Food and Agriculture Organization of the United Nations

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

CSAM

Conservation Agriculture: Challenges and Opportunities

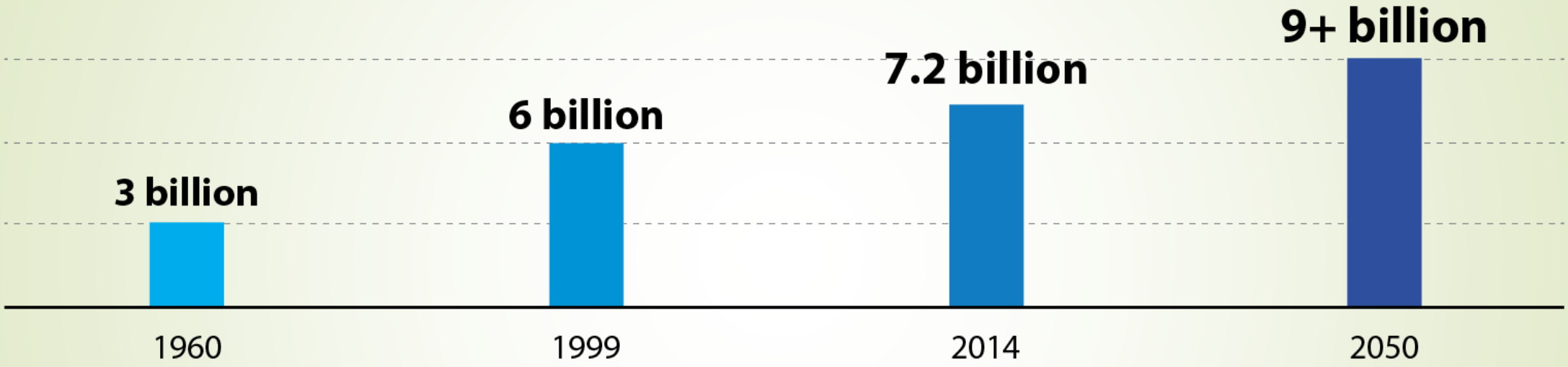
Presented by
Prof. Dr. Hafiz Muminjanov

Regional Workshop on the Role of Mechanization in Strengthening Smallholders' Resilience through Conservation Agriculture in Asia and the Pacific
18-20 April 2018, Phnom Penh, Cambodia

Presentation Outlines

- Global challenges
- Food security and SDG
- Conservation Agriculture – a core of Sustainable Crop Production Intensification
- Global adoption of CA
- Adoption and promoting CA in Central Asia and Turkey
- Lessons learned
- Conclusions

