The System for Providing Farmers with Agro-Meteorological Information on the Base of Web-Technology

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“The Information and Advisory System for Farmers” has been developed within National Institute on Agricultural Meteorology (Federal Service on Hydro-Meteorology and Environment Monitoring) with finance support by Remez Inc. The system is a combination of an Advisory System and a Decision Support System and it has to provide information services concerning current and forthcoming weather at a particular location.

The service is available on the base of subscription to farms of the different size as well as to some insurance companies working in an area of agriculture.

The system is the first national information interactive tool.
Development aims

• The system was designed to create the condition to eliminate the hazards of weather and environment on agriculture

• The system is provided end-users with the information about the potential of natural resources within a territory, about climate and current weather and some forecasts, about weather impacts on farmer’s activities

• System is an Internet application available as a web resource.
Subsystems – 3 items

• PLANT CULTIVATION, FRUIT GROWING, GREEN HOUSE GARDENING
• ANIMAL HUSBANDRY
• YIELD FORECAST, HARVESTING & STORAGE

Subsystems provide users with the information, advices and recommendations concerning a particular farm. Input data include routine observations from the agro-meteorological network, data from devices and information about the farm received from the end-user. Data base updating is conducted every ten days, but some parameters are renewed every day or when the corresponding data become available.
Уважаемый пользователь!

На этой странице помещена анкета с информацией о конкретном хозяйстве, которая оставается закрытой для всех пользователей системы, кроме руководства данного хозяйства. Эта анкета является упрощенной экономической моделью хозяйства. Занесение ее в базу данных необходимо для настройки параметров модели и выдачи рекомендаций по оптимальному использованию имеющихся в хозяйстве ресурсов.

Пользователи обобщенной информации по административному району анкеты не заполняют, поэтому эта страница остается не заполненной.

Информация о хозяйстве

Хозяйство/Административный район: Нет имени

<table>
<thead>
<tr>
<th>Культуры, которые возделываются в хозяйстве</th>
</tr>
</thead>
<tbody>
<tr>
<td>Кулуары</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Озимая пшеница</td>
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<tr>
<td>Озимая риска</td>
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<tr>
<td>Яровая пшеница</td>
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<td>Ячмень</td>
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<tr>
<td>Овес</td>
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<tr>
<td>Гречиха</td>
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<tr>
<td>Кукуруза</td>
</tr>
</tbody>
</table>
Subsystem: PLANT CULTIVATION

Page “Hydro-meteorological parameters for the farm territory” includes:

1. Observed weather data for previous ten days and the forecasts on the forthcoming period; the mean or averaged climate parameters for the farm territory calculated on the base of routine measurements conducted on meteorological network.

2. Information about hazard weather phenomena on the farm territory such as spring frosts, hail, etc. with their statistics (probability, dispersion and others).

3. Comments and estimates if current weather conditions meet crops demands and requirements.
The example of a page “Hydro-meteorological parameters for the farm territory”
Subsystem: PLANT CULTIVATION

Page “Heat availability at the vegetation period for the farm territory” includes:

1. Thresholds and corresponding dates when mean daily temperature stably exceeds those thresholds; duration of warm (without frosts) period

2. Climatic sum of temperature, which exceeds 10°C, and the forecast of such a sum for the current vegetation period.
The example of a page “Heat availability at the vegetation period for the farm territory”
Subsystem: PLANT CULTIVATION

Page “Crops to be cultivated on the farm territory” includes:

1. List of crops, which give stable yield with 80% probability in current climate conditions if applying the best land and plant treatment.

2. List of crops and their species graded by precocity. They are marked if the heat resource available in the current year exceeds a species’s requirement. As the corresponding forecast is issued before spring species sowing the farmer could rely on it to take his correct decision.
The example of a page “Crops to be cultivated”
Subsystem: PLANT CULTIVATION

Page “Plant protection” includes:

Information about pests and diseases, which could impact crops cultivated on the farm:

• a pest or a disease name,
• features of a pest or a disease,
• type of damages or harm,
• techniques and procedures to combat pests and diseases or to mitigate the consequences.
The example of a page “Plant protection”
Subsystem: YIELD FORECAST, HARVESING AND STORAGE

- Page “YIELD FORECAST” contains information about expected productivity and total yield in the particular region. Now it is a common agro-meteorological forecast, in future similar forecasts would be prepared on the scale of the farm territory.
- Page “HARVESTING” contains a plot of sum of temperature exceeded 10°C and corresponding estimates for the next ten days; the table with the temperature threshold for maturing cultivated crops; the forecast of harvest beginning for cereals (on the base of weather conditions); some advices on recommended procedure of harvesting.
Principal components of the system
Statistics and auxiliary data

