

spatial arrangement, a rotation, or both. There are usually both ecological and economic interactions between the trees and other components of the system. Agroforestry systems, where trees maintain SOM by litter and root residues, are very effective in soil conservation, more so than traditional crops. Soil erosion, which results in the loss of SOM and nutrients is controlled by trees and shrubs in agroforestry. Agroforestry systems are also beneficial in reducing emission of GHGs.

COVER CROP AND GREEN MANURE

A cover crop is defined as a "crop that provides soil protection, seedling protection, and soil improvement between periods of normal crop production, or between trees in orchards and vines in vineyards". In contrast, green manure is defined as "a plant material incorporated into soil while green or at maturity, for soil improvement." A cover crop may be referred as a green manure when plowed under and incorporated into the soil. Briefly, cover crop enhances soil quality while green manure impacts mainly on soil productivity.

A systematical use of cover crops has long-term effects, including protection of soil and environment, and uptake and storage of plant nutrients between seasons when available nutrients are susceptible to leaching.

SOIL FERTILITY MANAGEMENT

The principal aim of using fertilizers is to obtain high yield, increase biomass production, and return more crop residues to the soil. The quantity of residues returned is positively related to the amount of SOC sequestered. An increase in SOC after N or NPK fertilization was also reported. N fertilization mitigated loss of C from conventional till crop rotation. Several experiments have confirmed an increase in SOC concentration by application of N or NPK fertilization.

MANURE AND BIOSOLIDS

Biosolids (organic by-products) and other organic amendments are resources that provide nutrients and C to soils. These resources include manure, sewage sludge and septic waste, food processing wastes, industrial organic wastes, logging and wood manufacturing wastes, and municipal refuse. Manuring and applying other soil organic amendments increase C inputs to soil and consequently enhance SOC concentration.

PRECISION FARMING / *Site specific Crop Management*

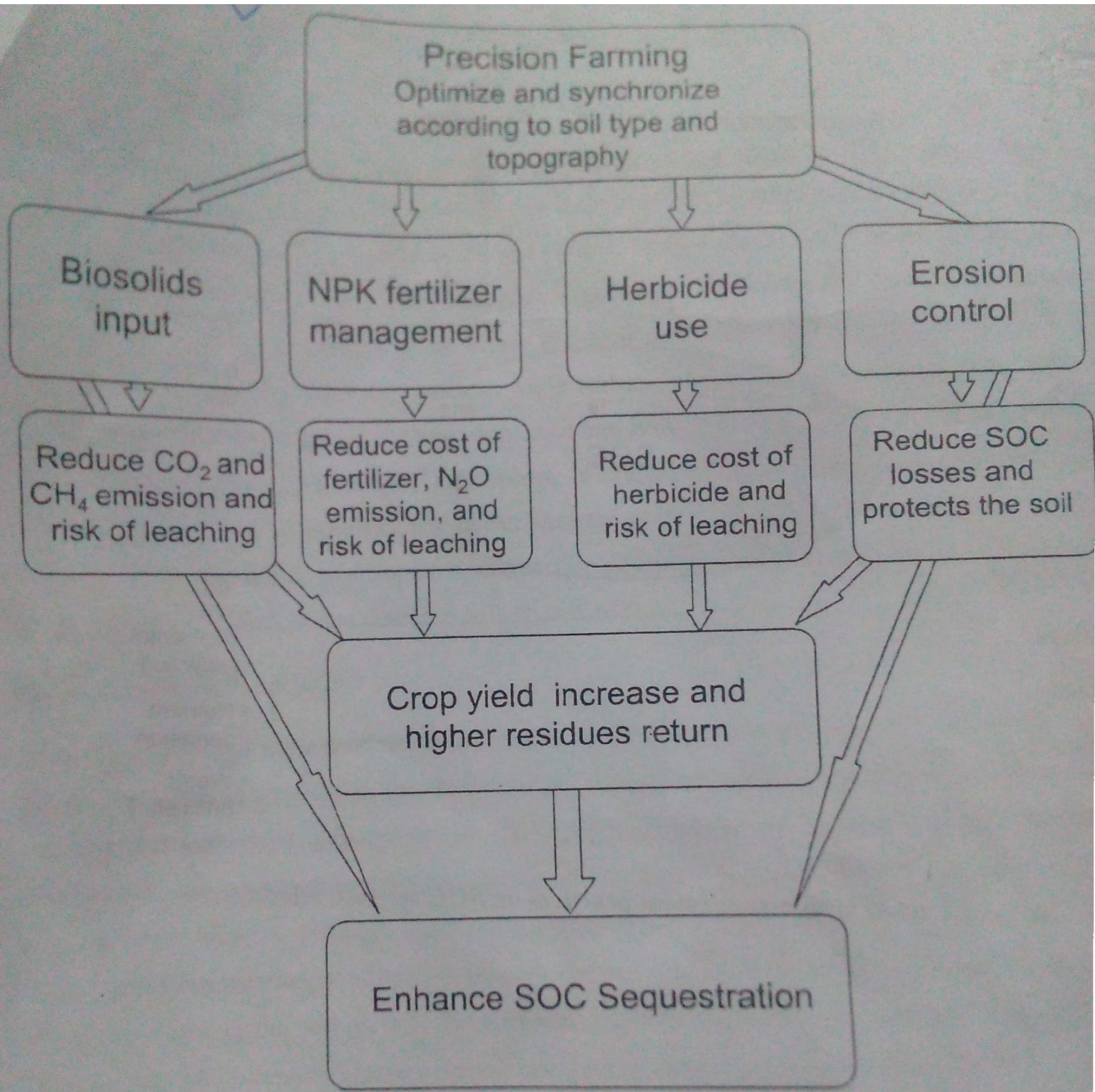
Precision farming is a technique which uses the best available technologies to tailor soil and crop management to fit specific conditions found within an agricultural field. Precision farming is a unique tool to combine production and environmental needs in agriculture. Precision farming, based on detailed information and a program for the specific site, is the management system that matches production expectations with environmental requirements, including SOC sequestration.

IRRIGATION AND SOIL WATER MANAGEMENT

Irrigation is a practice of increasing soil water supply under arid and semiarid conditions. Presently about 17% of world cropland (255 Mha) under irrigation produces 40% of world's food. Irrigation avoids drought periods and prolongs the growing season. It is widely implemented in arid, semiarid, subhumid, and even in humid areas. Enhancing crop production increases soil C input and improves SOC concentration on irrigated vis-à-vis rainfed cropland. High crop yields lead to more surface ^{and} root residues returned to the soil. Irrigation offers a possibility to convert less productive soils to economic croplands and, by increasing _____

Co-Benefits

In addition to mitigating carbon emissions, increasing soil carbon can have profound effects on soil quality and agroecosystem productivity. Soil carbon plays important roles in maintaining soil structure, improving soil water retention, fostering healthy soil microbial communities, and providing fertility for crops. These improvements are well documented and have generated a consensus that improvements to soil carbon are key to improving agricultural systems as a whole.



Effect of precision farming on SOC sequestration