Major global challenge in feeding an expanding world population



To nourish another 2 billion people in 2050, food production must rise by 60%

The way we produce more food cannot be at the expense of the planet

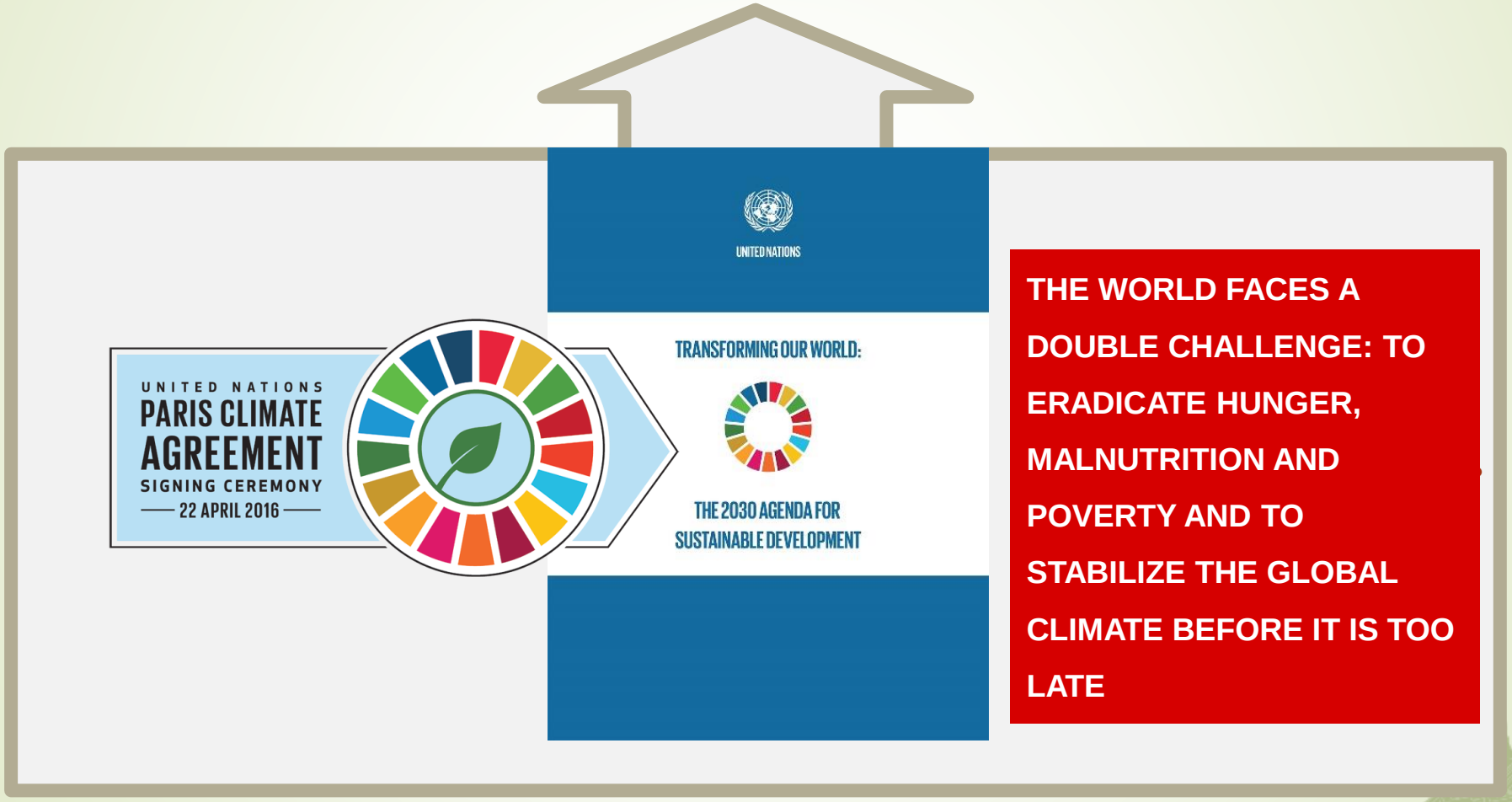
Global and regional challenges

- **Arable land per capita is declining. Moreover land and soils are degraded**
- **Scarcity of water is a constraint for agriculture and rural development**
- **Diseases and pest infestations**
- **Availability and access to inputs**
- **Farmers are vulnerable to social crises and climate change**
- **…**

Food security and poverty alleviation are the key issues of SDG

17 goals
169 targets
231 indicators

A turning point for Sustainable Development



THE WORLD FACES A DOUBLE CHALLENGE: TO ERADICATE HUNGER, MALNUTRITION AND POVERTY AND TO STABILIZE THE GLOBAL CLIMATE BEFORE IT IS TOO LATE

Sustainable crop production intensification

- **The world needs more sustainable agricultural production and food whilst at the same time conserving natural resources**
- **The new FAO concept of “Save and Grow” – producing more with less inputs – describes the pathway to such “sustainable crop production intensification”**

Conservation Agriculture

1

Avoiding mechanical soil disturbance through no-till seeding and weeding

2

Maintenance of soil mulch cover with crop residues and cover crops

3

Crop diversification involving crop rotations andassociations with annuals and perennials

Minimum soil disturbance

Groundcovers

Mulch

Cover crops and residues

How Conservation Agriculture works?

