Expert System for Maize Crop

Expert System for Maize Crop is developed using AgriDaksh. This system is a farmer oriented and user friendly software which provides spectrum of information with images of maize crop such as Variety Selection, Cultural Practices, Disease Diagnosis, Insect Identification, and Post Harvest Technology etc. The Variety Selection module advises location specific varieties and Cultural Practices advises on the aspects of irrigating, application of fertilizers and insecticides. Disease Diagnosis and Insect Identification module helps the stake-holders to diagnoses the disease and to identify insects affecting the maize crop and suggest preventive and control measures. Post Harvest Technology subsystem deals with storage and processing of maize for developing value added products. In Introduction module, detail information about basic, Origin & History, Soils and suitable areas for cultivation are covered. Maize technology module has many links such as introduction, production technology, seed production technology, varieties, value addition in maize product. Production technology provides information about specialty corn which contains detail information on a quality protein maize (QPM), baby corn, sweet corn, pop corn, high oil corn.

AGRIdaksh, a tool for building online expert system is developed at Division of Computer Applications, Indian Agricultural Statistics Research Institute (IASRI), New Delhi. Maize AGRIdaksh is a expert system developed using AGRIdaksh. Expert System for Maize Crop is available online through IASRI web site http://www.iasri.res.in or at its direct link http://expert.iasri.res.in/agridaksh. The system was released by Honorable DDG Crop Science Dr. S.K. Dutta at 54th Annual Conference of Maize at Coimbatore during 2-4 April 2011. The system is developed by a team of expert from IASRI, New Delhi in collaboration with Directorate of Maize Research (DMR), New Delhi.
1. Crops & Varieties

1.1 How to add a new crop?

i) Click on ‘Knowledge Acquisition’ option item from the left frame.
ii) Choose ‘Crops’ option and then ‘Modify’ option.
iii) Enter ‘Crop name’ and select appropriate ‘Crop type’ in the right frame (Fig. 1.1).
iv) Click on ‘Add’ button (Fig. 1.1).
v) Successful insertion message appears confirming the entry of a new crop.

![Fig. 1.1 Adding New Crop](image)

1.2 How to update a crop name?

i) Click on ‘Knowledge Acquisition’ option item from the left panel.
ii) Choose ‘Crops’ option and then ‘Modify’ option.
iii) Click on ‘UPDATE’ tab at the top of the lower right frame.
iv) Select ‘Crop name’ and click on ‘Update’ button. (Fig. 1.2)
In next window, enter new ‘Crop name’ and select correct ‘Crop type’ and click on ‘Update’ button.

1.3 How to delete existing crop?

i) Click on ‘Knowledge Acquisition’ option item from the left frame.
ii) Choose ‘Crops’ option and then ‘Modify’ option.
iii) Click on ‘DELETE’ button at the top of the lower right frame.
iv) Select appropriate ‘Crop’ and click on ‘Delete’ button (Fig. 1.3).
Fig. 1.2 Updating Crop Name

Fig. 1.3 Deleting Crop

1.4 How to add a new Basic Crop Attribute Feature?

i) Click on ‘Knowledge Acquisition’ option then ‘Crops’ and finally ‘Basic Feature’ option.
ii) Select the ‘Crop’ and click ‘Next’ button (Fig. 1.4)
iii) In next window, set the attributes by selecting the attributes from the left list and moving them to right list by >> button. (Fig. 1.5).
iv) Click on ‘Next’ button (Fig. 1.5).
v) Submit the values for the attributes.
vi) Click on Insert button.

1.5 How to add a new Crop Economic Features?

i) Click on ‘Knowledge Model’ option and finally ‘**Economic Feature**’ option.
ii) Select appropriate Crop and Location and Click on Next button (Fig 1.6).

iii) In next window, set the attributes by selecting the attributes from the left list and moving them to right list by >> button. (Fig. 1.7).

iv) Click on ‘Next’ button (Fig. 1.7).

v) Submit the values for the attributes.

vi) Click on ‘Insert’ button.

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1.6 How to add Basic Features of a new Variety?

i) Click on ‘Knowledge Acquisition’ option then ‘Variety Management’ and finally ‘Basic
Features’ option.

ii) Select crop name for which new variety is to be added (Fig. 1.8).

iii) Make appropriate entries about new variety, like Name, Parentage, Breeding Method, purpose etc. and set the Location (Fig. 1.8).

iv) Click on the ‘Insert’ button to enter the information in database.

Note: Do remember to check the variety in update varieties before adding new variety.

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**Fig 1.8 Adding Basic Attribute Values of a new Variety**

1.7 How to update basic features of existing variety?

i) Click on ‘Knowledge Acquisition’ option then ‘Variety Management’ and finally ‘Basic Features’ option.

ii) Click on ‘UPDATE’ at the top of the lower right frame (Fig 1.8).

iii) In next window, Select ‘Crop’ and appropriate variety for the ‘updation’ and click on ‘Update’ button.

iv) Make appropriate Modifications in Name, Parentage, Breeding Methods etc. and set the new location (Fig.1.9).

v) Click on the ‘Update’ button to enter the information in database.
1.8 How to delete existing variety details?

i) Click on ‘Knowledge Acquisition’ option then ‘Variety Management’ and finally ‘Basic Features’ option.

ii) Click on ‘DELETE’ at the top of the lower right pane (Fig 1.8).

iii) Select the variety which has to be deleted from list of varieties (Fig 1.10).

iv) Click on Delete button (Fig 1.10).

v) In next window, confirm the deletion.
1.9 How to add specific features of the variety?

i) Click on ‘Knowledge Acquisition’ option then ‘Variety Management’ and finally ‘Specific Features’ option.

ii) Select appropriate ‘Crop name’ and ‘Crop variety name’ (Fig. 1.11).

iii) Click on ‘Next’ button (Fig. 1.11).

iv) Make appropriate entry for displayed attributes (Fig. 1.12).

v) Click on ‘Insert’ button (Fig. 1.12).

