Highlands Initiative.
- Legume -grain rotations and green manure cover crops in southern Africa, e.g., the work coordinated by the CIMMYT– NARS Soil Fertility Network.
- Conservation tillage and soil water management in eastern and southern Africa, with inputs from GTZ, Silsoe, NARS, farmers, with recent coordination taken up by the African Conservation Tillage Network (ACT).