Tillage based Agriculture

Action of Soil Biota

Soil Organic Matter = Healthy Soil

low soil organic matter

High Soil Organic Matter

Biological Tillage

Mechanical Tillage

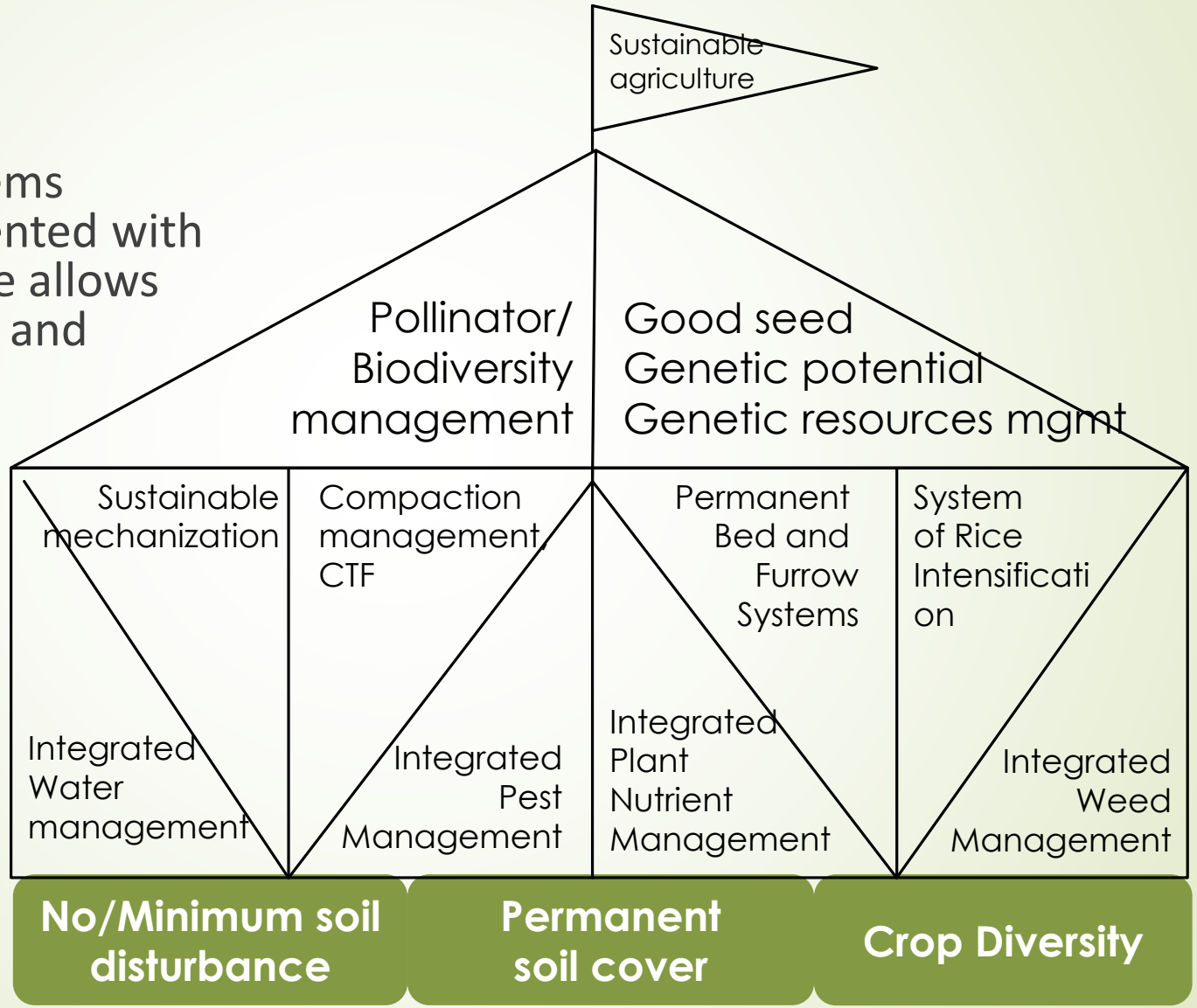
No Tillage

Conservation Agriculture

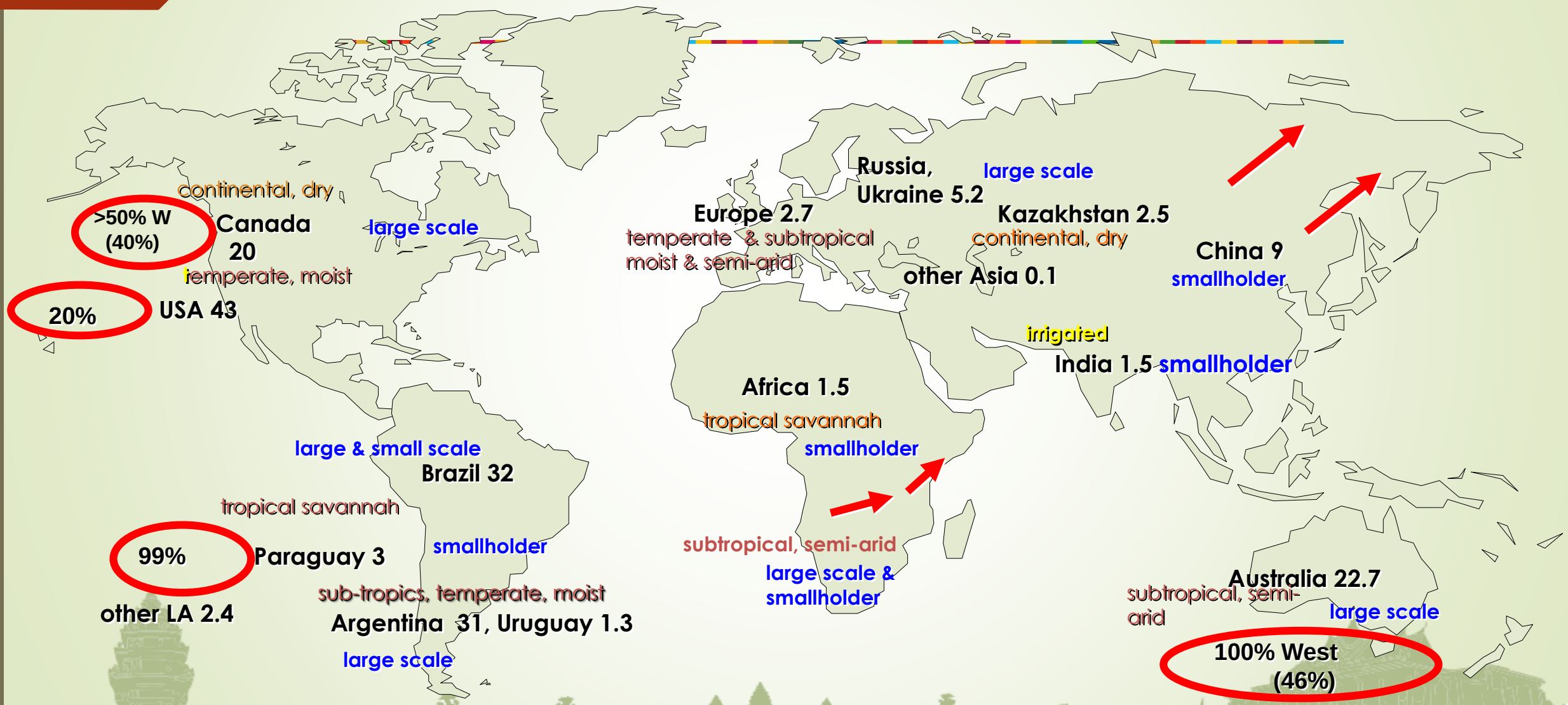
- **Core element of sustainable intensification of crop production**
- **Builds resilience on ecosystem services (nutrient, water and carbon cycling),**
- **Makes efficient use of inputs (seed, fertilizer, pesticides, water, labour, energy, time, machinery),**
- **Conserves and enhances natural resources - reduced degradation and environmental pollution.**
- **Adaptable to different cropping and farming systems, geographic locations and scales.**

Ecological Foundation of CA Systems

CA does not solve **ALL** problems (NO panacea) but complemented with other good practices CA base allows for high production intensity and sustainable agriculture **in all land-based production systems (rainfed & irrigated, annual, perennial, plantation, orchards, agroforestry, crop-livestock, rice systems)**



Conservation Agriculture globally 180 Million ha (2015/16) (~12.5% of annual cropland)



Machinery innovations – key for global promotion of CA

Adoption and promotion of CA in Central Asia and Turkey

Wind erosion was a driving force for developing soil protecting technologies

2002-2004, TCP/KAZ/2801 & 2901: Conservation Agriculture for sustainable crop production in Northern Kazakhstan

CA for wheat production in Kazakhstan

- **Area under CA-based practices increased from 0 ha in 2001 to 1,8 mln. ha in 2012 (*FAO-WB report, 2012*)**
- **Since 2008, the government of Kazakhstan is providing subsidies to the farmers adopting CA-based technologies.**
- **Kazakhstan is now included among the top 10 countries with the largest areas under No-tillage in the world**
- **In 2012 due to severe drought, wheat harvest significantly reduced, however the CA farmers did not lose much.**