1.10 How to add economic attributes to a variety?

i) Click on ‘Knowledge Acquisition’ option then ‘Variety Attribute’ and finally ‘Economic Feature’ option.

ii) In next window, select ‘Crop name’, ‘Variety name’ and ‘Location’ then click ‘Next’ button.

iii) Make appropriate entries of different economic features of selected variety for the selected location (Fig. 1.13).

iv) Click on ‘Insert’ button (Fig. 1.13).
Fig 1.11 Selecting Crop and Variety for Adding Specific Features.
Fig 1.12 Adding Variety Specific Features Values.
2. Plant Protection

2.1 Disease Management

2.1.1 How to add a new disease?
   i) Click on Knowledge Acquisition option then Diseases and finally Basic Features option.
   ii) Enter new disease Local name. (Fig 2.1)
   iii) Make other appropriate entries about the new disease, like Scientific Name, Control, Symptoms etc. (Fig 2.1)
   iv) Click on the Insert Button to enter the information in the database. (Fig 2.1)

2.1.2 How to update the basic features of previous Disease?
   i) Click on Knowledge Acquisition option then Disease and finally Basic Features option.
   ii) You can update either disease basic details or image of disease infection. Select the disease to be updated. (Fig 2.2)
   iii) Click on appropriate Update button. (Fig 2.2)
iv) If you select for the updating of basic features of disease then make appropriate modifications in Names, Life Cycles, Distribution etc. (Fig 2.2)

v) Click on the Update Button to enter the information in database. (Fig 2.2)

vi) If you select for the updation of image of disease infection then for addition of image click on browse button, select the image and click Update button. (Fig 2.2)

vii) For the deletion of previous image click on Delete link on the side of image. (Fig 2.2)

2.1.3 How to update the images of previous disease?

i) Click on Knowledge Acquisition option then Disease and finally Basic Features option.
ii) Select the disease to be updated and then Click Update button for image updating. (Fig 2.3)

iii) For the addition of image click on browse button, select the image and click Update button. (Fig 2.4)

iv) For the deletion of previous image click on Delete link on the side of image. (Fig 2.4)

Fig. 2.3 Disease Updation
2.1.4 How to delete the disease entry?

i) Click on Knowledge Acquisition option then Disease and Basic Features option.
ii) Click on DELETE at the top of the lower right frame. (Fig 2.5)
iii) Select the Disease name which has to delete from list of diseases. (Fig 2.5)
iv) Click on Delete button. (Fig 2.5)
2.1.5 How to add specific features of a disease?

i) Click on Knowledge Acquisition option then Disease and finally Specific Features option.

ii) Select appropriate Crop Name and Disease Local Name. (Fig 2.6)

iii) Make appropriate entries about Disease Symptom, Yield Loss, Nature of Damaging and Control for selected disease. (Fig 2.6)

iv) Click on Insert button. (Fig 2.6)

2.1.6 How to update specific features of a disease?

i) Click on Knowledge Acquisition option then Disease and finally Specific Features option.

ii) Click on UPDATE at the top of the lower right frame. (Fig 2.7)

iii) Select appropriate Crop Name and Disease Local Name. (Fig 2.7)

iv) Click on Update button. (Fig 2.7)

v) Make appropriate updating about Disease Symptom, Yield Loss, Nature of Damaging and Control for selected disease. (Fig 2.7)

vi) Click on Update button. (Fig 2.7)
2.1.7 How to delete specific feature of a disease?

i) Click on Knowledge Acquisition option then Disease and finally Specific Features option.
ii) Click on DELETE at the top of the lower right frame. (Fig. 2.8)
iii) Select appropriate Crop Name and Disease Local Name for deletion. (Fig. 2.8)
iv) Click on Delete button. (Fig. 2.8)

2.2. Physiological Disorder Management

2.2.1 How to add a basic features of new Physiological Disorder?

i) Click on Knowledge Acquisition option then Physiological Disorder and finally Basic Features option.
ii) Make new entries about Casual Agent, Symptom and Dose for Physiological Disorder. (Fig. 2.9)
iii) Click on the Insert Button to enter the information in database. (Fig. 2.9)
2.2.2 How to update the basic features of previous Physiological Disorder?

i) Click on Knowledge Acquisition option then Physiological Disorder and finally Basic Features option.

ii) Click on UPDATE at the top of the lower right frame. (Fig. 2.10)

iii) Select appropriate Physiological Disorder for the updation and click on Update button. (Fig. 2.10)

iv) Make appropriate Modifications in Casual Agent, Symptom and Dose for Physiological Disorder. (Fig. 2.10)

v) Click on the Update Button to enter the information in database. (Fig. 2.10)
2.2.3 How to delete the Physiological Disorder entry?

