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News from Drynet

A global initiative giving future to drylands

Drynet is a project of 14 organisations from all over the world. They work together to combat land degradation

GLOBAL NEWS

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Drynet Update

Welcome to the sixth issue of "News from Drynet", a newsletter from the Drynet network on global concerns for drylands from local perspectives. This issue highlights the topic of agriculture in the drylands of the world.

One of the areas in which people find themselves most affected by changing climate patterns is agriculture. Farmers all over the world are confronted with unstable rainfall, increasing drought or flash floods, new pests, temperature fluctuations and thus increased instability for their crops and income. While bigger industrialised agriculturalists can generally fend off some of the effects, small scale subsistence farmers can be completely ruined by one or two years of bad yields. In the volatile regions of the world, such as drylands, this can have far reaching consequences for the entire area, such as mounting poverty which can lead to humanitarian crisis, a mass exodus to cities, and the further degradation and desertification of lands. However, increasingly people have begun to find ways of adapting to harsh circumstances and changing weather patterns. Through stronger cooperation within communities, by using innovative irrigation methods or by experimenting with variations in seeds and plant breeding, many people in drylands have begun to create new spaces of adaption and survival. In this issue we would like to discuss the situation of agriculture in drylands and present some initiatives and alternatives which have sprung up.

The Drynet group is at the moment actively drafting proposals for the follow-up for the current project which will terminate in December 2009. Furthermore, some Drynet partners are presently working on bringing attention to the participative processes during the COP 9 in Buenos Aires in September this year.

By Drynet partner: Both ENDS, the Netherlands - drynet@bothends.org

Alternative agricultural production in Drylands: Quinoa Plantation in Bolivia

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Evolutionary-participatory plant breeding:

A HOLISTIC APPROACH TO ADAPT CROPS TO AGRONOMY, CLIMATE AND PEOPLE

Women planting seedlings in Iran. Picture by Mohsen Yosefi

The massive and rapid decline in agricultural biodiversity is caused in part by the success of modern plant breeding especially in wheat, rice and maize which make up 60% of the calories in human diets. As a result the most widely grown varieties of these three crops are closely related and genetically uniform. The major consequence is that our main sources of food are more vulnerable than ever before, and that, as the well known cases of the potato famine in Ireland in the mid 1800, the reduction of corn production in 1970 in USA due to the southern corn leaf blight, and more recently the rapid spreading of UG99 from Uganda, to Kenya, Ethiopia, Yemen and Iran, by favouring the spreading of new virulence type of pathogens, genetic uniformity puts food security in danger. Genetic uniformity has very much the same effects on reaction to abiotic stresses such as temperature extremes and drought.

It is widely recognized that traditional varieties (landraces) have much greater resilience to drought and other stresses. Some of the landraces that have been lost due to the introduction of Green Revolution technologies are available in national and international gene banks. These gene bank collections serve a very important purpose - avoiding the loss of individuals and species, and of the genes, which may be unique, they carry. On the other hand by "freezing" seeds they also "freeze" evolution at the time of the collection. Therefore, many scientists and policy makers advocate that together with conservation in gene banks - ex situ -, the diversity should also be conserved in its original locations - in situ -, where the plant populations can continue to evolve.

In addition, the high-yielding varieties introduced through the Green Revolution require optimal growing conditions which are created through heavy use of chemical pesticides, fertilizers and water. Creating such an optimal environment has caused on the one hand farmers in favourable environments to go into debt to purchase these expensive inputs and to pollute the land and water and overuse scarce water sources, and on the other, farmers in marginal environments have been bypassed by a research philosophy that do not take their special needs into account.

It is now unequivocal that the climate is warming, as it is evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. It is also very likely that in several areas the frequency and the intensity of drought as well as the variability of the climate are increasing.

To cope with the challenges posed by genetic uniformity, climate changes and dependence on chemical inputs, it is urgent to deploy on the ground a dynamic and inexpensive strategy which will quickly enhance the adaptation of crops to climate change and hence mitigate the impact of climate change. Such a strategy is based on four components: locally adapted genetic resources (landraces), farmer's knowledge and participation, integration of plant breeding and crop management (agronomy, soil management, disease and pests management), and respect of farmers' rights. These four components are used in a multi country program of

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evolutionary plant breeding consisting in deploying populations with large genetic variability in the hands of the farmers and letting them gradually evolve and adapt to both climate and management changes including organic conditions.

At the moment one population made up by mixing an equal number of seed of nearly 1600 barley F2 is grown in 5 locations in Iran, 4 in Jordan, 4 in Syria and 3 in Algeria and will soon be grown in 3 locations in Algeria. The locations were chosen together with farmers for being affected by one or more of the abiotic and biotic stresses affecting crop yield and quality. In each location the populations will be left to evolve under the joint forces of natural and artificial selection operated by the farmers (with the skills developed through their participation in the breeding programs), and eventually by breeders (evolutionary-participatory plant breeding). These populations can be used for a short term objective to develop specifically adapted varieties to the different areas and to the current levels of abiotic and biotic stresses. At the same time, as recombination and natural selection will continue to occur, new gene and gene combination not even present in gene banks may appear. Therefore, these populations will slowly become better and better adapted and will also be used for the long term objective to develop varieties resistant to the future levels of climate and agronomic changes. As the populations evolve farmers will use a small part of the seed produced every year to plant and harvest the evolving population to allow a progressive adaptation to the prevailing stresses. After the first years and with the availability of an increased amount of seed the population can be shared with other farmers and evolve under a number of combinations of agronomic management and climatic conditions. The remnant seed can be shared with other farmers who can start their own evolutionary populations adjusting its size to the land and resources available, or to plant their crop.