Innovating new and adjusting available machine to no-till system

Snow trapping in Kazakhstan

2003-2007, TCP/UZB/2903 & 3102: Sustainable agriculture practices in the drought affected region of Karakalpakistan

2004-2006, TCP/UZB/3001: Enhanced productivity of cotton-wheat systems through the adoption of conservation agriculture practices

No-till planting of wheat in to growing cotton

2003-2005, TCP/TAJ/2903: Participatory watershed management in upland Tajikistan

2011-2013, GCP/RER/030/TUR: Conservation Agriculture for Irrigated Areas in Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan

CONSERVATION AGRICULTURE IN CENTRAL ASIA: Status, Policy and Institutional Support, and Strategic Framework for its Promotion

Regional Workshop on CA

Main challenges for promotion of CA

- **Lack of policy, strategies and institutional support**
- **Changing mindset on land preparation**
- **Lack of knowledge on use of CA equipment**
- **Availability and access to CA equipment**
- **Knowledge and experience on plant residue management**
- **Weed control**
- **Weak extension service and lack of technical capacity**

CA Perspectives in Central Asia

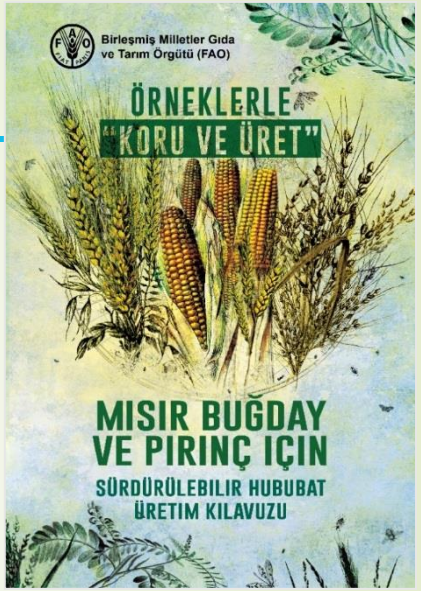
- **Development of regional and national strategies and action plans for policy and institutional support for promotion of CA**
- **Development of manuals and guidelines, policy and regulations**
- **Legalize the new crop management techniques and introduce them into curricula and extension services**
- **Establishment of favorable environment to support modern crop management techniques, including development of CA Associations, development of relevant technologies and input supply through commercial networks.**
- **Promotion of incentives as a payment for application of environment friendly methods of land use and community services.**
- **As CA adoption levels increase, introduce penalties for polluting and degrading ways of agriculture as additional incentive for late adopters.**

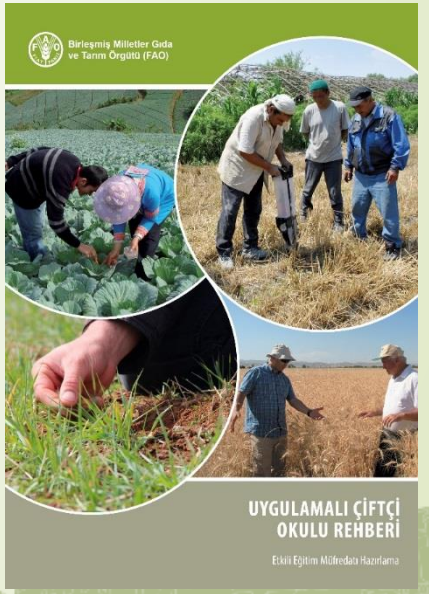
TCP/KYR/3403: Development of FFS to promote modern crop management and pest control technologies

TCP/TAJ/3405: Support to adoption and promotion of modern crop management practices

Support to the promotion of Conservation Agriculture in Turkey

- **Turkish Association on CA established and joined ECAF**
- **Status of CA in Turkey updated and strategy for further promotion developed**
- **CA promoted to the farmers' fields through establishment of demonstration sites, FFS and providing suitable equipment**
- **Research and development work presented at the 8 WCCA, Rosario, Argentina**





International Conference on Conservation Agriculture:

Strategies for the Promotion and Uptake in the Central and West Asia and North Africa Region