i) Click on Knowledge Acquisition option then Physiological Disorder and finally Basic Features option.

ii) Click on DELETE at the top of the lower right frame. (Fig. 2.11)

iii) Select the physiological order which has to delete from list of varieties. (Fig. 2.11)

iv) Click on Delete button. (Fig. 2.11)
2.2.4 How to add specific features of a Physiological Disorder?

i) Click on Knowledge Acquisition option then Physiological Disorder and finally Specific Features option.

ii) Select appropriate Crop Name and disorder Name / Casual Agent. (Fig. 2.12)

iii) Make appropriate entries about Symptom, and Control of disorder. (Fig. 2.12)

iv) Click on Insert button. (Fig. 2.12)
2.2.5 How to update specific features of a Physiological Disorder?

i) Click on Knowledge Acquisition option then Physiological Disorder and finally Specific Features option.

ii) Click on UPDATE at the top of the lower right frame.

iii) Select appropriate Crop Name and Disorder Name (Fig. 2.13).

iv) Click on Update button.

v) Make appropriate updating about Symptom and control of disorder.

vi) Click on Update button.

2.2.6 How to delete specific feature of a Physiological Disorder?

i) Click on Knowledge Acquisition option then Physiological Disorders option.

ii) Click on DELETE at the top of the lower right frame.

iii) Select appropriate Disorder Name from the list. (Fig. 2.14).

iv) Click on Delete button.
2.3 Insects Management

2.3.1 How to add Basic Features of a new Insects?

i) Click on Knowledge Acquisition option then Insects and finally Basic Features option.

ii) Enter new Insect Local name.

iii) Make other appropriate entries about new insect like Scientific Name, Life Cycle, IPM Level, Description etc. (Fig. 2.15).
iv) Click on the Insert Button to enter the information in database.

![Image of adding basic features of insect](image)

**Fig. 2.15 Adding Basic Features of Insect**

2.3.2 How to update the basic features of previous Insects?

i) Click on Knowledge Acquisition option then Insect and finally Basic Features option.

ii) You can update either insect basic details or image of insect infection. Select the option which to be updated (Fig. 2.16).

iii) Click on appropriate Update button.

iv) If you select for the updation of basic features of insect then make appropriate modifications in Names, Life Cycles, IPM Level etc. (Fig. 2.17).

v) Click on the Update Button to enter the information in database.

vi) If you select for the updation of image of insect infection then for addition of image click on browse button, select the image and click Update button. (Fig. 2.16).

vii) For the deletion of previous image click on Delete link on the side of image.
2.3.3 How to update the images of previous Insects?

i) Click on Knowledge Acquisition option then Insect and finally Basic Features option.

ii) Select the insect to be updated and then Click Update button for image updation.

iii) For the addition of image click on browse button, select the image and click Update button (Fig. 2.18).

iv) For the deletion of previous image click on Delete link on the side of image.
2.3.4 How to delete the Insect entry?
i) Click on Knowledge Acquisition option then Insect and finally Basic Features option.
ii) Select the Insect name which has to delete from list of diseases (Fig 2.19).
iii) Click on Delete button.

2.3.5 How to add specific features of an Insect?
i) Click on Knowledge Acquisition option then Insect and finally Specific Features option.
ii) Select appropriate Crop Name and Insect Name.
iii) Make appropriate entries about Symptom, and Control of insect (Fig 2.20).
iv) Click on Insert button.

2.3.6 How to update specific features of an Insect?
i) Click on Knowledge Acquisition option then Insect and finally Specific Features option.
ii) Select appropriate Crop Name and Insect Name (Fig. 2.21).
iii) Click on Update button.
iv) Make appropriate updation about Symptom and control of Insect (Fig. 2.22).
v) Click on Update button.

Fig. 2.20 Adding Specific Features of Insect
Fig. 2.21 Updating Specific Features of Insect

Fig. 2.22 Updating Specific Features of Insect
2.3.7 How to delete specific feature of an Insect?
   i) Click on Knowledge Acquisition option then Insect option and finally Specific Features option.
   ii) Click on DELETE at the top of the lower right frame.
   iii) Select appropriate Insect Name from the list (Fig. 2.23).
   iv) Click on Delete button.

2.4 Weeds

2.4.1 How to add Basic Features of a new Weeds?

   i) Click on Knowledge Acquisition option then weeds and finally Basic Features option.
   ii) Enter new Weed Local name.
   iii) Make other appropriate entries about new weed like Scientific Name, Description, Height, Control etc. (Fig. 2.24).
   iv) Click on the Insert Button to enter the information in database.
2.24 Adding Basic Features of Weed

2.4.2 How to update the basic features of existing Weed?

i) Click on Knowledge Acquisition option then Weed and finally Basic Features option.

ii) You can update either weed basic details or image of weed infection. Select the option which to be updated (Fig. 2.25).

iii) Click on appropriate Update button.

iv) If you select for the updation of basic features of weed then make appropriate modifications in Names, Description, Height, Control etc. (Fig. 2.26).

v) Click on the Update Button to enter the information in database.

