M2M in Agriculture
Presentation map

1. Major Problems Faced in Farming Sector
2. How M2M can help
3. A Generic Architecture
4. Enabling Technologies and Standards
5. Representative Business model
Major Problems Faced in Farming Sector

1. The pressure to produce more food with shrinking land & resources.
2. Inefficiencies caused by suboptimal use of automation in Agriculture segment.
3. Finding the man power for agricultural purpose is also a challenge in some countries.
4. Lack of environment and local weather information.
5. Blanket inputs (fertilizers, chemicals etc.) treatment while growing crops.
How M2M can help

- Equipment monitoring and diagnostics
- Equipment/ process control
- Weather conditions information
- Remote Crop monitoring
- Logistics Management
- Market analysis, information sharing
- Sensor Magic
## Equipment monitoring and diagnostics

<table>
<thead>
<tr>
<th><strong>Equipment monitoring and diagnostics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural Equipments</strong> e.g. tractors, harvesters, tanks can be monitored remotely for their status of operation, diagnostics and proactive maintenance.</td>
</tr>
<tr>
<td><strong>Wireless modems</strong> fitted onto equipment and used for communication with central servers.</td>
</tr>
<tr>
<td><strong>Alerts</strong> sent to farmers’ mobile phone in case of any specific events.</td>
</tr>
<tr>
<td><strong>GPS</strong> used for identifying the location of any equipment.</td>
</tr>
<tr>
<td><strong>Retrofit kits</strong> developed to support such monitoring and diagnostics for existing equipment.</td>
</tr>
</tbody>
</table>
Agricultural Equipments and their operation can be controlled remotely. This can save significant effort and time. For example, water pump can be remotely turned on and off as required.

For any regular set of control operations, rules can be set on mobile phone / PC based UI, For example, from Oct 30th to Nov 15th, ‘turn on’ water pump at 5.00 am and ‘turn it off’ at 7.00 am.
Weather information

- It's utmost important for farmers to be aware of complete weather information so that they can take informed decisions like when to sow the seeds, when to harvest the crop, irrigation planning etc.

- Farmers can be provided all this information over mobile phone or PC based apps. Farmers can also configure and get alerts for any specific weather forecast conditions (e.g. if rain is predicted within next 15 days)

Important Weather Parameters

- Wind speed
- Temperature
- Sunshine
- Rain
- Pressure
- Humidity
Remote Crop monitoring

IP Based cameras installed at specific locations in the farms

Farmers able to get the pictures to see the growth and health of the crop and also check weed growth

This may not completely alleviate the need for closer inspection but it can reduce the frequency of farm visits thus saving time and money
Wireless (or wired) sensors can help precisely monitor different parameters critical for agriculture.

Farmers can be provided all this information over mobile phone or PC based apps. Farmers can also configure and get alerts for crossing any threshold values for these parameters.

Examples of such parameters include:

- Humidity
- Soil Moisture
- Temperature
- Water Tank Level
Wireless connectivity and GPS on agricultural equipments can be leveraged to optimize the deployment of such equipments.

Farmers can get a live view of their farm equipments on the PC.

Farmers can send commands for movement and deployment of these equipments to any specific location with dynamic schedule management.
Farming Market data and analysis can be made accessible to farmers by simple applications running on mobile phones and PC.

Farmers news groups and chat groups to be evolved so that they can exchanges information for business benefit.

Farmers can register to get personalized (specific to their crops, geographical area etc.) reminders and tips on their mobile phones / PC.
A Generic Architecture
Enabling Technologies and Standards

- Networking Technologies: TCP/IP, Wi-fi
- Sensor Technologies: Zigbee, ISM, proprietary RF
- Cellular Technologies: GSM, CDMA, 3G, LTE
Representative Business Model

**Service Providers**
- TSPs/ ISPs or Agro companies as service providers to offer complete solution as a packaged service.
- Provide bundled equipment as kit in the services package OR recommend farmers to buy equipment from chosen OEM partners.
- Tie up with Agri. market analysis agencies

**Software Providers**
- Software providers to provide:
  - M2M Services Core
  - User end applications and Web pages
  - Administrative/ back end applications
  - Information gathering and analytics SW
- Software vendors need to work closely with OEMs for device dependent services and inter operability

**OEMs**
- Provides equipment for automation, sensors
- Work closely with Agricultural equipment OEMs as some of the equipments for automation, sensors need to be retro fitted or factory fitted on agricultural equipment
- OEMs will sell the equipment directly to farmers or through service providers

**Agriculture Domain Experts/SME**

**Farmers**
Thank You