• It is possible to select and look through available statistics and auxiliary data such as
  – Productivity of main cultivated crops in regions at selected years
  – Areas occupied by main cultivated crops in regions at selected years
  – Total yield for main cultivated crops in regions at selected years
Forecasting subsystem

- Selecting a region the end user receives the list of crop cultivated in the region and corresponding lists of available forecasting procedures, procedures for vegetation period evaluation, and procedures for forecast accuracy estimation.
MK-15 Agro

Measures:
- Speed and direction of wind,
- Temperature, humidity, pressure,
- Precipitation, moisture and soil temperature,
- Radiation, dew

Calculates:
- Turbulence parameters

Do not have any movable parts

Provides high reliability in heavy meteorological conditions
(precipitation, frost, dust storm, etc.)
Example of the screen, developed by MK-15 Agro
Using of MK-15 Agro

• MK-15 Agro aimed at information support of farmers

• A farmer could save some money using MK-15 Agro by:
  – Avoiding some chemical treatments of fields
  – Used fertilizers when they needed
  – Used less materials and machinery on products
  – Rises productivity
  – Etc.
Using of MK-15 Agro

• MK-15 Agro monitors the situation and gives the warning about hazard phenomena

• MK-15 Agro tested with the models:
  – Colorado beets forecast
  – Apple seed worm forecast
  – Apple scab forecast
  – Using of nitrogen fertilizer with winter wheat and spring barley
  – Etc.
# Example of Colorado beets forecast and chemical processing of potato

**The system of phyto-sanitary and agro-ecologic monitoring**

<table>
<thead>
<tr>
<th>Data base</th>
<th>Looking through</th>
<th>Forecast</th>
<th>Printing</th>
<th>Help</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Colorado beets forecast</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Activity</strong></td>
<td><strong>Date</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steadiness of temperature above 10 degrees</td>
<td>15/04/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beets appearance</td>
<td>12/06/08</td>
<td></td>
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<tr>
<td>Beginning of eggs rafting</td>
<td>12/06/08</td>
<td></td>
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<tr>
<td>Larvae (first age) appearance</td>
<td>20/06/08</td>
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<td></td>
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<tr>
<td>Larvae (second age) appearance</td>
<td>23/06/08</td>
<td></td>
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</tr>
<tr>
<td>Beginning of first chemical processing</td>
<td></td>
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<td></td>
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<tr>
<td>Larvae (fourth age) appearance</td>
<td>30/06/08</td>
<td></td>
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<td></td>
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<tr>
<td>Finishing of first chemical processing</td>
<td></td>
<td></td>
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<tr>
<td>Beginning of larvae transforming to pupae</td>
<td>04/07/08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beginning of beets (first generation) appearance</td>
<td>26/07/08</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Beginning of second chemical processing</strong></td>
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</table>

International Workshop, May 2009, Australia
Apple seed warm forecast and chemical processing of trees

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/04/08</td>
<td>Steadiness of temperature above 10 degrees</td>
</tr>
<tr>
<td>15/04/08</td>
<td>Diapause finishing for wintering caterpillars</td>
</tr>
<tr>
<td>06/06/08</td>
<td>Moths (first generation) of apple seed warm appearance</td>
</tr>
<tr>
<td>09/06/08</td>
<td>Ending of period for preparing nutrition</td>
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<tr>
<td>13/06/08</td>
<td>Beginning of eggs rafting by moths (first generation)</td>
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<td>21/06/08</td>
<td>Caterpillars (from eggs) appearance</td>
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<tr>
<td>22/06/08</td>
<td>Expected date of first chemical processing</td>
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<tr>
<td>23/06/08</td>
<td>Caterpillars (from eggs) appearance</td>
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<tr>
<td>24/06/08</td>
<td>Caterpillars (from eggs) appearance</td>
</tr>
<tr>
<td>25/06/08</td>
<td>Finishing of first chemical processing</td>
</tr>
</tbody>
</table>

The system of phyto-sanitary and agro-ecologic monitoring
Conclusions

• The Agricultural Ministry is interested in the system. Now it prepares the list of farms to have the access to system
• The number of farmers in our country is not the big one, but the movement is observed and we hope for using of the system
• The contents of the system could be defined by the farmers of the country
Internet address of the system

http://www.agromet.ru