vi) If you select for the updation of image of weed infection then for addition of image click on browse button, select the image and click Update button (Fig. 2.25).

vii) For the deletion of previous image click on Delete link on the side of image.
2.4.3 How to update the images of existing Weed?

i) Click on Knowledge Acquisition option then Weed and finally Basic Features option.

ii) Select the Weed to be updated and then Click Update button for image updation.

iii) For the addition of image click on browse button, select the image and click Update button (Fig. 2.27).

iv) For the deletion of previous image click on Delete link on the side of image.
2.4.4 How to delete the Weed entry?

i) Click on Knowledge Acquisition option then Weed and finally Basic Features option.
ii) Click on DELETE at the top of the lower right frame.
iii) Select the Weed name which has to delete from list of diseases (Fig. 2.28).
iv) Click on Delete button.
2.4.5 How to add specific features of a Weed?

i) Click on Knowledge Acquisition option then Weed and finally Specific Features option.

ii) Select appropriate Crop Name and Weed Name (Fig. 2.29).

iii) Make appropriate entries about Symptom and Control of weed.

iv) Click on Insert button.
2.4.6 How to update specific features of a Weed?

i) Click on Knowledge Acquisition option then Weed and finally Specific Features option.
ii) Click on UPDATE at the top of the lower right frame.
iii) Select appropriate Crop Name and Weed Name (Fig. 2.30).
iv) Click on Update button.
v) Make appropriate updating about Symptom and control of Weed (Fig. 2.31).
vi) Click on Update button.

2.4.7 How to delete specific feature of a Weed?

i) Click on Knowledge Acquisition option then Weed option and finally Specific Features option.
ii) Click on DELETE at the top of the lower right frame.
iii) Select appropriate Weed Name from the list.
iv) Click on Delete button.
2.5 Nematodes
2.5.1 How to add Basic Features of a new Nematodes?

   i) Click on Knowledge Acquisition option then Nematodes and finally Basic Features option.
   ii) Enter new Nematode Local name.
iii) Make other appropriate entries about new nematode like Scientific Name, Life Cycle, Spreading Mode, Host, Symptoms etc. (Fig. 2.32).
iv) Click on the Insert Button to enter the information in database.

![Fig. 2.32 Adding Basic Features of Nematode](image)

2.5.2 How to update the basic features of existing Nematode?

i) Click on Knowledge Acquisition option then Nematodes and finally Basic Features option.
ii) You can update either weed basic details or image of nematode infection. Select the option which to be updated (Fig. 2.33).
iii) Click on appropriate UPDATE button.
iv) If you select for the updating of basic features of nematode then make appropriate modifications in Names, Life Cycle, Spreading Mode, Host, Symptoms etc. (Fig. 2.34).
v) Click on the Update Button to enter the information in database.
vi) If you select for the updating of image of nematodes infection then for addition of image click on browse button, select the image and click Update button.
vii) For the deletion of previous image click on Delete link on the side of image.
2.5.3 How to update the images of existing Nematodes?

i) Click on Knowledge Acquisition option then Nematodes and finally Basic Features option.

ii) Select the Nematode to be updated and then Click Update button for image updation.

iii) For the addition of image click on browse button, select the image and click Update button (Fig. 2.35).

iv) For the deletion of previous image click on Delete link on the side of image.
2.5.4 How to delete the Nematode entry?

i) Click on Knowledge Acquisition option then Nematodes and finally Basic Features option.

ii) Click on DELETE at the top of the lower right frame.

iii) Select the Nematode name which has to delete from list of diseases (Fig. 2.36).

iv) Click on Delete button.
2.5.5 How to add specific features of a Nematode?

i) Click on Knowledge Acquisition option then Nematodes and finally Specific Features option.
ii) Select appropriate Crop Name and Nematode Name (Fig. 2.37).
iii) Make appropriate entries about Symptom and Control of nematode.
iv) Click on Insert button.

2.5.6 How to update specific features of a Nematode?

i) Click on Knowledge Acquisition option then Nematodes and finally Specific Features option.
ii) Click on UPDATE at the top of the lower right frame.
iii) Select appropriate Crop Name and Nematode Name (Fig. 2.38).
iv) Click on Update button.
v) Make appropriate updating about Symptom and control of Nematode (Fig. 2.39).
vi) Click on Update button.

Fig. 2.37 Variety – Nematode Data Entry
2.5.7 How to delete specific feature of a Nematode?
   i) Click on Knowledge Acquisition option then Nematode option and finally Specific Features option.
ii) Click on DELETE at the top of the lower right frame.
iii) Select appropriate Nematode Name from the list (Fig. 2.40).
iv) Click on Delete button.

![Fig. 2.40 Nematode Deletion](image)

3. Soil and Climate

3.1 How to add Basic Features of a new Soil & Climate factor?

i) Click on ‘Knowledge Acquisition’ option then ‘Soil & Climate’ and finally ‘Basic Features’ option.
ii) Select crop/variety name for which new Soil & Climate factor going to be added.
iii) Make appropriate entries about new Soil & Climate factor like Ph, Soil Texture, ECE of Soil etc. (Fig. 3.1).
iv) Click on the Insert Button to enter the information in database.
Fig. 3.1 Adding Basic Features of Soil & Climate

3.2 How to update existing Soil & Climate factor?
i) Click on ‘Knowledge Acquisition’ option then ‘Soil & Climate’ and finally ‘Basic Features’ option.
ii) Click on ‘UPDATE’ at the top of the lower right frame
iii) Select Crop/Variety and appropriate Soil & Climate factor for the updation and click on ‘Update’ button (Fig. 3.2).
iv) Make appropriate Modifications in Ph, Soil Texture, ECE of Soil etc.
v) Click on the Update Button to enter the information in database.