In some selected locations we will start experimenting on combining conservation tillage, improved rotations and varieties. The integration of rotation, tillage and breeding requires that at each selected location in a farmer's field a given piece of land will be allocated to these experiments for the duration of the project. The experimental approach will be to initiate with the agronomic treatment in either a 2 factor or a 3 factor experiment. In the 2 factor experiment we will have in the first year alternate strips of either the two types of tillage or two types of rotations. In the second year the participatory trials, but also the evolutionary populations, will be planted orthogonally to the direction of the agronomic treatment in a way that half of each plot (=1 variety) will be on one treatment and the other half on the second treatment. These types of trials, if repeated in at least three locations will give information on genotype x agronomic treatment x years x locations interactions.

A similar approach can easily be used to adapt crops to organic agriculture.

By Salvatore Ceccarelli, ICARDA. Presented by Drynet partner CENESTA, Iran

International Agenda 2009

25 - 28 August 2009 - *1st International IFOAM Conference on Organic Animal and Plant Breeding: Breeding Diversity in Santa Fe, New Mexico, USA.* The conference aims to encourage the dialogue between commercial and subsistence farmers, scientists and practitioners, professional farmers and hobby gardeners/animal keepers to promote the lively exchange of experiences and perspectives on organic breeding.
More information: www.ifoam.org

31 August 2009 - 04 September 2009
The World Climate Conference - 3 in Geneva, Switzerland. Conference organised by World Meteorological Organization. WCC-3 will build on the achievements of the First and Second World Climate Conferences and focus on how humankind can benefit from the huge advances in climate prediction and knowledge. WCC-3 will contribute to the outcomes of the 15th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, to be held in Copenhagen, Denmark, in December 2009.
More information: www.wmo.int/wcc3

07 - 11 September 2009 - SADC *Sustainable Land Management Drylands Conference in Windhoek, Namibia.* The MET in collaboration with the UNDP and other partners are organizing a conference that will serve as a platform for practitioners to demonstrate best practices as well as to share lessons learned in pursuant of integrated sustainable land management (ISLM).
More information: www.sadc.int

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Excerpt from Inspiring Initiative: Partnerships for Sustainable Agriculture

AN INTEGRATED MULTI-INSTITUTIONAL APPROACH TO IMPROVED WATER MANAGEMENT IN COMMUNAL LANDS: A CASE OF POTSHINI IN KWAZULU-NATAL, SOUTH AFRICA.

A densely populated rural community in the foothills of South Africa's Drakensberg is refusing to give in to land degradation and poverty. Most people practice subsistence agriculture, growing mainly maize and beans for home consumption. Cattle are grazed in communal lands in summer when the crops are in the fields. In winter, after harvesting, cattle are allowed to graze on crop residues in the crops fields. However, decades of overcrowding - an artefact of discriminatory Apartheid land policies - and the resultant poor land-use practices are largely to blame for excessive soil erosion and the nutrient degradation of the farmers' fields.

With the help of the Farmer Support Group (FSG), farmers, especially women have been developing more sustainable and productive systems of natural resource management. Using participatory action research, cross visits and participatory monitoring and evaluation by the farmers themselves, FSG and approximately 60 farmers shared and experimented with new technologies in farming, including water conservation measures such as trench beds, cover crops and tower gardens.

In Farmer Life Schools, farmers and facilitators interacted as co-learners in sessions held regularly to deal with specific issues. People considered to be knowledgeable on various topics were invited to address specialised topics as and when necessary. Farmers were encouraged to take up some of the ideas from cross visits and to implement them on their farmers, even on an experimental basis. In addition, field days were held periodically to share information on the innovations that were being experimented with in the project.

The successes of this joint initiative include reduced soil erosion, recharged water tables, increased access to water for agriculture, enhanced food security, increased food nutrition and health, increased crop yields and increased ability to finance household expenses. For example, the project demonstrated that the minimum tillage technique, which the project assessed against conventional tillage, resulted in maize yield increases of 168% above those of the conventional treatments.

One of the major reasons for the success of this project was the participatory, collaborative manner in which this initiative was managed. Engagement with the project deepened the understanding of the various stakeholders of multi-stakeholder
partnerships and what is necessary for them to be fruitful. The project also facilitated their mutual support for one another in promoting longer term

Dryland farmers learning new technologies and methods as part of the 'Partnership for Sustainable Agriculture'.
Picture by Michael Malinga

sustainability of development in the area. The project allowed an understanding of the breadth of issues that have to be dealt with when supporting the efforts of farmers to improve their situation. Stakeholders thus realized the need to work together and acted upon this.

As Potshini is typical of rain-fed communal farming areas in South Africa, the approaches and technologies used in this project can be applied in many areas in South Africa and elsewhere in sub-Saharan Africa.

By Drynet partner: EMG, South Africa. For more information about this initiative please check www.dry-net.org

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