

# Improving Water Use for Dry Season Agriculture by Marginal and Tenant Farmers in the Eastern Gangetic Plains

## TECHNICAL NOTE

## Decision Support Tools and Mobile Apps



Activity 3.4 in the DSI4MTF project involves the development of interactive tools to support the understanding and knowledge of improved irrigation, water and energy management. Some prototype software tools have also been developed to assist the project staff to capture field data. This Technical Note details some of the tools, their function, intended audience and potential improvements.

### Decision support tools

Mobile phones, particularly internet connected smartphones are efficient tools for sending and receiving information in the field. Simple interfaces can capture data, process it and/or instantaneously send it to cloud databases for processing and storage. Using these tools can reduce the time delay for data transfer (from the field to the office) and any potential transcription errors.

### Inputs and outputs

Some of the tools (e.g. Water Level Tool) have been designed for the one way transfer of data, and are aimed at the DSI4MTF field staff to collect and send data. Other tools are quick calculators (e.g. Conversion Calculator, Orifice Discharge Tool, etc.) that will give fast feedback to a query, but don't store any data. The remaining tools are a combination of both data capture and information feedback tools. These tools are capturing information and performing calculations but are also sending the data to a cloud database to build a time series dataset. These tools allow the analysis of trends but also help users make some estimate of what can be expected in the future.



any potential transcription errors.

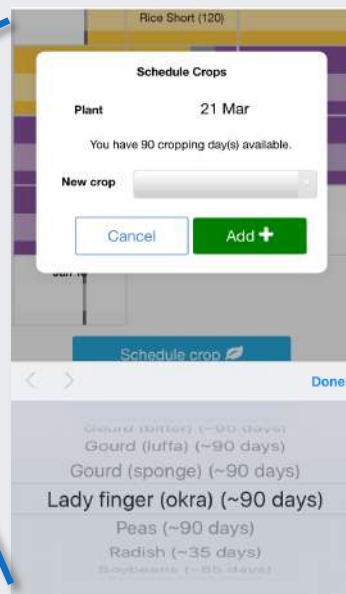


Figure 1: The DSI4MTF Applets portal contains a growing number of prototype apps. An example of an applet (above) is the Cropping Calendar, which allows farmers to investigate potential cropping rotations based on the planting of paddy and the remaining cropping days in a given year



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| Icon   | Tool                     | Function  | Audience  | Inputs   | Outputs  | Potential   |
|--|--------------------------|---|---|--|--|---|
|    | Conversion Calculator    | Converts units of area, weight and currency from SI/ Australian/US units to local measurements and currencies   | Primarily those working in projects that cross state or country borders | Ha, or m <sup>2</sup> , or Bihari Bigha, or Nepali Katta, or AUD | Other units i.e. West Bengali Bigha or INR, or BDT       | Could also be expanded to rates i.e. convert quintals /katta to tonnes /hat             |
|    | TDR Converter            | Converts the millivolt reading from a MP406 probe into volumetric soil moisture                                 | DSI4MTF technical staff   | Calibration curve  | Point readings of volumetric soil moisture               | Logging ability connected to phones GPS   |
|    | Orifice Discharge Tool   | Calculated the flow rate from a pump using a velocity head and the orifice equation                             | DSI4MTF and SRFSI technical staff                                       | Pump outlet diameter and the discharge velocity head             | Flow rate in L/s and a graphic of the flow rate curve    |   |
|    | Pump Assessment Tool     | Calculates the cost of pumping (Rupees per kL). Captures assessment data and compare one scenario with another  | DSI4MTF and SRFSI technical staff                                       | Pump discharge and diesel usage                                  | Cost of pumping at a point in time                       | Incorporate suction and discharge pressures and calculate % efficiency                  |
|   | Irrigation Schedule Tool | Uses FAO56 methodology to calculate an irrigation schedule. Also records rainfall and irrigation applied        | Initially DSI Team—eventually farmers with smartphones                  | Crop setup (soil, plant dates, etc) irrigation & rainfall data   | How much irrigation to apply and when                    | Automatically capture rainfall and evapotranspiration data from a weather station       |
|  | Cropping Calendar        | Scenario based assessment to determine the potential cropping rotations in a given year                         | DSI4MTF and SRFSI technical staff and farmers with smartphone           | Paddy plant date, then choice of rabi and pre-khariff crops      | Calendar of potential cropping rotations                 | Filter cropping options based on season<br>Exporting of scenario reports                |
|  | Data Collection Tool     | GIS data collection of fields and monitoring locations (ponds, tubewells) for real time relay to cloud database | DSI4MTF Team  | Field polygons & pins, daily and weekly monitoring data          | Field and infrastructure maps. GIS data                  | Improve the user interface and further simplify   |
|  | Water Level Tool         | Simple tool for capturing real time pond and tubewell levels and water quality data                             | DSI4MTF Team  | Weekly water level measurements                                  | Auto uploads to the GIS data tables                      | Link to GPS to identify ponds and shallow tubewells                                     |
|  | Market Price Calculator  | Allows users to collect data and watch produce market prices at the nearest 4 markets                           | DSI4MTF and SRFSI technical staff and farmers with smartphone           | Regular prices of commodities at local markets                   | Best price for individual commodity, best market overall | Ability to compare seasonal and annual trends in market prices with climatic conditions |
|  | Rainfall Recorder        | Simple tool for the collection of site specific rainfall  | DSI4MTF and SRFSI technical staff and farmers with smartphone           | Daily rain gauge readings in mm                                  | Rainfall chart and tracking against long term average    | Link to display some forecasting  |
|  | Crop Chat                | Forum for discussing agronomy and irrigation technical problems between the field and the advisors              | DSI4MTF and SRFSI technical staff and farmers with smartphone           | Questions on and photos of crop problems or irrigation hardware  | Open, searchable discussions and answers                 | Categorisation of forum posts<br>Alerts and notifications                               |