3.3 How to delete existing Soil & Climate factor details?
i) Click on ‘Knowledge Acquisition’ option then ‘Soil & Climate’ and finally ‘Basic Features’ option.
ii) Click on ‘DELETE’ at the top of the lower right frame.
iii) Select the Soil & Climate factor which has to delete from list of factors (Fig. 3.3).
iv) Click on ‘Delete’ button.
4. Herbicide, Insecticide & Nutrients

4.1 Herbicide
4.1.1 How to add a new Herbicide details?

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Herbicide’ option.

ii) Enter new Herbicide Local name.

iii) Make other appropriate entries about new Herbicide like Group, Chemical Content, Dose etc. (Fig. 4.1).

iv) Click on the Insert Button to enter the information in database.
4.1.2 How to update existing Herbicide details?

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Herbicide’ option.

ii) Click on ‘UPDATE’ at the top of the lower right frame.

iii) Select appropriate Herbicide name for the updation and click on ‘Update’ button (Fig. 4.2).

iv) Make appropriate Modifications in Group, Chemical Content, Dose etc. (Fig. 4.3).

v) Click on the Update Button to enter the information in database.
4.1.3 How to delete existing Herbicide details?

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Herbicide’ option.

ii) Click on ‘DELETE’ at the top of the lower right.

iii) Select the Herbicide name which has to delete from list of factors (Fig. 4.4).

iv) Click on ‘Delete’ button.

4.2 Insecticide

4.2.1 How to add a new Insecticide details?
i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Insecticide’ option.
ii) Enter new Insecticide Local name.
iii) Make other appropriate entries about new Insecticide like Active Ingredient, Insect Control, Apply Rate, Mixture etc. (Fig. 4.5).
iv) Click on the Insert Button to enter the information in database.

4.2.2 How to update existing Insecticide details?

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Insecticide’ option.
ii) Click on ‘UPDATE’ at the top of the lower right frame
iii) Select appropriate Insecticide name for the updation and click on ‘Update’ button (Fig. 4.6).
iv) Make appropriate Modifications in Active Ingredient, Insect Control, Apply Rate, Mixture etc. (Fig. 4.7).
v) Click on the Update Button to enter the information in database.
4.2.3 How to delete existing Insecticide details?

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Insecticide’ option.

ii) Click on ‘DELETE’ at the top of the lower right frame.

iii) Select the Insecticide name which has to delete from list of factors (Fig. 4.8).

iv) Click on ‘Delete’ button.
4.3 Nutrient

4.3.1 How to add a new Nutrient details?

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Nutrient’ option.

ii) Enter new Nutrient name.

iii) Make other appropriate entries about new Nutrient like Function, Deficiency Symptoms, Description etc. (Fig. 4.9).

iv) Click on the Insert Button to enter the information in database.

4.3.2 How to update existing Nutrient details?

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Nutrient’ option.

ii) Click on ‘UPDATE’ at the top of the lower right frame.

iii) Select appropriate Nutrient name for the updation and click on ‘Update’ button (Fig. 4.10).

iv) Make appropriate Modifications in Function, Deficiency Symptoms, Description etc. (Fig. 4.11).

v) Click on the Update Button to enter the information in database.
4.3.3 How to delete existing Nutrient details.

i) Click on ‘Knowledge Acquisition’ option then ‘Agricultural Chemicals’ and finally ‘Nutrient’ option.

ii) Click on ‘DELETE’ at the top of the lower right frame.

iii) Select the Nutrient name which has to delete from list of factors (Fig. 4.12).

iv) Click on ‘Delete’ button.
5. Knowledge Retrieval

5.1 How to get the detail information about varieties?
i) Click on ‘Knowledge Retrieval’ option then click on ‘Varieties’.
ii) Select appropriate Crop and Location and Click on ‘Next’ button.
iii) Click on Variety name for getting the details information of that variety (Fig. 5.1).
iv) Click on for details of Cost Benefit Analysis details.

5.2 How to get the Cost Benefit Analysis of Varieties?
i) Click on ‘Knowledge Retrieval’ option then click on ‘Cost Benefit Comparison of Varieties.’.
ii) Select appropriate Crop, Variety name and Location than Click on ‘Next’ button (Fig. 5.2).

iii) you will get the Cost Benefit Analysis details of selected variety.

5.3 How to get the Cost Benefit Comparison of Varieties?

i) Click on ‘Knowledge Retrieval’ option then click on ‘Cost Benefit Analysis’.

ii) Select appropriate Crop, Variety name and Location than Click on ‘Submit’ button.
iii) Click on ‘View Report’ link according to crop for getting the report (Fig. 5.3).