5-7 June 2017, Konya, Turkey

Lessons learned

No tillage starts at harvest of the previous crop: residue must be cut and spread out

Lessons learned

Farmers' prefer reduced tillage as per its economic advantage. However, for CA proper and suitable no-till drill/seeders are required

Lessons learned

Most of machinery produced for large scale production

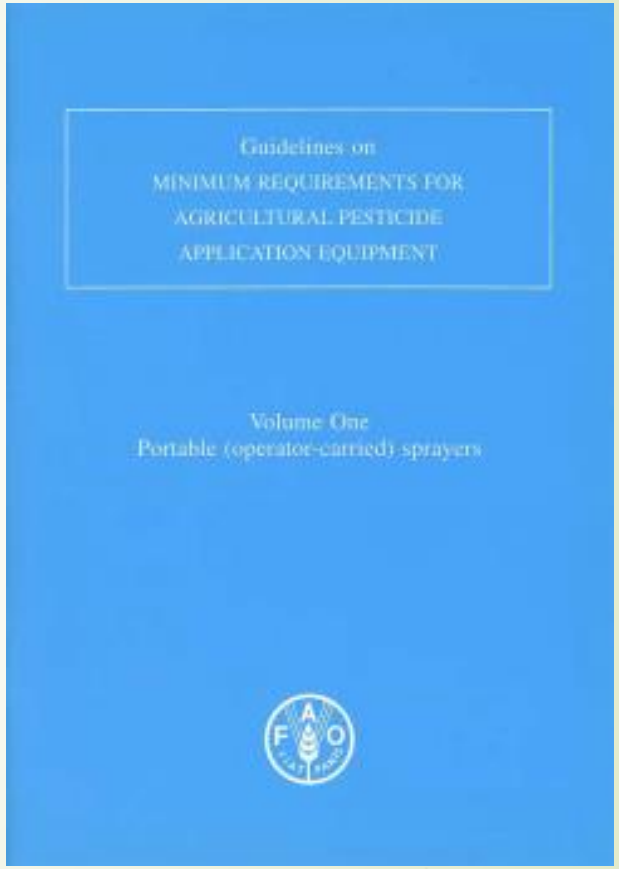
Lessons learned

Machinery for small scale farms are needed

Lessons learned

Tine seeders vs Disk seeders

Lessons learned

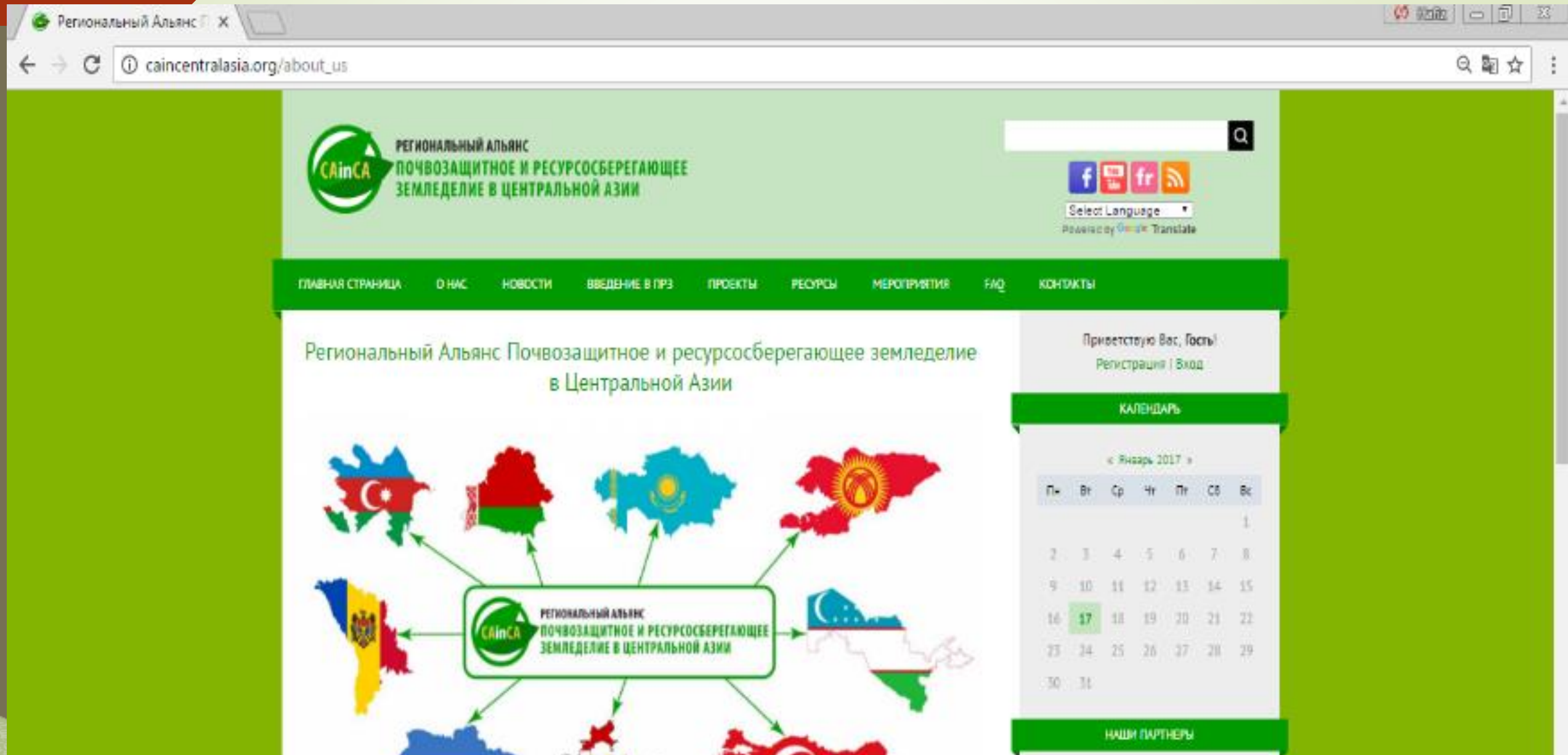


Proper equipment for safe pesticide application

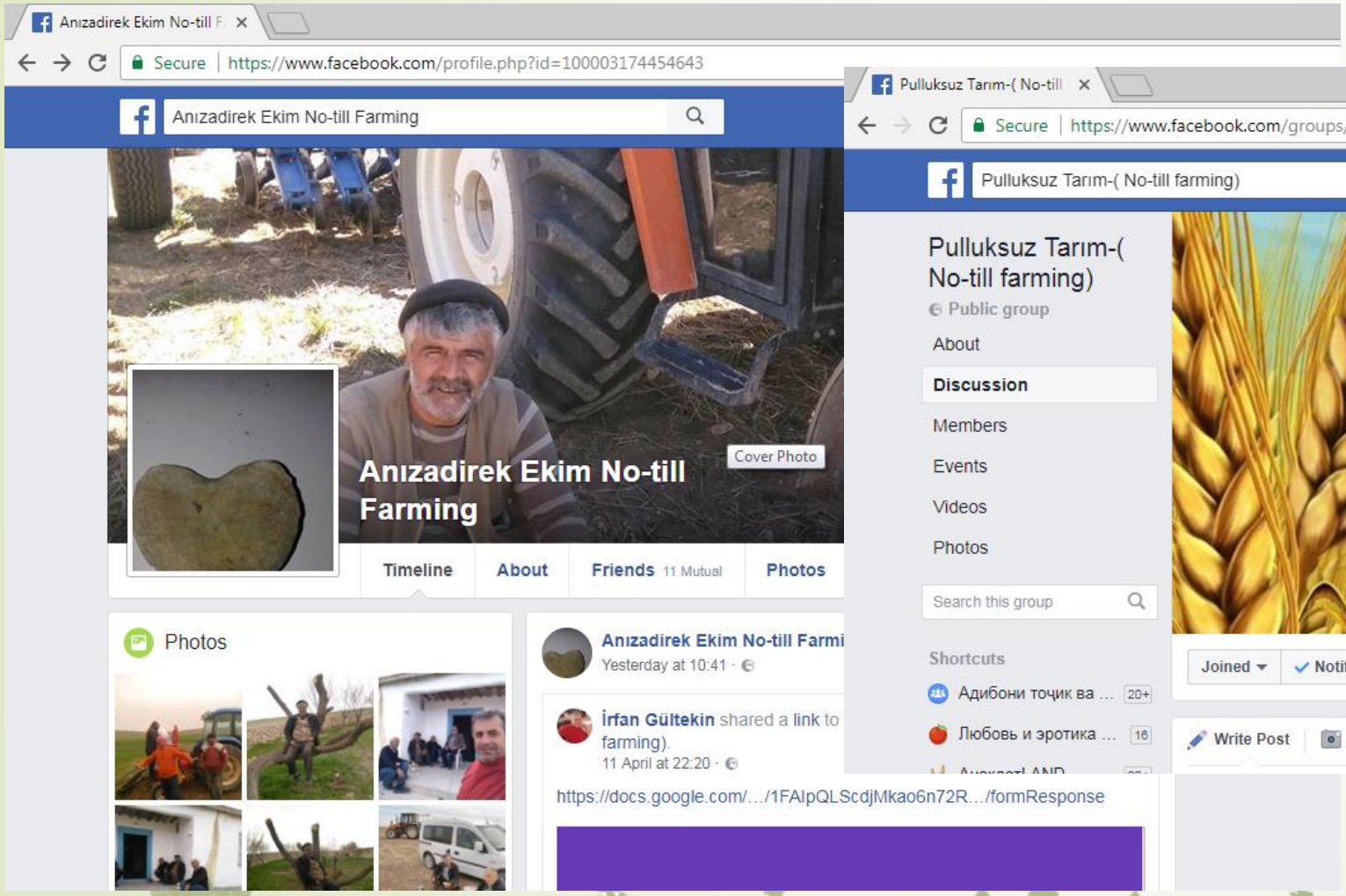
Lessons learned

Farmer oriented publications on CA are needed in local languages

Regional website on CA



Promotion of CA through social networks



Side events during FAO Regional Conferences

Participation in the WCCA

CA for double cropping systems

CA for pasture rehabilitation

CA in intensive orchards

Conclusion

- CA could be adapted for any type of famers, especially on the machinery side. This is not an issue of smallholders or big landowners.
- CA is the best way to mitigate and adapt to climate change whilst being productive and profitable!
- CA is an optimum approach to improve water management, especially in water scarce regions.
