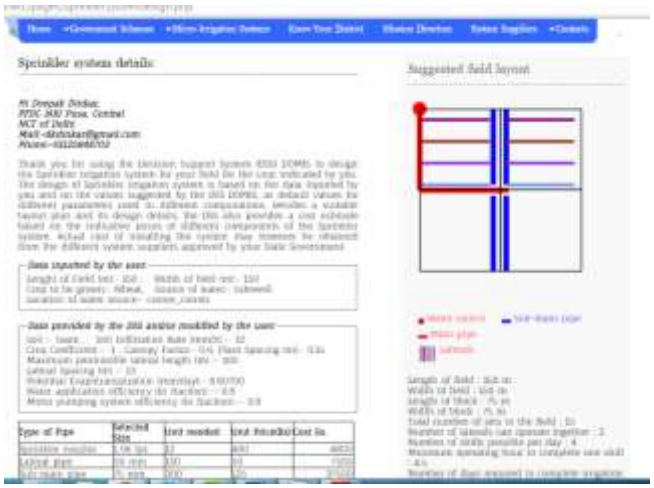
Decision Support System- Design of Micro Irrigation Systems (DOMIS)

To fulfilling the dream of our visionaries, supporting digital India initiative and requirements of farmers, **P**recision **F**arming **D**evelopment **C**entre (PFDC) at Water Technology Centre, ICAR-**I**ndian **A**gricultural **R**esearch **I**nstitute (IARI), New Delhi, India, has took initiative to develop a web based decision support system for designing micro irrigation systems. A Decision Support System namely, **DOMIS** (**D**esign of **M**icro **I**rrigation **S**ystems) has been developed to help the user to design appropriate micro irrigation systems for efficient water utilization under different agro-climatic conditions in India. DOMIS includes the design of Drip Irrigation, Sprinkler Irrigation System and Micro-Sprinkler Irrigation Systems.The developed DSS has been seamlessly integrated into a user-friendly interface implemented in the open source programming languages i.e. PHP, MySQL, runs in Apache server, which can be accessed with help of any computers, laptops, mobiles, phablets, tablets or any internet enabled device having assured internet connectivity. The system is organised in three tiers: data, logic and presentation and has been hosted at http://domis.iari.res.in. DOMIS provides default data as well as guidance for selection of suitable microirrigation components taking the user through different design steps interactively as follows:

i. Partitioning the whole field into blocks of desired dimensions.
ii. Determination of most appropriate layout plan for main, sub main and lateral pipes in the field.
iii. Estimation of water requirements at plant, lateral, sub main and main pipe level based on agro-climatic data.
iv. Determination of suitable water application rate as per the soil properties.
v. Determination of sizes of laterals, sub main and main pipes based on their frictional loss analysis.
vi. Estimation of size & type of accessories such as filters & fertigation equipment based on water quality and crop demand.
vii. Determination of size of motor pumping unit and the power requirement.
viii. Estimation of the cost of the system based on costs of individual components.

Databases, cost calculation and suggested field layout: It uses rich database with information on crops, soil climatic data, MI equipment as well as, source and quality of water. Agro-climate data i.e. Potential Evapotranspiration (PET mm/day), soil data, ground water data, crops data, climatic data for all the districts of 29 states and 7 UT's of India has been compiled and used. User submitted records along with agro-climate details are compiled by scientifically accepted software algorithms with richness



System design layout generated by DSS-DOMIS

of information and agricultural engineering practices and formulae. DSS-DOMIS suggests most optimal layout plans for main, sub-main and lateral pipes. It determines the appropriate sizes of different components including main, sub main and lateral pipes, pumping system, filters and fertilizer application systems. The suggested field layout can be taken as print out or can be accessed through email. DSS also provides an estimate of the costs of different components of the system.

In a nutshell, the web based system (http://domis.iari.res.in), uses scientifically accepted software algorithms with richness of information and expert opinions, flexibility and simplicity of use which makes the DSS DOMIS a superior tool for designing micro irrigation systems with a view to enhance water productivity in agriculture. Besides providing the support in designing the appropriate micro irrigation systems DOMIS also provides general information about Schemes of Government of India, agencies promoting micro irrigation, implementing agencies in different States of India, approved system suppliers in different States and general information about different districts in the country. The developed DSS has been tested and appreciated by 22 Precision Farming Development Centres, State Micro Irrigation Mission Directors and several micro irrigation industries. The decision support system will be useful for farmers, researchers and policy makers.

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