![Fig. 5.3 Cost Benefit Comparison of Varieties](image)

**5.4 How to get the Cost varieties Comparison Report?**

i) Click on ‘Knowledge Retrieval’ option then click on ‘Cost Variety Comparison Report’

ii) Select the location from list and click on ‘Submit’ button.

iii) Make your selection either crop or variety.

iv) Select crop name and variety name (Fig. 5.4).

v) Click on ‘Next’ button.

**5.5 How to get the Plant protection details about insect?**

i) Click on ‘Knowledge Retrieval’ option then click on ‘Plant Protection’.

ii) Select the crop

iii) Click on ‘Next’ button.

iv) Select ‘Insect’ radio button (Fig. 5.5).

v) Select any of the search criteria.

vi) Select Disease Name.

vii) Click on ‘Next’ button.
5.6 How to get the Plant protection details about diseases?

i) Click on ‘Knowledge Retrieval’ option then click on ‘Plant Protection’. (Fig. 5.6).

ii) Select the crop

iii) Click on ‘Next’ button.

iv) Select ‘Insect’ radio button.

v) Select any of the search criteria.

vi) Select Disease Name.

vii) Click on ‘Next’ button.
5.7 How to get the Plant protection details about nematodes?
   i) Click on ‘Knowledge Retrieval’ option then click on ‘Plant Protection’.
   ii) Select the crop
   iii) Click on ‘Next’ button.
   iv) Select ‘Nematodes’ radio button (Fig. 5.7).
   v) Select any of the search criteria.
   vi) Select Disease Name.
   vii) Click on ‘Next’ button.

5.8 How to get the Plant protection details about weeds?
   i) Click on ‘Knowledge Retrieval’ option then click on ‘Plant Protection’.
   ii) Select the crop
   iii) Click on ‘Next’ button.
   iv) Select ‘Weeds’ radio button (Fig. 5.8).
   v) Select any of the search criteria.
   vi) Select Disease Name.
   vii) Click on ‘Next’ button.
5.9 How to get the general report about insects?
i) Click on ‘Knowledge Retrieval’ option then click on ‘Plant General Report’.
ii) Select the crop
iii) Click on ‘Next’ button.
iv) Select ‘Insect’ radio button.
v) Select any of the search criteria.
vi) Select Insect Name either (Fig. 5.9).
vii) Click on ‘Next’ button

5.10 How to get the general report about diseases?
i) Click on ‘Knowledge Retrieval’ option then click on ‘General Report’.
ii) Select the crop
iii) Click on ‘Next’ button.
iv) Select ‘Disease’ radio button.
v) Select any of the search criteria.
vi) Select Disease Name either (Fig. 5.10).
vii) Click on ‘Next’ button
Fig. 5.8 Knowledge Retrieval – Plant Protection

Fig. 5.9 Insect Information
5.10 Diseases Information

5.11 How to get the general report about nematodes?
i) Click on ‘Knowledge Retrieval’ option then click on ‘General Report’.
ii) Select the crop
iii) Click on ‘Next’ button.
iv) Select ‘Nematode’ radio button.
v) Select any of the search criteria.
vi) Select Nematode Name (Fig. 5.11).
vii) Click on ‘Next’ button.

5.12 How to get the general report about weeds?
i) Click on ‘Knowledge Retrieval’ option then click on ‘General Report’.
ii) Select the crop
iii) Click on ‘Next’ button.
iv) Select ‘Weed’ radio button.
v) Select any of the search criteria.
vi) Select Weed Name (Fig. 5.12).
vii) Click on ‘Next’ button.

Fig. 5.12 Weed Information

5.13 How to get the general report about physiological disorder?

i) Click on ‘Knowledge Retrieval’ option then click on ‘General Report’.
ii) Select the crop
iii) Click on ‘Next’ button.
iv) Select ‘Physiological Disorder’ radio button.
v) Select any of the search criteria.
vi) Select Disorder Name (Fig. 5.13).
vii) Click on ‘Next’ button.

5.14 How to get the general fertilizer report about herbicide?

i) Click on ‘Knowledge Retrieval’ option then click on ‘General Fertilizer Report’.
ii) Select ‘Herbicide’ radio button (Fig. 5.14).
iii) Click on ‘View Report’ button.
iv) Click on herbicide name link.
5.15 How to get the general report about insecticide?

i) Click on ‘Knowledge Retrieval’ option then click on ‘General Fertilizer Report’.

ii) Select ‘Insecticide’ radio button (Fig. 5.15).

iii) Click on ‘View Report’ button.

iv) Click on insecticide name link.
5.16 How to get the general report about nutrients?

i) Click on ‘Knowledge Retrieval’ option then click on ‘General Fertilizer Report’.

ii) Select ‘Nutrient’ radio button (Fig. 5.16).

iii) Click on ‘View Report’ button.

iv) Click on nutrient name link.

5.17 How to get the post harvest technology?
i) Click on ‘Knowledge Processing’ option then click on ‘Post Harvest Technology’.
ii) Select the name of Crop (Fig. 5.17).
iii) Select the Post Harvest technology.
   Click on the view Report (Fig. 5.18).

