Open burning actions in a wider agricultural development context

Introduction
Open burning in agricultural fields involves the burning of crop residue, vegetation and biological waste as part of the practice of land preparation for crop establishment. It is practiced in many tillage-based production systems where such biomass cannot be utilized in other useful ways, and it is an integral part of the ‘slash and burn’ production systems. These systems are unsustainable because of their propensity to degrade the land resource base and the environment leading to

Conservation Agriculture (CA)
CA is seen as a real alternative to conventional tillage agriculture, and it is replacing conventional tillage agriculture globally at the annual rate of some 10 M ha of cropland because it offers many benefits to the farmers and to the society. In 2016, CA cropland area covered some 180 M ha globally (12.5% of global cropland).

CA systems are ecologically underpinned by three interlinked principles of:

(i) No or minimum mechanical soil disturbance (through the practice of no-till seeding and crop establishment and no-till weeding)
(ii) Maintenance of soil mulch cover (through the practice of retaining crop residue, stubble and biomass from cover crops)
(iii) Diversified cropping (through the practice of crop rotations or sequences or associations, involving annuals and perennials including legumes).

Above principles when put into practices (as indicated in the parenthesis) with locally formulated adapted practices, along with other best management practices of integrated crop, nutrient, pest, water, energy, labour and farm power management, have shown in all continents to be able to address the fundamental weaknesses of the conventional tillage agriculture.

Benefits from CA
CA is not a panacea as it does not solve ALL problems, but complemented with other good integrated good practices it allows for intensification of production in terms of crop yields rather than increase in production inputs. CA principles serve as a biologically dynamic foundation for ecological sustainability to all land-based production systems, including rainfed and irrigated systems, annual and perennial systems, orchards and plantation systems, agroforestry systems, crop-livestock systems, rice-based systems and organic systems.

CA calls for no burning of crop residues or vegetation biomass. Instead, biomass produced by crops is managed to enhance and maintain soil health and productivity, resulting in significant benefits which include: greater farm output and productivity (efficiency), greater stability in yields, enhanced resilience to biotic and abiotic stresses and extreme events, a range of ecosystem services such as clean water, control of soil erosion and land degradation, improved carbon, water and nutrient cycling, and greater water infiltration and soil water retention.

CA is considered to save on purchased inputs including fuel because of the greater factor productivity, and hence is more profitable. CA is considered to be climate-smart because of its adaptability to climate change and ability to contribute to climate change mitigation through carbon sequestration and reduction in CH₄ and N₂O emissions. CA also has the ability to rehabilitate or regenerate degraded soil.
Open burning actions in a wider context
CA systems are already being promoted as representing the alternate paradigm of agriculture. CA requires that there should be no burning of crop residues and vegetation biomass but instead it be used as soil mulch cover to enhance soil health and productivity, reduce soil erosion and degradation. It would thus make better sense to combine effort to stop open burning on farms with promotion of CA.

Contributions of CA as part of open burning actions could include:
(i) sustainable production and intensification
(ii) sustainable livelihood
(ii) sustainable food security
(iv) pro-poor agricultural development strategy for poverty alleviation
(v) enhance soil functions and soil-mediated ecosystem services
(vi) combat soil degradation, promoting soil regeneration
(vii) climate smart agriculture

CA can also be considered to contribute to the achievement of:
(i) UNCCD -- Land Degradation Neutrality
(ii) UNFCCC – 4 per thousand, Climate Smart Agriculture Alliance
(iii) CBD
(iv) SDGs particularly SDG 1 (no poverty), SDG 2 (zero hunger), SDG 6 (water), SDG 7 (energy), SDG 12 (responsible production and consumption), SDG 13 (climate action), SDG 14 (life below water) and SDG 15 (life on land), although it is realized that all SDGs are interconnected.

Constraints to uptake of CA as a solution to controlling open burning
CA is a relatively new agricultural paradigm and therefore there are several constraints that need to be recognized and overcome in efforts to promote its adoption and spread such as.
(i) Green revolution paradigm and mind-set continues to dominate in the public, private and civil sectors, including the farming communities.
(ii) Policy and institutional support not effectively organized for practical action; need for advocacy and awareness creation, promotion of training and demonstration, farmer organizations, access to equipment and machinery (e.g. no-till drills, crop residue shredder and spreader), financial support.
(iii) Poor knowledge and experience of CA in the farming and development community, particularly for rice-based systems.
(iv) Poor knowledge and experience of CA in the research, extension and education community.

The above, notwithstanding, constraints are being addressed in South Asia, and efforts to promote CA systems are on the increase. For example, the 4th World Congress on CA was held in New Delhi in 2009. Research and empirical evidence generated from South Asia of the superior performance of CA systems compared to conventional tillage systems has increased considerably in the last 10 years.

It appears that India already has some 1.5 M ha of CA cropland, and some 5 M ha of no-till wheat. Pakistan is reported to have some 0.6 M ha of CA. Bangladesh has 1,500 ha of CA. There are several other countries in Asia that are now reporting cropland area under CA.

The question for discussion: What are the strategic and operational implications for SSG?

AK – 8 March 2018