- Salinity of soils can be controlled by leaving a higher amount of residues in CA. This would prevent the raise of salt by capillarity. Then, either by rain or by irrigation, salts would go down to deeper soil layers.
- A proper crop rotation is essential (different types of roots) to avoid a higher pressure of pests, diseases and soil compaction.
- Agricultural machinery innovations are the driving force towards achieving more sustainable, energy-efficient, lean, affordable and cost-effective solutions

Thank you

For further information please contact:

Hafiz.Muminjanov@fao.org

Conclusions

- CA continues spreading around the world and in the region
- Originally a farmer's driven process only attention is increasing by governments and development organizations
- Most countries still struggle with introduction of CA
- Further policy support is needed for faster adoption AND for safeguarding quality of CA to ensure environmental services.
- More technical assistance and investment support to be provided.
- Cooperation with partners to be strengthened.
- Agricultural machinery innovations are the driving force towards achieving more sustainable, energy-efficient, lean, affordable and cost-effective solutions

Conclusions

- **Ploughing could not solve the problem with pests, especially with weeds**
- **CA does not promote chemical control, it based on the principles of sustainable intensification of agriculture**
- **Transition from conventional farming to CA requires good preparation for pest control (initial weed control, selection of cropping patterns in the rotation, etc.)**
- **Crop rotation and pest control rotation – key of success**
- **Only application of CA in combination of other good agriculture practices brings success**
- **Successful promotion of CA satisfies farmers**

Conclusions

- CA is a holistic sustainable system applicable to all agro-climatic regions
- CA is a win-win situation for both farmers and the society.
- Well skilled agronomist, engineers, technicians,… are essential to develop and adapt the system to local conditions (Cambodia).
- Private sector entrepreneurs should be incentivized to offer services including to smallholders
- Demand should be enhanced (by government or donor) through targeted subsidies (service vouchers)
- Differential subsidies (reward climate smart / resilience enhancing innovative equipment)
- Training in machinery operation and business skills must be enhanced to create employment with mechanization
- Bundling of services (agriculture, transport, etc.)

Minimum soil disturbance

Cover crops

Mulch

Cover crops and mulch


16/10/2008

J López Díez, 2010

J López Díez, 2010