5.17 How to identify the problems?
iv) Click on ‘Knowledge Processing’ option then click on ‘Problem Identifier’ (Fig. 5.19).
v) Select the name of Crop.
vi) Click on ‘Next’ button.
vii) Select a problem area and click on ‘Next’ button.
viii) Select affected crop stage and click on ‘Next’ button (Fig. 5.19).
ix) Select correct answer of the given question and click on ‘Next’ button.

x) Keep on going with answers of asked questions with click on ‘Next’ button.

viii) At the end you will get the probable identification of problem (Fig. 5.20).

![Fig. 5.17  Knowledge Retrieval – Post Harvest Technology](image)
Fig. 5.18 Post Harvest Technology

Fig. 5.19 Knowledge Processing
6. Administration

6.1 How to manage self account? (Only for Administrator and Domain Expert)

i) Click on ‘Administration’ option then click on ‘My Account’.

ii) To change the existing password, enter the previous password and new password in the given text box and then click on ‘SUBMIT’ button (Fig. 6.1).

iii) Click on the ‘EDIT’ button to edit the existing information’s regarding account (Fig. 6.1).

iv) Make appropriate modifications and click on ‘Update’ button.
6.2 How to handle User management? (Only for Administrator)

i) Click on ‘Administration’ option then click on ‘User Management’.
ii) For user search there are 3 options available and these are ‘ExSysEx ID’ ‘Name’ and ‘Mail ID’. Select the appropriate choice and then click on search button (Fig. 6.2).
iii) To view all users click on ‘Click Here’ in front of ‘To view all users’ (Fig. 6.2).

![Fig. 6.2 User Management](image)

6.3 How to create new users?

i) New user can be created by click on ‘Sign Up’ link on the main page.
ii) Then fill the username, password, e-mail ID, name and address in the appropriate text boxes.
iii) Click on ‘Submit’ button.
iv) A new user can be created by the Administrator on click of ‘Create new Account’ link in the User Management section of Administrator option (Fig. 6.2).

6.4 How to validate the submitted information by Domain experts through Administrator?

i) Click on the ‘Valid Information’ section of Administrator option.
ii) Select the Area of interest.
iii) Click on ‘Validate’ link to validate or on delete to delete or on ‘Modify’ to modify the existence relevant information’s.
6.5 How to select location of interest?

i)  Click on the ‘Select Location’ option.
ii) Select the name of State from the State list (Fig. 6.6).
iii) Select the name of the district from district list (Fig. 6.6).
iv) Click on ‘Submit’ button.
Fig. 6.4 Registration
6.6 How to know the information about the team of Expert System of Maize Crop?

i) Click on the ‘About Us’ link exists on the top of the page.

ii) It will display all the major persons involved in the whole system development (Fig. 6.7).
6.7 How to get the design techniques of Expert System of Maize Crop?

i) Click on the ‘Design Techniques’ link from top of the page.
ii) The diagrammatic view of design technique of Expert System of Maize Crop is shown (Fig. 6.8).
7. Expert Management

7.1. How to add new decision tree for solving the problem?
   i) Select the ‘Expert Management’ from the left blue frame.
   ii) Click on ‘ADD NEW’ button (Fig. 7.1).
   iii) Enter the tree name and description (Fig. 7.2).
   iv) Successful creation of tree message confirms the new tree creation.

7.2 How to add new Nodes in Decision Tree?

   i) Select the ‘Expert Management’ from the left green frame.
   ii) Click on the displayed tree name in which you want to add the nodes (Fig. 7.1).
   iii) Click on ‘Add New Node’ link.
   iv) Enter the desired information on the displayed form (Fig. 7.3).
   v) Click on insert button.
   vi) Similarly add all the nodes of the decision tree.
Fig. 7.1 Tree Management

Fig. 7.2 Entering New Tree Name
7.3 How to update/delete the Nodes in Decision Tree?

i) Select the ‘Expert Management’ from the left blue frame.
ii) Click on the displayed tree name in which you want to add the nodes (Fig. 7.1).
iii) Click on the modify/delete link displayed in the last column against the node to be updated/deleted.
iv) Update the desired information on the displayed form (Fig. 7.4).
v) Click on update button.
7.4 How to link the nodes of the decision tree to solve the problem?

i) Select the ‘Expert Management’ from the left blue frame.

ii) Click on the displayed tree name in which you want to link the nodes (Fig. 7.1).

iii) Click on the ‘Tree Management’ Link.

iv) Select the ‘Parent Node’ to link to the children node (Fig. 7.5).

v) Select the ‘Next Node Name’ to link to the parent node (Fig. 7.5).

vi) Select the type of associations with the children i.e. multiple branch type or yes-no type (Fig. 7.5).

vii) Click on ‘Submit’ button. According to selection of the type of association form elements will be displayed above the ‘Submit’ button.

viii) Select the name of the children nodes and click on show selection.

ix) Confirm the selection by pressing Next button.

x) You can also update the children at this time before the association is built.
8. Farmer Questions and Feedback

8.1 How to Ask a Question?
This module is made for farmers who can ask queries from the expert or provide feedback corresponding to various problems encountered by them.

i. Click on Feedback/Ask Question present in Queries & Solutions.
ii. Select the State from the drop-down menu list (Fig. 8.1).
iii. Select the District corresponding to the state.
iv. Select the Problem Area for which question or feedback is to be provided.
v. Enter the Name of Farmer who is providing the feedback or asking the question.
vi. Enter the Email-Id of Farmer.
vii. Enter the Phone Number of Farmer.
viii. Enter the question or the feedback related to a particular Problem Area.
ix. Click on Insert button.
8.2 How to View a Response?
This module is made for Experts or Farmers who can view the response of the queries asked without login.

i. Select Expert Response from the left green frame.

ii. Select any one or combination of parameters to view the farmer’s feedback or queries.

iii. Select any State from the drop down menu list (Fig. 8.2).

iv. Select any District corresponding to the State selected.

v. Select Problem Area for which feedback or query is to be viewed.

vi. In case of Query, select the Reply Status, i.e. you want to view the replied or non-replied queries.

vii. Also, Select the Range of Date for which you want to view the result.

viii. Click on Search button to obtain the appropriate data.
Fig. 8.2 Searching Farmer’s Question/Feedback

8.3 How to provide the response?
This module is made for Experts who can provide the response of the queries asked by the Farmers only after the login. Experts are allowed to view the queries only in the particular domain they are expertise in.

i. Login using Login-Id and Password.
ii. Select Farmer Response from the left green frame.
iii. Select any one or combination of parameters to view the farmer’s feedback or queries (Fig. 8.3).
iv. Select any State from the drop down menu list.
v. Select any District corresponding to the State selected.
vi. Select Problem Area for which feedback or query is to be viewed.
vii. In case of Query, select the Reply Status, i.e. you want to view the replied or non-replied queries.
viii. Also, Select the Range of Date for which you want to view the result.
ix. Click on Search button to obtain the appropriate data (Fig. 8.4).
9. Problem Identification (Ontology Based)

9.1 How to identify the problem?
i. Click on Problem Identification on left green menu.

ii. Select the module from amongst Disease Diagnosis, Variety Selection and Pest Identification (Fig. 9.1).

iii. Click ‘Proceed Further’.

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Fig. 9.1 Problem Identification

9.1.1 Disease Diagnosis

Answer the Expert Question in order to diagnose the disease by which your crop is infected by.

i) Select the Crop and Click Proceed Further (Fig. 9.2).

ii) Then Select the Stage of Crop (Fig. 9.3).

iii) Select the Part Affected (Fig. 9.4).

iv) Select the Initial Symptom (Fig. 9.5).

v) Select the Final Symptom (Fig. 9.6).

vi) At every point you will see your Answer History that contains the Expert Question along with your response.

vii) At any point, whenever you make inappropriate selection, you may click ‘Restart’ and again start from the beginning.

viii) Finally Expert Solution and Management Practices will be given based on your response provided for different questions (Fig. 9.7).
**Fig. 9.2 Expert Question : Selecting Crop**

**Fig. 9.3 Expert Question : Selecting the Stage of Crop**
Fig. 9.4 Expert Question: Selecting the Part Affected

Fig. 9.5 Expert Question – Selecting Initial Symptom
Fig. 9.6 Expert Question: Selecting the Final Symptom

Fig. 9.7 Expert’s Solution
9.1.2 Variety Selection
Answer the Expert Questions in order to select Crop Variety.
i) Select the Type of Crop and Click Proceed Further (Fig. 9.8).
ii) Select the Area of Adoption (Fig. 9.9).
iii) Select the maturity level of the Crop.
iv) Select the Grain Type (Fig. 9.10).
v) Select the Grain Color Type (Fig. 9.11).
vi) At every point you will see your Answer History that contains the Expert Question along with your response.
vii) At any point, whenever you make inappropriate selection, you may click ‘Restart’ and again start from the beginning.
viii) Finally Expert Solution for the crop variety will be given based on your response provided for different questions (Fig. 9.12).

Fig. 9.8 Expert Question : Selecting Crop
Fig. 9.9 Expert Question: Selecting Area of Adoption

Fig. 9.10 Expert Question: Selecting Grain Type
9.1.3 Pest Identification
Answer the Expert Question in order to determine the insects/pests that affect your crop.

i) Select the Crop and Click Proceed Further (Fig. 9.13).

ii) Then Select the Stage of Crop from among Germination going through Flowering till Post Harvest (Fig. 9.14).

iii) Select the Part Affected (Fig. 9.15).

iv) Select the Initial nature of Damage (Fig. 9.16).

v) Select the Final nature of Damage (Fig. 9.17).

vi) At every point you will see your Answer History that contains the Expert Question along with your response.

vii) At any point, whenever you make inappropriate selection, you may click ‘Restart’ and again start from the beginning.

viii) Finally Expert Solution will be given based on your response provided for different questions (Fig. 9.18).

Fig. 9.13 Expert Question: selecting the crop
Fig. 9.14 Expert Question: Selecting Stage of Crop

Expert Question: select the stage of the crop.

- Germination
- Seedling
- Early whorl
- Mid whorl
- Late whorl
- Flowering

Proceed further

Fig. 9.14 Expert Question: Selecting Part Affected

Expert Question: select the part affected.

- Stems
- Leaves
- Root

Proceed further

Restart
Fig. 9.15 Expert Question: Selecting Part Affected

Fig. 9.16 Expert Question: Selecting Initial Nature of Damage
Fig. 9.17 Expert Question: Selecting Final Nature of Damage

Fig. 9.18 Expert’s Solution